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Nuclear Law and International Courts: Accountability After the Unthinkable

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Introduction

This book begins from a place that international law has long sought to avoid: the aftermath of a nuclear detonation. It asks how law can make accountability real after the unthinkable, when human suffering, environmental devastation, and geopolitical shock converge. Rather than rehearsing strategic debates or technical specifications, the chapters that follow trace concrete legal pathways—across courts, tribunals, and United Nations mechanisms—through which victims, states, and international bodies may seek justice and remediation. Our aim is both descriptive and practical: to map the legal terrain as it exists and to identify the tools most likely to function when urgency, uncertainty, and political pressure are at their highest.

The scope is necessarily broad. Nuclear use engages the law on the resort to force (*jus ad bellum*) and the law governing conduct in conflict (*jus in bello*), as well as international criminal law, human rights law, environmental law, and the law of state responsibility. It raises questions of attribution and complicity, the availability of defenses such as necessity, and the contours of reparations for harms that are immediate, long-term, and often transboundary. In examining these issues, the book treats accountability as an ecosystem: international and domestic forums interact with investigative bodies, scientific institutions, and humanitarian responders, each contributing different capacities and constraints.

The legal sources are diverse. Treaty regimes—including the United Nations Charter, the Geneva Conventions and their Additional Protocols, nuclear-specific agreements such as the Non-Proliferation Treaty, the Comprehensive Nuclear-Test-Ban Treaty, and the Treaty on the Prohibition of Nuclear Weapons—intersect with customary international law and general principles. The International Law Commission's Articles on State Responsibility provide a framework for attribution and remedy, while international criminal law defines individual liability for war crimes, crimes against humanity, and, in some circumstances, genocide. Throughout, we pay close attention to institutional roles: the International Court of Justice and International Criminal Court, regional human rights courts, domestic judiciaries exercising universal jurisdiction, and UN organs that can investigate, condemn, sanction, or facilitate settlement.

Accountability must be measured by what it delivers for people and places harmed. Survivors of blast and thermal effects, those exposed to ionizing radiation, communities displaced or stigmatized, indigenous peoples and others historically situated near test sites, and future generations facing environmental and genetic risks—all have legal interests that can be framed and pursued. The book foregrounds victims' rights to truth, participation, and effective remedy; it examines gendered harms, intergenerational impacts, and cultural loss alongside bodily injury and

property damage. Because causation and proof are exceptionally challenging in radiation cases, we devote particular attention to evidence, dose reconstruction, epidemiology, and standards of proof appropriate to mass harm and complex scientific uncertainty.

Institutions matter, but so do politics and timing. In the wake of nuclear use, the Security Council may act—or deadlock. States may contest jurisdiction or invoke immunities. Scientific data might be scarce, contested, or controlled. We therefore analyze not only formal routes to judgments and awards but also the practical levers of accountability: targeted sanctions, commissions of inquiry, compensation funds, and negotiated claims processes that can mobilize resources more quickly than litigation alone. Where gaps persist—whether in environmental remediation, long-term health monitoring, or cross-border claims—we consider how creative use of existing law and institutions can narrow them.

The structure of the book mirrors this layered reality. Early chapters establish foundational rules and responsibilities; middle chapters address remedies, victims' rights, and the most relevant courts and tribunals; later chapters turn to evidentiary standards, environmental restoration, domestic avenues, and settlement mechanisms; and the final chapter looks forward, considering how norms evolve when deterrence narratives collide with humanitarian imperatives. The analysis is written for practitioners, policymakers, advocates, and scholars. It does not offer legal advice for any particular case, but it aims to be usable—clarifying options, trade-offs, and likely procedural paths when time and clarity are scarce.

Ultimately, accountability after a nuclear detonation is not only about assigning blame; it is about reaffirming law's capacity to respond to extraordinary harm with principled, workable remedies. By assembling the doctrines, institutions, and practices most relevant to that task, this book seeks to make accountability imaginable—and therefore more achievable—should the unthinkable occur.

CHAPTER ONE: The Unthinkable in Law: Scenarios and Definitions

Nuclear law begins with a paradox: the law is built to govern what it hopes never to see. The subject is not abstract. It asks how legal systems—shaped by state sovereignty, evidentiary rules, and diplomatic caution—respond to detonations that generate blast, fire, and ionizing radiation at scales that overwhelm ordinary categories of harm. To approach this task, we need clear definitions and plausible scenarios. Without them, legal analysis drifts into metaphor, and accountability becomes a slogan rather than a process. This chapter sets the stage by mapping the kinds of nuclear events that law might confront, the actors involved, and the basic legal questions that arise immediately after detonation.

A working definition helps. For purposes of legal analysis, “nuclear use” means the intentional or accidental detonation of a nuclear device, whether tested or deployed, by a state or non-state actor, resulting in blast, thermal, and radiological effects. The detonation may be atmospheric, underground, underwater, or high-altitude, each producing distinct forensic, environmental, and legal consequences. Nuclear events also include radiological dispersal devices (“dirty bombs”) that combine conventional explosives with radioactive material, which engage overlapping regimes under criminal law and the legal frameworks governing nuclear safety and security.

Legal analysis must also distinguish “nuclear weapon detonation” from other events, such as nuclear accidents in civilian power facilities, including the Chernobyl and Fukushima disasters. While both produce ionizing radiation and long-term public health consequences, the former is governed primarily by the law of armed conflict and state responsibility, whereas the latter is anchored in nuclear safety law, liability conventions, and human rights law. That said, the legal tools overlap: notification duties, assistance obligations, compensation mechanisms, and human rights protections all apply, which makes the boundary between these regimes important but porous.

The “unthinkable” has a history, and law has watched it closely. Hiroshima and Nagasaki produced unprecedented civilian casualties and a legal legacy rooted in the laws of war, proportionality, and the protection of civilians. The Cold War codified deterrence, while the Partial Test Ban Treaty and later the Comprehensive Nuclear-Test-Ban Treaty sought to constrain testing and its environmental harms. More recently, the Treaty on the Prohibition of Nuclear Weapons reframed nuclear weapons as a humanitarian and human rights issue. The history matters because it shows how legal norms evolve from experience, testimony, and technical understanding, rather

than from abstract theory alone.

Consider a first scenario: a state uses a nuclear weapon in armed conflict against another state's military forces. This immediately raises *jus ad bellum* questions—whether the resort to force was lawful—and *jus in bello* questions—whether the use of a nuclear weapon complied with distinction, proportionality, and precaution. It also triggers state responsibility for internationally wrongful acts, potential individual criminal liability, and the possibility of reparations for victims and affected states. In practice, the detonation creates immediate facts on the ground that complicate evidence collection, humanitarian response, and diplomatic efforts to de-escalate.

A second scenario involves a nuclear detonation against a civilian population center. This engages the core protections of international humanitarian law, including the prohibition on attacks directed at civilians and the requirement to avoid excessive incidental harm. The scale of civilian casualties and infrastructure destruction likely implicates war crimes and could, depending on intent and context, rise to the level of crimes against humanity. The legal system must then balance emergency response with the need to secure evidence, manage cross-border radiation risks, and coordinate humanitarian assistance.

A third scenario is a high-altitude electromagnetic pulse detonation, which may target military command and control systems but also cripples civilian power grids, communications, and medical infrastructure. While the blast and thermal effects might be limited, the cascading systemic failures can produce widespread suffering. Law here confronts questions of foreseeability, proportionality, and the duty to minimize harm to civilians. The transboundary nature of electromagnetic effects, combined with the difficulty of attributing causation, tests legal doctrines designed for more direct injuries.

Fourth, consider a radiological dispersal device ("dirty bomb") used by a non-state actor in a metropolitan area. This event does not involve a nuclear chain reaction but spreads radioactive contamination, causing panic, displacement, and long-term environmental harm. It engages international criminal law, terrorism-related treaties, domestic criminal law, and nuclear security obligations. The legal response includes investigation and prosecution, victim compensation, and regulatory actions to secure and remediate contaminated sites.

Fifth, an accidental detonation or near-miss during storage, transport, or maintenance of nuclear weapons. Accidents raise issues of state responsibility, due diligence, and the obligation to prevent harm. While the law of armed conflict may be less central, human rights law, environmental law, and nuclear safety frameworks come into play. The state of custody bears obligations to secure, notify, and assist, and may face liability for negligence or failure to meet international standards.

Sixth, nuclear testing—historically atmospheric, underground, or underwater—produces transboundary fallout, environmental damage, and long-term health effects. Testing remains governed by treaty regimes, including the Partial Test Ban Treaty and the Comprehensive Nuclear-Test-Ban Treaty, and raises questions of state responsibility and reparations. Indigenous communities near test sites have advanced claims grounded in human rights and cultural harm, illustrating the intersection of environmental justice and international law.

Seventh, a nuclear attack on critical infrastructure, such as dams, ports, or energy facilities, causing secondary effects like flooding or radiation release. This scenario implicates the principles of distinction and proportionality and the prohibition on causing superfluous injury or unnecessary suffering. It also raises questions about dual-use targets and whether the anticipated military advantage justifies the collateral harm. Legal analysis must account for cascading environmental and humanitarian consequences that extend across borders.

Eighth, an attack on or interference with nuclear power plants, resulting in radiological release. Such acts may constitute war crimes if they cause severe civilian harm and lack a clear military necessity. They also engage nuclear safety law, the duty to notify and cooperate, and the obligations to provide assistance. The legal framework must address both the intentional attack and the ensuing public health and environmental emergency.

In all these scenarios, several threshold legal questions recur. First, the attribution of conduct: is the detonation attributable to a state, a non-state actor, or both? Second, classification of the act: is it an act of war, a crime, or a breach of safety obligations? Third, the legal consequences: what duties to victims and affected states arise, and what remedies are available? Fourth, the institutional response: which courts, tribunals, or UN bodies are competent to address claims or investigate facts?

It is also necessary to define the actors. States remain central, but non-state actors and private entities can be involved in procurement, sabotage, or misuse. Command structures matter: leadership and operational personnel may face individual criminal responsibility under doctrines of command responsibility and superior orders. Private contractors and corporate entities involved in nuclear security or logistics may also be implicated in state responsibility or domestic liability regimes. The legal analysis must trace lines of responsibility across these layers.

Radiation introduces distinctive legal challenges. Unlike blast injuries, radiation exposure can be invisible, latent, and diffuse. Causation requires scientific methods like dose reconstruction and epidemiology, and legal standards of proof must accommodate mass harm and uncertainty. International humanitarian law's requirement to take precautions may be tested by the difficulty of predicting long-

term effects. Human rights law, meanwhile, recognizes the right to health and information, which becomes crucial in managing risk perception and consent.

Time matters in legal responses. Immediate steps include notifications to the UN Security Council, assistance to affected populations, and preservation of evidence. In the first hours, information is incomplete, and decision-makers face political and military pressures. Law cannot stop the immediate harm, but it can guide the response to limit suffering, secure facts, and lay groundwork for later accountability. Speed and clarity in legal frameworks are not luxuries; they are necessities.

The geography of harm is rarely contained. Fallout does not respect borders, and high-altitude detonations can disrupt communications and power across regions. Legal doctrines on transboundary injury, cooperation, and notification will be central. The “no harm” principle under customary law, combined with treaty-based obligations, provides a baseline for state duties. But enforcement depends on political will and institutional capacity, which is why accountability requires both legal tools and practical coordination.

Deterrence narratives often overshadow legal accountability. States rely on nuclear deterrence for security, which can create tensions with humanitarian and human rights perspectives. This book does not take a position on deterrence policy; it maps the law as it is and examines how accountability can function in its shadow. Whether one views nuclear weapons as legitimate or illegitimate, the legal system still must address harm, causation, and remedy when detonation occurs.

There is also the issue of secrecy and control of information. Many aspects of nuclear weapons programs are classified, and states may resist disclosure on security grounds. Legal proceedings must navigate secrecy claims while protecting victims’ rights to truth and evidence. International investigative mechanisms and scientific bodies can play a key role in verifying facts and building credible records, especially where access to sites is limited.

Legal frameworks are layered. Treaty obligations—such as the UN Charter, the Geneva Conventions, the NPT, the CTBT, and the TPNW—intersect with customary law and general principles. The International Law Commission’s Articles on State Responsibility provide structure for attribution and remedies, while international criminal law defines individual liability. Domestic law complements these regimes, from criminal prosecution to civil claims and compensation funds. Accountability depends on using the right tool in the right forum at the right time.

Victims’ rights sit at the center of accountability. Survivors and affected communities have interests in recognition, participation in proceedings, access to information, and effective remedy. Gendered harms, intergenerational impacts, and cultural loss must be addressed alongside physical injuries and property damage. Legal processes that

ignore these dimensions risk irrelevance. Chapter 10 will delve further into victims' rights and participation, but the foundational point is that accountability must serve the people it affects.

Environmental harm is another core dimension. Radiation contamination affects soil, water, air, and biodiversity, with long-term consequences for ecosystems and communities. International environmental law, human rights law, and nuclear safety frameworks all impose duties to prevent, mitigate, and remediate harm. The right to a healthy environment is increasingly recognized, and its intersection with nuclear events is a critical frontier for legal innovation.

Scientific uncertainty and evidentiary standards are recurring challenges. In radiation litigation, plaintiffs must prove exposure, injury, and causation amid complex toxicology and contested data. Courts and tribunals must balance the rights of victims with the need for credible evidence, sometimes relying on presumptions or burden-shifting where appropriate. Technical assistance, expert panels, and international scientific cooperation are essential to bridge knowledge gaps.

Institutional capacity shapes outcomes. The International Court of Justice can address state responsibility and interpret legal obligations, but its jurisdiction depends on consent. The International Criminal Court can prosecute individuals, but its reach is limited by state cooperation and the Rome Statute's scope. Regional human rights courts may offer remedies for violations of human rights, while domestic courts can exercise universal jurisdiction or provide compensation funds. UN organs can investigate, condemn, and facilitate settlements, but political dynamics may constrain action.

Practical accountability is not limited to courts. Commissions of inquiry, fact-finding missions, and scientific assessments can establish records that support later claims. Sanctions and diplomatic pressure may incentivize cooperation. Compensation funds and claims commissions, while imperfect, can deliver faster relief than lengthy litigation. Accountability thus requires an ecosystem approach, where legal doctrines and institutional mechanisms work in concert.

Definitions matter for sequencing legal responses. Classifying an event as a nuclear weapon detonation rather than a radiological accident will determine which legal regimes are primary. Likewise, determining whether the act occurred during armed conflict or in peacetime affects the applicability of humanitarian law. Precise classification avoids misapplication and helps align victims' expectations with realistic legal pathways.

We also need to define "accountability" in a way that is actionable. Accountability is not solely about punishment or blame. It includes truth-seeking, participation, reparations, guarantees of non-repetition, and institutional reforms. These elements

are recognized in transitional justice and human rights practice, and they apply with particular force in the context of nuclear harm, where injuries are complex and long-lasting.

The legal landscape is evolving. The TPNW's emphasis on humanitarian consequences and the growing recognition of environmental and intergenerational harms push the law toward a broader view of injury and responsibility. Meanwhile, advances in forensics, radiation monitoring, and data analytics are improving the capacity to investigate and prove causation. These developments do not eliminate political obstacles, but they expand the toolbox for accountability.

Context shapes legal strategy. In the immediate aftermath, the priority is humanitarian assistance and stabilization. Legal steps must be designed to support, not hinder, these efforts. As facts become clearer, pathways for claims and investigations can be activated. Over the long term, remediation, compensation, and institutional reforms come to the fore. The law must accommodate both urgency and persistence.

It is also important to recognize the limits of law. Law cannot undo physical harm, and it cannot neutralize geopolitical realities. But law can structure responses, protect rights, and allocate responsibility in ways that give affected people and states agency. Accountability after the unthinkable is not a single event but a process, and the legal framework is the map for that process.

This book's approach is pragmatic. Each chapter examines how legal principles operate in practice, focusing on forums, procedures, evidence, and remedies. Chapter 1 introduces scenarios and definitions to anchor the analysis. Later chapters will explore sources of law, state responsibility, reparations, and the specific roles of courts and UN mechanisms. The goal is to equip readers with a clear understanding of options, trade-offs, and pathways when time and clarity are scarce.

The tone here is factual rather than aspirational. The law is a human system, built from treaties, decisions, and customary practice. It is imperfect and often slow. Yet it provides tools that can be used, adapted, and improved. Accountability after nuclear detonation requires knowing what those tools are, when they apply, and how to make them work under extraordinary pressure. That is the task this book sets out to fulfill.

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