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# The Protection of Persons in Nuclear Disasters: The Case of Environmentally Displaced and Trapped Persons in Fukushima Nuclear Accident

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► **To cite this version:**

Reiko Hasegawa. The Protection of Persons in Nuclear Disasters: The Case of Environmentally Displaced and Trapped Persons in Fukushima Nuclear Accident. Law. Lyon3, 2023. English. NNT : 2023LYO30022 . tel-04316999

**HAL Id: tel-04316999**

**<https://hal.science/tel-04316999v1>**

Submitted on 30 Nov 2023

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N°d'ordre NNT : 2023LYO30022

**THÈSE DE DOCTORAT DE L'UNIVERSITÉ  
JEAN MOULIN LYON 3**

**Membre de l'Université de Lyon**

**École Doctorale N° 492**

**Discipline de doctorat** : Doctorat en Droit

**Mention** : Droit de l'environnement

Soutenue publiquement le 03/07/2023, par

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**The Protection of Persons in Nuclear Disasters:**

**The Case of Environmentally Displaced and Trapped  
Persons in Fukushima Nuclear Accident**

*La protection des personnes à la suite de catastrophes  
nucléaires : le cas des déplacés environnementaux et des  
personnes piégées à Fukushima*

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## Abstract/Résumé

The protection of persons in nuclear disasters is ensured by the nuclear regulation authorities of each country in conformity with international nuclear safety and radiation protection norms established by the International Commission on Radiological Protection (ICRP) and the International Atomic Energy Agency (IAEA). Nuclear disaster management, however, is quite distinct from regular disaster management implemented in armed conflicts, natural disasters and other human-made disasters.

Under the nuclear framework, the protection of persons is a relative concept, conditioned upon meeting certain criteria set up by nuclear authorities and handled en masse, largely ignoring the protection of individual rights. Using the 2011 Fukushima nuclear accident as a case study, this doctoral research analyses nuclear disaster protection from the perspective of international normative frameworks that usually apply in times of disasters: namely, the normative framework for internally displaced persons (IDPs), generally called the forced migration regime, which is founded on the principles of international humanitarian and human rights laws. The Fukushima case study reveals that a normative conflict indeed exists between the nuclear regime and the human rights/forced migration regime in protecting persons in the event of nuclear disasters.

Calling into question the adequacy and legitimacy of the nuclear regulation framework in providing relief and protection to nuclear disaster victims, this doctoral study argues for an alternative approach that places human rights protection at the heart of its response and conforms to environmental law principles. By identifying nuclear disaster victims as environmentally displaced and trapped persons, the thesis proposes a new set of protection norms, including a new concept – “the right to displacement” – which would address the specific plight of nuclear disaster victims, especially those in situations of “voluntary” evacuation and forced immobility.

Ultimately, the research aims to induce a paradigm shift, in other words, the “denuclearisation” of the off-site nuclear disaster management, detaching the protection aspect of disaster response from the nuclear regulation framework and aligning or incorporating it into the forced migration and human rights frameworks, which are today established as the international norm in managing disasters.

**Keywords:**

Nuclear Disaster – Fukushima – Internally Displaced Persons (IDPs) – Environmental Displacement – Forced Immobility — “Denuclearisation” of Nuclear Disaster Protection – Human Rights-Based Approach (HRBA) – the Right to “Displacement” – the Right to a Safe and Healthy Environment – *hibakusha* – Precautionary Principle

La protection des personnes en cas de catastrophe nucléaire est assurée par les autorités nucléaires de chaque pays, conformément aux normes internationales de sûreté nucléaire et de radioprotection établies par la Commission internationale de protection radiologique (CIPR) et l’Agence internationale d’énergie atomique (AIEA). La gestion des catastrophes nucléaires est toutefois très différente de la gestion habituelle des désastres comme les guerres, les catastrophes naturelles et les autres catastrophes d’origine humaine.

Dans le cadre nucléaire, la protection des personnes est un concept relatif, subordonnée à certains critères définis par les autorités nucléaires sur la base des normes internationales, et appliqués à l’ensemble de la population touchée, ignorant largement la protection des droits individuels. En prenant l’accident nucléaire de Fukushima en 2011 comme étude de cas, cette recherche doctorale analyse la gestion des catastrophes nucléaires à l’aune des cadres normatifs internationaux qui s’appliquent habituellement en cas de catastrophes : à savoir, le cadre normatif relatif aux personnes déplacées à l’intérieur de leur propre pays (PDI), appelé plus généralement le régime des migrations forcées, basé sur les principes des droits humains et du droit humanitaire. Il en ressort qu’il existe effectivement un conflit normatif entre le régime nucléaire et le régime des droits humains/des migrations forcées en ce qui concerne la protection des personnes en cas de catastrophes nucléaires. En questionnant l’adéquation et la licéité du cadre réglementaire nucléaire en matière de secours et de protection des personnes touchées par les catastrophes nucléaires, cette thèse plaide en faveur d’une approche alternative qui place la protection des droits humains au cœur de sa réponse et qui se conforme aux principes du droit de l’environnement. En identifiant les victimes de catastrophes nucléaires comme des déplacés environnementaux et des personnes piégées dans l’environnement, la thèse propose un nouvel ensemble de normes de protection, y compris un nouveau concept, le « droit au déplacement », qui répondrait à leur situation spécifique, en particulier lorsqu’elles se trouvent dans des situations d’évacuation « volontaire » et d’immobilité forcée.

Plus fondamentalement, cette recherche vise à induire un changement de paradigme, visant à la « dénucléarisation » de la protection des populations dans la gestion des catastrophes nucléaires, en séparant les questions de protection du cadre de la réglementation nucléaire et en les alignant

ou en les incorporant dans les cadres de la migration forcée et des droits humains, qui sont d'ailleurs aujourd'hui établis comme la norme en matière de gestion des catastrophes.

**Mots clés :**

Catastrophes nucléaires – Fukushima – Personnes déplacées à l'intérieur de leur propre pays (PDI) – déplacements environnementaux – immobilité forcée — “dénucléarisation” de la protection – approche fondée sur les droits de l’homme – le droit au “déplacement” – le droit à un environnement sûr et sain – *hibakusha* – principe de précaution



# Acknowledgement

First, I would like to express my deepest gratitude to Professor Philippe Billet for having accepted to become my thesis supervisor despite my different academic and professional background. I cannot thank enough for his trust, guidance, support, and feedback which was always to the point, enlightening and thought-provoking.

I also owe a debt of gratitude to Mr Romain Garcier, the co-supervisor of this thesis, who has always provided me with extremely insightful comments and advice, continuous encouragement and kind support, which greatly helped me at every stage of this research project. I am also extremely grateful to Professor Masashi Shirabe, the scientific advisor of the thesis, for his invaluable comments and continuous support from Japan.

I would like to also extend my sincere gratitude to Professor Gaelle Marti, Professor Anne Millet-Devalle and Professor Laurent Fonbaustier who have accepted to become the members of the jury and examine this doctoral study, by which I am profoundly honoured.

Many thanks also to Professor Takayuki Onai, Ryutsu Keizai University (Japan) for his numerous help and to Mr Akira Nagasaki, attorney at law, for his expertise and guidance on the Japanese legal system.

Special thanks are extended to my colleagues in the *Institut de droit de l'environnement*, Tom, Rémy, Alexandra and others, who warmly welcomed me at the institute and supported me at difficult moments.

My heartfelt thanks to Christine Fassert and Rina Kojima for their support and help, with whom I shared unforgettable experience during the field research in Fukushima and elsewhere in Japan through the SHINRAI (IRSN-Sciences Po-Tokyo Tech) and DEVAST (IDDRI-Waseda-TokyoTech) projects. Special thanks to Christine for her feedback to my thesis, which was extremely helpful.

To Jean-Christophe, for his extraordinary patience and infallible support. Without him, I would not have made it until the end of this PhD journey.

To Elica, my sunshine who always brightens my day in dark times.





# List of Abbreviations

ACAATA	Allocation de cessation anticipée d'activité des travailleurs de l'amiante
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ADR	Alternative Dispute Resolution (MEXT/Japan)
AEA	Atomic Energy Authority (UK)
AEC	Atomic Energy Commission (US)
ALARA	As Low As Reasonably Achievable
ASN	Autorité de sûreté nucléaire (France)
BSS	Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards (IAEA)
BWR	Boiling Water Reactor
CAI	Centre d'accueil et d'information du public (France)
CAT	Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment
CCPR	Human Rights Committee
CED	International Convention for the Protection of All Persons from Enforced Disappearance
CEDAW	Convention on the Elimination of All Forms of Discrimination against Women
CESCR	Committee on Economic, Social and Cultural Rights
CFR	Charter of Fundamental Rights of the European Union
CIC	Cellule interministérielle de crise (France)
CJEU	Court of Justice of the European Union
CNS	Convention on Nuclear Safety
CODIRPA	Comité directeur pour la gestion post-accidentelle d'un accident nucléaire
CRC	Committee on the Rights of the Child
CRC	Convention on the Rights of the Child
CRIEPI	Central Research Institute of Electric Power Industry (Japan)
CRPD	Convention on the Rights of Persons with Disabilities
CSC	Convention on Supplementary Compensation for Nuclear Damage
DRR	Disaster Risk Reduction
EAEC	European Atomic Energy Community (or Euratom)
ECHR	Convention for the Protection of Human Rights and Fundamental Freedoms (known as European Convention on Human Rights)

ECOSOC	United Nations Economic and Social Council
ECs	European Communities
ECSC	European Coal and Steel Community
ECtHR	European Court of Human Rights
EDF	Electricité de France
EDPs	Environmentally Displaced Persons
EEC	European Economic Community
EPA	Environmental Protection Agency (US)
EPD	Extended Planning Distance (IAEA)
EPZ	Emergency Planning Zones (US, Japan)
ERC	Emergency Response Centre (Japan)
ETPs	Environmentally Trapped Persons
F1NPP	Fukushima Daiichi (No.1) Nuclear Power Plant
F2NPP	Fukushima Daini (No.2) Nuclear Power Plant
FAO	Food and Agriculture Organization
FEMA	Federal Emergency Management Agency (US)
FRC	Federal Radiation Council (US)
GPID	Guiding Principles on Internal Displacement
HRL	Human Rights Law
IAEA	International Atomic Energy Agency
IASC	Inter-Agency Standing Committee
ICAO	International Civil Aviation Organisation
ICCPR	International Covenant on Civil and Political Rights
ICERD	International Convention on the Elimination of All Forms of Racial Discrimination
ICESCR	International Covenant on Economic, Social, and Cultural Rights
ICJ	International Court of Justice
ICMW	International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families
ICPD	Ingestion and Commodities Planning Distance (IAEA)
ICRC	International Committee of the Red Cross
ICRP	International Commission on Radiological Protection
ICRU	International Commission on Radiation Units and Measurements
IDL	International Disaster Law
iDMC	Internal Displacement Monitoring Centre
IDNDR	International Decade for Natural Disaster Reduction
IDPs	Internally Displaced Persons

IFRC	International Federation of Red Cross and Red Crescent Societies
IHL	International Humanitarian Law
ILC	United Nations International Law Commission
ILO	United Nations International Labour Organization
IMO	International Maritime Organisation
INES	International Nuclear and Radiological Event Scale
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
IRSN	Institut de radioprotection et de sûreté nucléaire (France)
ITB	Iodine Thyroid Blocking
JAEA	Japan Atomic Energy Agency
JAEC	Japan Atomic Energy Commission
JAERI	Japan Atomic Energy Research Institute
JCER	Japan Centre for Economic Research
JFBA	Japan Federation of Bar Associations
KI	Potassium Iodide
LNT	Linear Non-Threshold
LSS	Life Span Study of Hiroshima and Nagasaki Bomb Survivors
METI	Ministry of Economy, Trade and Industry (Japan)
MEXT	Ministry of Education, Culture, Sports, Science and Technology (Japan)
MHLW	Ministry of Health, Labour and Welfare (Japan)
mSv	millisievert
MW	megawatts
NAIIC	National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission
NAS	National Academy of Sciences (US)
NDVs	Nuclear Disaster Victims
NEA	Nuclear Energy Agency (OECD)
NERHQ	Nuclear Emergency Response Headquarters (Japan)
NIED	Negligent Infliction of Emotional Distress (US)
NIRS	National Institute of Radiological Sciences (Japan)
NISA	Nuclear and Industrial Safety Agency (Japan)
NRA	Nuclear Regulation Authority (Japan)
NRC	Nuclear Regulatory Commission (US)
NRC	Nuclear Research Council (US National Academy of Sciences)
NSC	Nuclear Safety Commission (Japan)
OCHA	United Nations Office for the Coordination of Humanitarian Affairs

OECD	Organisation for Economic Co-operation and Development
OHCHR	Office of the United Nations High Commissioner for Human Rights
ORSEC	Organisation de la Réponse de Sécurité Civile (France)
PAG	Protective Action Guide (FEMA/US)
PAZ	Precautionary Action Zone (IAEA)
PBq	petabecquerel
PP	Precautionary Principle
PPI	Plan particulier d'intervention (France)
PPP	Polluter Pays Principle
RERF	Radiation Effects Research Foundation (Japan)
SAFLAN	Save Fukushima Children Lawyers' Network
SGDSN	Secrétariat général de la défense et de la sécurité nationale (France)
SOLAS	International Convention for the Safety of Life at Sea
SPEEDI	System for Prediction of Environmental Emergency Dose Information
SPs	Special Procedures (Human Rights Council)
SSRs	Soviet Socialist Republics
SSRs	Specific Safety Requirements (IAEA)
STA	Science and Technology Agency (Japan)
TEPCO	Tokyo Electric Power Company
TEU	Treaty on European Union
TFEU	Treaty on the Functioning of the European Union
UDHR	Universal Declaration of Human Rights
UK	United Kingdom of Great Britain and Northern Ireland
UNCHR	United Nations Commission on Human Rights
UNDP	United Nations Development Programme
UNDRR	United Nations Disaster Risk Reduction
UNFCCC	United Nations Framework Convention on Climate Change
UNGA	United Nations General Assembly
UNHCR	United Nations High Commissioner for Refugees
UNHRC	United Nations Human Rights Committee
UNISDR	United Nations International Strategy for Disaster Reduction
UNSCEAR	United Nations Scientific Committee on the Effects of Atomic Radiation
UPR	Universal Periodic Review
UPZ	Urgent Protective Action Planning Zone (IAEA)
US	United States of America
WHO	World Health Organization
WMO	World Meteorological Organization

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# Introduction

*(C) e qu'on appelle des "réacteurs nucléaires", ces bombes atomiques à retardement dont la date d'explosion n'a pas été fixée*  
Günther Anders<sup>1</sup>

*Chernobyl made us understand that a nuclear accident anywhere is an accident everywhere.*  
Hans Blix<sup>2</sup>

Nuclear accidents are relatively recent phenomena in history. The civil nuclear programme only began in the mid-1950s following the end of World War II. Prior to that, atomic energy had been solely exploited for military purposes since the discovery of nuclear fission in 1938. The first atomic bombs were developed by the United States and dropped in Hiroshima and Nagasaki during the US-Japan war in 1945, the first ever use of nuclear weapons against humans, which took 210,000 lives immediately and 600,000 more later due to radiation exposure.<sup>3</sup> The civil use of energy was launched by the Atoms for Peace speech, made by then US President Dwight D. Eisenhower at the United Nations General Assembly in 1953. The speech represented an early American attempt to curtail the global proliferation of nuclear weapons at the beginning of the Cold War with mounting tensions and a nuclear arms race between the United States and the Soviet Union and their respective allies. The strategy

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<sup>1</sup> The quote is from Günther Anders, *L'Obsolescence de l'homme: Tome II, Sur la destruction de la vie à l'époque de la troisième révolution industrielle* (Christophe David tr, éditions Fario 2011) 389. The original text in German was published in 1980 by Verlag C.H. Beck oHG (Munich). The translation of the quote in English (by R. Hasegawa): 'so-called "nuclear reactors", these atomic time bombs without a fixed detonation date'

<sup>2</sup> Former Director General of the IAEA (1981-1997). The quote is from his speech entitled 'Global Stability and a Knowledge Driven Energy Future' at Energy Foresight Symposium, held in Bergen (Norway) on 3-4 April 2006.

<sup>3</sup> Source: Nagasaki City Peace website <[http://nagasakipeace.jp/content/files/minimini/english/e\\_gaiyou.pdf](http://nagasakipeace.jp/content/files/minimini/english/e_gaiyou.pdf)>, consulted 28 February 2023, and also Tatsujiro Suzuki, *核兵器と原発 日本が抱える「核」のジレンマ (Atomic Weapons and Nuclear Power: 'Atomic' Dilemma of Japan)* (Kodansha Gendai Shinsho 2017). Suzuki is former Vice-Chairman of Japan Atomic Energy Commission of the Cabinet Office and currently the Director of Research Center for Nuclear Weapons Abolition at Nagasaki University.

consisted of offering fission technology for “peaceful” purposes to non-nuclearized countries in exchange for abandoning the pursuit of atomic bombs. Although it did not achieve its primary goal – nuclear containment – in the end, the speech led to the creation of International Atomic Energy Agency (IAEA) in 1957, missioned to implement the Atoms for Peace proposal: the promotion of civil nuclear energy and the dissuasion of military nuclear development in the world. The birth of the civil nuclear programme has thus an undeniable link with military use and non-proliferation.

Since then, the world has experienced two major accidents, Chernobyl and Fukushima, and several other accidents with more local consequences.<sup>4</sup> The Chernobyl accident, which occurred in the former Soviet Union in 1986, was said to have released 1,000-8,000 petabecquerels (PBq;  $10^{15}$  Bq) of radioactivity,<sup>5</sup> the amount which equals ‘the simultaneous explosion of 500 A-bombs’.<sup>6</sup> Nearly 8.4 million people in Belarus, Ukraine and Russia were exposed to the fallout,<sup>7</sup> which also affected 40% of the total surface area of Europe, especially those of Sweden, Norway, Finland, Austria and Bulgaria.<sup>8</sup> Some scientists estimated that the accident would cause nearly one million cases of radiation-induced cancer and close to 20,000

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<sup>4</sup> IAEA and NEA/OECD, ‘INES: The International Nuclear and Radiological Event Scale User’s Manual’ (International Atomic Energy Agency 2013) 152–153. According to the report, Kyshtym (Russia) in 1957, Windscale Pile (UK) in 1957, Three Mile Island (USA) in 1979, Goiânia (Brazil) in 1987, Tokaimura (Japan) in 1999, Saint Laurent des Eaux (France) in 1980, Fleurus (Belgium) in 2006 are listed as INES Scale 4-6 accidents with wider or local consequences on people and the environment.

<sup>5</sup> UNSCEAR, ‘Sources and Effects of Ionizing Radiation: UNSCEAR 2000 Report to the General Assembly, with Scientific Annexes. Volume II: Effects. Annex J (Exposure and Effects of the Chernobyl Accident)’ (UN Scientific Committee on the Effects of Atomic Radiation 2000) 519.

<sup>6</sup> Xue Hanqin, *Transboundary Damage in International Law* (University Press 2003) 22.

<sup>7</sup> UN, ‘Annan Urges Continued International Support for Victims of Chernobyl Disaster’ *UN Press Release* (26 April 2004) <<https://news.un.org/en/story/2004/04/101382-annan-urges-continued-international-support-victims-chernobyl-disaster>> accessed 26 April 2022.

<sup>8</sup> Ian Fairlie and David Sumner, ‘The Other Report on Chernobyl (TORCH): An Independent Scientific Evaluation of the Health-Related Effects of the Chernobyl Nuclear Disaster with Critical Analyses of Recent IAEA/WHO Reports’ (The European Greens 2006).



cases of radiation-induced leukaemia among the exposed.<sup>9</sup> The accident also uprooted at least 350,000 residents and made another 7 million live in the contaminated territories.<sup>10</sup> As such, some sociologists described the Chernobyl as ‘not an event or accident but rather a new human condition where millions of survivors are condemned to live in durably contaminated territories’.<sup>11</sup> Likewise, the Fukushima nuclear accident, which occurred 25 years later in Japan, released the amount of radioactivity as much as half of the Chernobyl release,<sup>12</sup> of which the released caesium-137 alone reached 168 times of the A-bomb dropped in Hiroshima.<sup>13</sup> The accident displaced at least 160,000 residents and left 1.6 million more to live in the contaminated territories.<sup>14</sup>

What differentiates nuclear disasters from other disasters is thus to do with radioactivity. The International Court of Justice (ICJ) recognised the pernicious and destructive nature of radiation effects to humans and the environment in the 1996 Advisory Opinion on *the Legality of the Threat or Use of Nuclear Weapons* by stating:

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<sup>9</sup> John W Gofman, ‘Assessing Chernobyl’s Cancer Consequences: Application of Four “Laws” of Radiation Carcinogenesis’ (1986) The 192nd National Meeting of the American Chemical Society: Symposium on Low-Level Radiation Division of Chemical Health and Safety, Anaheim, California, 9 September 1986.; Gofman was a respected American biophysicist at the University of California Berkeley who had also participated in the Manhattan Project, the U.S. nuclear bomb development programme during the WWII. His study on the Chernobyl fallout concluded that the cancer and leukaemia estimates of the UNSCEAR was at least 16 to 25 times too low.

<sup>10</sup> UNDP and UNICEF, ‘The Human Consequences of the Chernobyl Nuclear Accident: A Strategy for Recovery.’ (2002); OCHA, ‘Chernobyl: A Continuing Catastrophe’ (UN Office for the Coordination of Humanitarian Affairs 2000).

<sup>11</sup> Guillaume Grandazzi and Frédéric Lemarchand, ‘Avant-Propos’ in Galia Ackerman, Guillaume Grandazzi and Frédéric Lemarchand (eds), *Les silences de Tchernobyl: L’avenir contaminé* (Frontières, Autrement 2006) 7.

<sup>12</sup> IRSN, ‘Impact Environnemental d’un Accident Nucléaire : Comparaison Entre Tchernobyl et Fukushima’ (French Institute for Radiological Protection and Nuclear Safety 2013) Website post on 1 March 2013 <<https://www.irsn.fr/savoir-comprendre/environnement/impact-environnemental-dun-accident-nucleaire-comparaison-entre?dId=5d0cc222-c748-41ea-bae7-33f47b490598&dwId=ebe35772-4442-413c-b628-068fde521abe#.XKydLqTgqUk>> accessed 21 April 2023.

<sup>13</sup> Asahi Shimbun, ‘原発事故の放出セシウム、原爆の168倍 保安院公表 (The Caesium Released from the Nuclear Accident Amounts to 168 Times of Atomic Bomb, NISA Reports)’ *Asahi Shimbun* (Tokyo, 27 August 2011) <<https://www.asahi.com/special/10005/TKY201108260665.html>> accessed 28 February 2023. According to the article, Nuclear and Industry Safety Agency (NISA) of the Ministry of Economy, Trade and Industry (METI), one of the nuclear regulators before the accident, reported that the accident had emitted 15,000 terabecquerels (TBq) of caesium-137 in total while the atomic bomb in Hiroshima had released 89 TBq.

<sup>14</sup> Nobuhiro Sawano, 本場に役立つ「汚染地図」 (*The Truly Useful ‘Contamination Map’*) (Shueisha e-Shinsho 2014).

The radiation released by a nuclear explosion would affect health, agriculture, natural resources and demography over a very wide area. [...] Ionizing radiation has the potential to damage the future environment, food and marine ecosystem, and to cause genetic defects and illness in future generations. [...] (I)t is imperative for the Court to take account of the unique characteristics of nuclear weapons, and in particular their destructive capacity, their capacity to *cause untold human suffering*, and their ability to *cause damage to generations to come* (emphases added).<sup>15</sup>

Although the statement was made in the context of a use of nuclear weapons, radiation released in a core meltdown or accidental explosion at a nuclear power station would have the same effects on public health and the environment.

As articulated by the ICJ, radioactivity has an exceptional capacity to spread over space and time, contaminating the environment far beyond national borders and causing deleterious health effects to the exposed persons decades later or to their offspring. Once absorbed in the soil, surface, and forest, radioactive materials are also very difficult to remove and remain toxic for a long time: a common fission product from nuclear power plant, Caesium-137, for example, has a half-life of 30 years.<sup>16</sup> As such, some contaminated areas become *de facto* no-go zones, prohibited for human habitation, after a severe nuclear accident. Many residents lose not only home but also their hometowns where their entire lives are rooted. The effects of major nuclear accidents are, as once described by a nuclear specialist, almost comparable to those of armed conflicts<sup>17</sup> where countries can ‘lose a part of their territory’.<sup>18</sup> Michaël Ferrier, a French writer and literature professor in Tokyo, ingeniously called the life

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<sup>15</sup> *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Rep 1996, para 35-36

<sup>16</sup> The half-life in nuclear decay is the time it takes to lose its original value in half.

<sup>17</sup> Norbert Pelzer, ‘The Present State of Research Carried Out by the English-Speaking Section of the Centre for Studies and Research’ in Centre for Studies and Research in International Law and International Relations (ed), *Les risques résultant de l’utilisation pacifique de l’énergie nucléaire; The hazards arising out of the peaceful use of nuclear energy* (Hague Academy of International Law, Martinus Nijhoff Publishers 1993) 270.

<sup>18</sup> The expression used in one of the ICRP publications. See ICRP, ‘Application of the Commission’s Recommendations to the Protection of People Living in Long-Term Contaminated Areas after a Nuclear Accident or a Radiation Emergency. ICRP Publication 111.’ (Elsevier 2009) Ann. ICRP 39 (3). 30.

after a nuclear accident a “half-life”, the life in suspension at perpetuity: ‘an amputated existence (amputated of its simplest pleasures: savouring a salad without fear, keeping a smile under the rain)’ or ‘a death on credit, a long sleepwalking existence, a whole life in limbo. We are not anymore in life, but not yet in survival’.<sup>19</sup>

Against these cataclysmic effects, how is the population protected by their governments and the international community today? What are the protection norms applied in nuclear disasters? Are they adequate or robust enough to protect citizens from harmful effects of radiation in case of severe accidents? Are they different from the protection norms applied in the event of other human-made and natural disasters? This doctoral research aims to answer these questions by examining the case of the Fukushima Nuclear Power Plant accident which occurred in March 2011 in Japan.

## **I. Protection in Controversy: the Fukushima Case**

The Fukushima Daiichi (No.1) Nuclear Power Plant (F1NPP hereafter) accident occurred on 11 March 2011 when a magnitude 9.0 earthquake struck off the Pacific coast of north-eastern Japan triggering a massive tsunami which caused fatal damage to the installation. The F1NPP is situated in Fukushima Prefecture on the Pacific coastal line, 230 km north of Tokyo (see Figure 1 below). Equipped with six boiling water reactors (BWR), it was one of the largest nuclear power stations in the world with its total output capacity of 4,696 MW.<sup>20</sup> Nearly 40 years in operation, it was also one of the oldest nuclear installations in the country, operated by Japan’s major private power company, Tokyo Electric Power Company (TEPCO, hereafter).

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<sup>19</sup> Michaël Ferrier, *Fukushima: Récit d'un Désastre* (Gallimard 2013) 293–294. Translation from French by R. Hasegawa. The original text in French: ‘une existence amputée (amputée de ses plaisirs les plus simples : savourer une salade sans crainte, rester en souriant sous la pluie)’ , ‘une mort à crédit. Une longue existence de somnambule, toute une vie dans les limbes. On n’est déjà plus dans la vie, pas encore dans la survie’. Ferrier uses the term “half-life” here in analogy to the half-life of radioactivity.

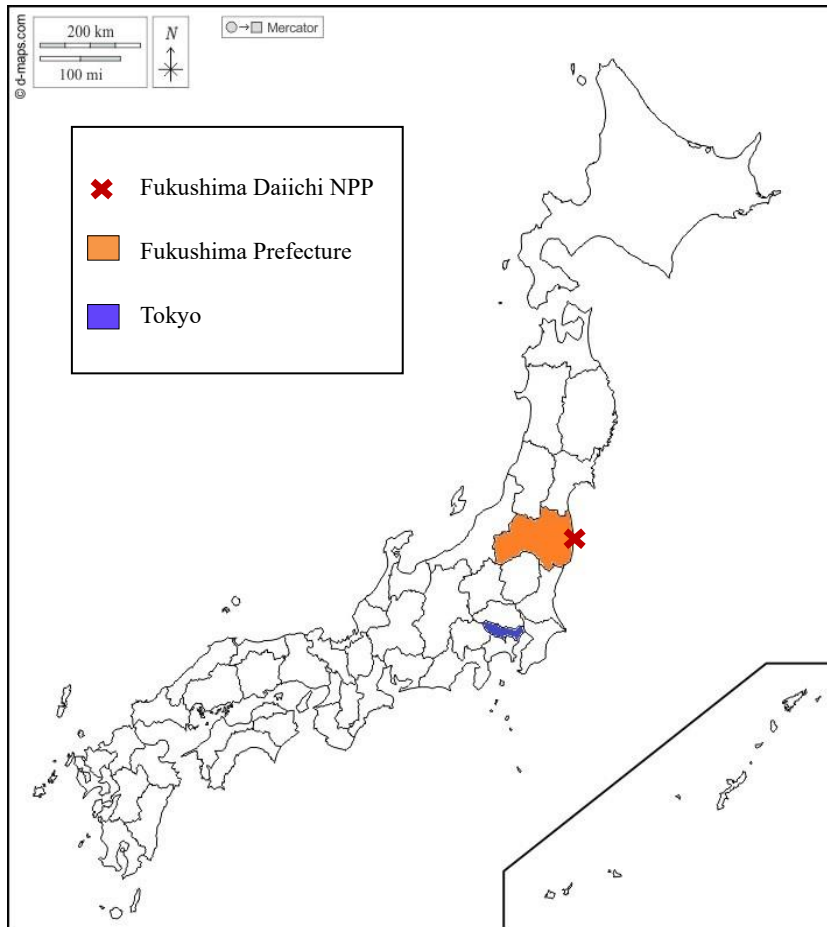
<sup>20</sup> NAIIC, ‘Report of the National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission’ (The National Diet of Japan 2012).

The plant lost all power supply after the emergency diesel generators placed in the basement were submerged by the tsunami, subsequently losing control of the reactor core cooling system. This resulted in three nuclear reactor meltdowns, three hydrogen-air explosions, and a massive release of radioactive substances in the environment. The accident was classified as Level 7 (Major Accident) according to the International Nuclear and Radiological Event Scale (INES), defined by the International Atomic Energy Agency (IAEA) and the Nuclear Energy Agency of the Organization for Economic Co-operation and Development (NEA/OECD). For Caesium alone, the accident has released between 33-50% of the Chernobyl fallout.<sup>21</sup> This effectively made the accident the worst nuclear catastrophe the world has ever experienced after the 1986 Chernobyl accident (also categorised as level 7).

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<sup>21</sup> IRSN, 'Impact Environnemental d'un Accident Nucléaire : Comparaison Entre Tchernobyl et Fukushima' (n 12).

Figure 1: Map of Japan and the Fukushima Daiichi NPP<sup>22</sup>



Faced with the accident, the Japanese government, known for its expertise and effectiveness in dealing with natural disasters, was completely overwhelmed and almost at a loss as to what to do. Its emergency response was extremely chaotic, in a constant state of improvisation where much of the key decision-making was made behind closed doors among Cabinet members without producing any meeting minutes on the content of these discussions.<sup>23</sup> Moreover, the protection of nuclear disaster victims was quickly separated from the rest of the

<sup>22</sup> Source: d-maps.com <[https://d-maps.com/carte.php?num\\_car=%2029487&lang=fr](https://d-maps.com/carte.php?num_car=%2029487&lang=fr)> accessed 24 April 2023, arranged by R. Hasegawa

<sup>23</sup> NAIIC (n 20). According to the report, it was only in January 2012, ten months after the accident, that the government first admitted that minutes had not been compiled for the official meetings dealing with the disaster. Following a public outcry, the government published the “reconstructed” minutes of these meetings in February-March 2012. They were made retrospectively by relevant ministry officials who had attended the meeting, recollecting information from their personal notes and other attended members, so it is quite unclear whether they accurately or sufficiently reflected the actual discussions.

disaster relief framework set up for the 2011 Great East Japan triple disaster and governed by a series of arbitrary and ad-hoc decisions made by nuclear regulatory authorities, without the consent of the Diet and inconsistent with certain provisions of radiation regulation legislation in some cases. Nuclear authorities justified these decisions by referring exclusively to the norms established by international nuclear institutions such as the IAEA, the International Commission on Radiological Protection (ICRP),<sup>24</sup> and the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR).<sup>25</sup>

These Fukushima post-accident policies in fact aggravated instead of relieved the plight of the affected population and triggered many controversies and protests not only from the victims but also from the scientific community and the civil society at large in Japan, some of which ended up being challenged in courts.

### **A. The 20 mSv/year Controversy**

The most controversial and pivotal of these post-accident policies is undeniably the reference level of 20 millisievert per year (mSv).<sup>26</sup> According to the ICRP recommendation, in the event of a nuclear accident, the competent authorities are advised to set the reference dose level (*de facto* “safety” criterion) which should guide disaster response and protective actions. Following this advice, the Japanese government established the reference dose, which was in effect 20 times the public annual dose limit. According to both the Japanese legislation and the

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<sup>24</sup> The ICRP is an international private expert organisation which is considered by many as the international authority in matters related to radiological protection.

<sup>25</sup> The UNSCEAR is a UN organisation which has 31 Member States (most of them are nuclear powers) which publishes reports on radiation effects. It is composed of scientists selected and sent by the Member States. In contrast to the ICRP, the Committee does not make any policy recommendations on radiological protection and is considered today the international scientific authority on radiation effects.

<sup>26</sup> “Reference level” is the term used by the ICRP for nuclear emergency and radiation existing situations and is differentiated from “dose limit” which only applies in planned exposure situation (i.e. regular situation without nuclear emergencies). In reality, the reference level functions in a similar way to “dose limit” or threshold dose in emergency situations. It is usually set higher than dose limit.

international radiation regulation norms, public dose limit is set at 1 mSv/year<sup>27</sup> and the dose level of 20 mSv/year represents the annual dose limit for occupationally exposed workers.<sup>28</sup>

This 20mSv/year reference dose, initially a provisional benchmark dose fixed for school children in Fukushima,<sup>29</sup> quickly became the definitive threshold value for the government to determine an area “safe” for the population to live or return to as well as to condition post-Fukushima protection assistance and compensation. As such, the evacuation (relocation) of residents was only instructed and assisted by the authorities when the airborne radiation level of the area exceeded 20 mSv/year. This meant that those living in the contaminated area where the dose level was short of 20 mSv/year were told to remain in place and were not assisted for evacuation. As a result, some residents found themselves in a situation of “captives”, being held against their will in the area where they felt their lives and health were at risk.

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<sup>27</sup> According to the ICRP, annual dose limit for public exposure (1 mSv/year) is the effective dose of an individual from external and internal exposures, excluding medical and occupational exposures, and only applies in planned exposure situations (i.e., not in nuclear emergencies). Effective dose is the term used by ICRP referring to the total exposure dose of a whole body from both external and internal exposures, adjusted by calculating the radiation weighting factor (e.g., for X-rays and gamma rays such as Caesium, the factor is 1) and the tissue weighting factor (sensitivity of each tissue and organ) (e.g., 0.12 for stomach, 0.08 for gonads, etc.) Effective dose is also called “whole-body dose” and expressed in the unit of sievert (S).

<sup>28</sup> For the Japanese radiation regulation, see METI’s Public Notice ‘実用発電用原子炉の設置、運転等に関する規則の規定に基づく線量限度等を定める告示 (Public Notice on Dose Limit on the Basis of Ordinance for Commercial Power Reactors)’ (No 187 of 21 March 2001) and MEXT’s Public Notice ‘試験研究の用に供する原子炉等の設置、運転等に関する規則等の規定に基づき、線量限度等を定める告示の一部を改正する告示 (Public Notice to Amend the Public Notice on Dose Limit on the Basis of Ordinance for Reactors at the Stage of Research and Development)’ (No 163 of 30 November 2005), both of which are relative to 核原料物質、核燃料物質及び原子炉の規制に関する法律 (Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors) No. 166 of 10 June 1957, as amended. For the international regulation, see ICRP, ‘The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.’ (Elsevier 2007) Ann. ICRP 37 (2-4).

<sup>29</sup> The reference dose was first decided by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) for the purpose of allowing school outdoor activities in Fukushima. See (in Japanese only) MEXT, ‘福島県内の学校の校舎・校庭等の利用判断における暫定的考え方について (Provisional View Regarding the Use of School Buildings and Shoolyards in Fukushima Prefecture)’ (Japan Ministry of Education, Culture, Sports, Science and Technology 2011) 19 April 2011 <[https://www.mext.go.jp/a\\_menu/saigaijohou/syousai/1305173.htm](https://www.mext.go.jp/a_menu/saigaijohou/syousai/1305173.htm)> accessed 1 January 2023.

Likewise, the return of evacuees to the contaminated areas was organised and encouraged by the authorities as soon as the radiation level decreased to 20 mSv/year or less. It was promoted by various financial incentives for housing and social services, official communications, employment opportunities, and the progressive discontinuation of evacuation assistance. This created a situation where some evacuees were compelled to return home against their will due to lack of state assistance for resettlement or alternative solutions. The Fukushima damage compensation scheme was then designed largely to follow and reinforce these policies.

The reference dose of 20 mSv/year policy thus sparked vivid controversy and strong protests from affected residents, civil society (especially, human rights and environmental NGOs), and the scientific community at large. The most spectacular example was the resignation of a government's scientific advisor, Toshiso Kosako, in April 2011, who held a press conference to announce his resignation and protest in tears against the government's decision to apply the 20mSv/year reference dose to infants and children in Fukushima.<sup>30</sup> A month later, 650 Fukushima residents protested in front of the Ministry of Education, Culture, Sports, Science and Technology (MEXT), demanding the cancellation of such a policy.<sup>31</sup> The national lawyers' association, Japan Federation of Bar Associations (JFBA)<sup>32</sup>, also urged the government to lower the reference level to 5 mSv/year in accordance with the Japanese law related to Radiation Controlled Area (RCA)<sup>33</sup> as well as following the precedent established in

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<sup>30</sup> His speech at the press conference, translated in English, can be read at <<http://japanfocus.org/events/view/83>> accessed 23 March 2023

<sup>31</sup> OurPlanet-TV, ‘「20 ミリシーベルト基準」撤回を～福島のパウチらが文科省に要請行動 (Fukushima Parents Protest at MEXT, Demanding the Cancellation of “the 20 MSv Criterion”’ *ourplanet-tv.org* (24 March 2011) <<https://www.ourplanet-tv.org/38326/>> accessed 28 February 2023.

<sup>32</sup> Established in 1949, the JFBA is the self-governing federation of all 52 bar associations in Japan. Its membership is mandatory for all attorneys who practise law in Japan.

<sup>33</sup> Radiation Controlled Area (RCA) is regulated by ministerial ordinances such as the MHLW Ordinance on Prevention of Ionizing Radiation Hazards (Ministry of Labour No 41 of 1972) (Article 3), METI Public Notice on Dose Limits (No 187 of 2001) (Article 2), MEXT Public Notice on Dose Limits (No 20 of 1988) (Article 2), MEXT Public Notice on Establishing Values of Radioisotope (No 5 of 2000) (Article 4), and others. According to



the Chernobyl accident where the reference level was set at 5 mSv/year for relocation.<sup>34</sup> In fact, the reference level of 5 mSv/year was also suggested by a Cabinet member, the then Minister of State for Nuclear Emergency Management and Preparedness, Goshi Hosono, in an undisclosed government meeting held in November 2011.<sup>35</sup> However, the proposal was finally rejected by other members of the Cabinet who worried that such a reference level would increase the number of evacuees and compensation payments.

Facing growing criticisms, the government tried to justify the choice of the 20 mSv/year dose level by referring systematically to international norms established by the ICRP, IAEA, and UNSCEAR. In addition, it insisted that the ‘risk of cancer development from radiation at levels of 100 mSv or lower is considered so slight *according to international consensus* that such risk is concealed by carcinogenic effects from other causes’ (e.g. smoking, obesity, and unbalanced diet).<sup>36</sup> In other words, the reference dose of 20 mSv/year poses almost no risk to health.

As mentioned earlier, the ICRP recommendation in the event of a nuclear emergency consists of disregarding the public dose limit and replacing it with a more flexible reference

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these ordinances, the area where effective dose of a person (worker) from external and internal exposures may exceed 1.3 mSv per three months (5 mSv per year) or a surface density of radioactivity may exceed 4 Bq/cm<sup>2</sup> (40,000 Bq/m<sup>2</sup>) except alpha rays should be designated as RCA. Once designated as RCA, the entry is strictly prohibited for all persons except designated personnel equipped with safety measures.

<sup>34</sup> JFBA, ‘被災者生活支援等施策の推進に関する基本的な方針（案）」に関する会長声明 (President’s Statement Regarding “The (Draft) Basic Framework Regarding the Promotion of Disaster Victims Life Support Measures”)’ (Japan Federation of Bar Associations 2013) 11 September 2013; JFBA, ‘避難住民の帰還に当たっての線量基準に関する会長声明 (President’s Statement Regarding the Dose Standard for the Return of Evacuees)’ (Japan Federation of Bar Associations 2014) 31 January 2014.

<sup>35</sup> Shinichi Sekine, ‘福島帰還基準、避難者増を恐れて強化せず 民主政権時 (The Dose Criteria for Return of Evacuees Were Not Lowered From the Fear of Increasing the Number of Evacuees)’ *Asahi Shimbun* (Tokyo, 25 May 2013) <[http://www.asahi.com/shinsai\\_fukkou/articles/TKY201305250024.html](http://www.asahi.com/shinsai_fukkou/articles/TKY201305250024.html)> accessed 2 February 2023.

<sup>36</sup> Cabinet Secretariat, ‘Report from the Working Group on Risk Management of Exposure to Low-Dose Radiation’ (Government of Japan 2011) 22 December 2011 5 <[https://www.cas.go.jp/jp/genpatsujiko/info/twg/Working\\_Group\\_Report.pdf](https://www.cas.go.jp/jp/genpatsujiko/info/twg/Working_Group_Report.pdf)> accessed 7 January 2023. The explanation in brackets and emphasis are added by the author of this thesis.

dose.<sup>37</sup> Specifically, it suggests that such reference dose shall be selected from the band of 20-100 mSv for the emergency phase and from the 1-20 mSv band for the recovery phase.<sup>38</sup> In view of this advice, the Japanese government's choice of 20 mSv/year is not, strictly speaking, deviant from the norms. On the other hand, the ICRP also adopts the linear non-threshold (LNT) model which assumes that biological damage caused by radiation exposure, cancer risk in particular, is proportional to exposed dose (dose-response relationship) even under the threshold of 100 mSv.<sup>39</sup> The LNT model implies that there is no threshold below which radiation exposure is harmless. From this point of view, the Japanese government's position on the low-dose risk – the threshold model – is thus not in conformity with the ICRP recommendation.

These justifications did not thus convince the majority of affected residents. Their uneasiness with the 20 mSv/year dose level was seen from the return rate of Fukushima evacuees to the former evacuation zones. Eleven years after the accident, only 30% of the residents returned home.<sup>40</sup> Moreover, the majority of these returnees consist of elderly persons over 60 years old, not accompanied by their children and grandchildren.<sup>41</sup> Protests against the 20 mSv/year also developed into legal actions.

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<sup>37</sup> ICRP, 'The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.' (n 28).

<sup>38</sup> In the most recent recommendation published after the Fukushima nuclear accident, the ICRP lowered these recommended dose bands: for the emergency phase, it now recommends the reference dose 'below 20 mSv' and for the recovery phase, 'in the lower half of the 1–20 mSv/year band' (i.e., the band of 1-10 mSv/year). See ICRP, 'Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.' (ICRP 2020) Ann. ICRP 49 (4) 78.

<sup>39</sup> ICRP, 'The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.' (n 28).

<sup>40</sup> Naofumi Yoshida, '避難指示解除区域の住民帰還頭打ち 福島第一原発事故被災地、移住率3割にとどまる (The Return of Evacuees to the Former Evacuation Zone Hit the Ceiling, the Rate of Inhabitation at 30% in the Affected Areas of the Fukushima Daiichi Nuclear Accident)' *Kahoku Shimpō* (Sendai, 14 September 2022) <<https://kahoku.news/articles/20220913khn000045.html>> accessed 28 February 2023.

<sup>41</sup> Reiko Hasegawa, 'Five Years on for Fukushima's IDPs: Life with Radiological Risk and without a Community Safety Net' *Blog post (Expert Opinion), Internal Displacement Monitoring Centre (IDMC) - Norwegian Refugee Council* (March 2016).

## B. Two Types of Displacement and Forced Immobility

This 20 mSv/year reference dose policy indeed generated a peculiar pattern of displacement among the affected population, which constitutes one of the distinct features of nuclear disasters: two types of human displacement and a situation of forced immobility. First, the Fukushima accident caused *mandatory* evacuation of residents under government orders for one, and *voluntary* evacuation of residents for the other. As mentioned earlier, mandatory evacuation zones were designated by the government using the dose criterion of 20 mSv/year which in fact replaced the provisional distance criteria initially adopted during the emergency phase. This forced about 110,000 residents to flee their homes, who became mandatory evacuees under the government orders. In addition, this prompted another type of movement outside the evacuation zones: spontaneous evacuation of residents who were not reassured by the “safety” threshold of 20 mSv/year. Called “voluntary” evacuees,<sup>42</sup> self-evacuees, or “out-of-zone” evacuees, these residents living in the contaminated areas outside the mandatory evacuation zones fled of their own accord in order to protect themselves, especially their children, from radiation exposure. The number of these evacuees was estimated at around 50,000-70,000, representing one third of all evacuees (160,000) reported by Fukushima Prefecture.<sup>43</sup> However, these “out-of-zone” evacuees were treated differently from mandatory

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<sup>42</sup> The term “voluntary” is mainly used by the Japanese authorities and the international nuclear organisations such as the ICRP and the IAEA. During the field interviews, many of these evacuees expressed their uneasiness with the term “voluntary” since they fled their home fearing for their lives or those of their children and therefore, they were “compelled” by the situation to flee. See Reiko Hasegawa, ‘Disaster Evacuation from Japan’s 2011 Tsunami Disaster and the Fukushima Nuclear Accident’ (IDDRI 2013) IDDRI Study No.05/13; Reiko Hasegawa, ‘Returning Home after Fukushima: Displacement from a Nuclear Disaster and International Guidelines for Internally Displaced Persons.’ (IOM 2015) IOM Policy Brief Series. Migration, Environment and Climate Change. Issue 4, Vo.1, September 2015. <[http://publications.iom.int/system/files/pdf/policy\\_brief\\_series\\_issue4.pdf](http://publications.iom.int/system/files/pdf/policy_brief_series_issue4.pdf)> accessed 24 October 2018; Christine Fassert and Reiko Hasegawa, ‘SHINRAI Research Project: The 3/11 Accident and Its Social Consequences: Case Studies from Fukushima Prefecture’ (IRSN/Sciences Po (Médialab) 2019).

<sup>43</sup> There are very few official data available on the number of “voluntary” evacuees. One report which estimated such a number was submitted to the MEXT Reconciliation Committee meeting held in November 2011. This was the first and one of rare occasions where the prefecture or the government officially presented the number of

evacuees and poorly assisted by the authorities. In some instances, they were even regarded as “rebels” or “troublemakers” who disobeyed the government’s instructions, making Fukushima appear unsafe to live in the eyes of the general public and thus jeopardising the collective effort to reconstruct Fukushima.<sup>44</sup>

The accident also produced another form of forced migration, opposite to displacement: forced immobility. Also called ‘displacement in place’ by some scholar,<sup>45</sup> it is an often-forgotten aspect of forced migration where persons are “trapped” in risk zones (e.g., radiologically contaminated territories) against their will due to lack of means or ability to flee. In effect, the Japanese government’s decision to evacuate only those areas with contamination levels of more than 20 mSv/year forced many to remain in the contaminated territories against their will. When these “trapped” residents protested such a reference dose and demanded evacuation assistance, they were simply told by the authorities to get on with their lives because the radiological situation of their environment posed little risk for their health. Accordingly, they were excluded not only from evacuation assistance but also damage compensation (some of them were granted meagre compensation later). This meant that only a few of those who had financial resources, occupational flexibility, or family connections elsewhere could evacuate on their own, becoming “voluntary” evacuees. Most residents did not have a choice but to stay even though they were not reassured by the government’s safety criteria. A vast majority of Fukushima disaster victims found themselves in that situation.

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“voluntary” evacuees. See Supporting Document (2-1) to the 16th Dispute Reconciliation Committee for Nuclear Damage Compensation held on 10 November 2011 in MEXT, which can be found (in Japanese only) at [http://www.mext.go.jp/b\\_menu/shingi/chousa/kaihatu/016/shiryo/\\_icsFiles/afieldfile/2011/11/11/1313180\\_2\\_2.pdf](http://www.mext.go.jp/b_menu/shingi/chousa/kaihatu/016/shiryo/_icsFiles/afieldfile/2011/11/11/1313180_2_2.pdf), consulted on 29 December 2022.

<sup>44</sup> Hasegawa, ‘Disaster Evacuation from Japan’s 2011 Tsunami Disaster and the Fukushima Nuclear Accident’ (n 42); Hasegawa, ‘Returning Home after Fukushima: Displacement from a Nuclear Disaster and International Guidelines for Internally Displaced Persons.’ (n 42); David H Slater, Rika Morioka and Haruka Danzuka, ‘Micro-Politics of Radiation’ (2014) 46 *Critical Asian Studies* 485.

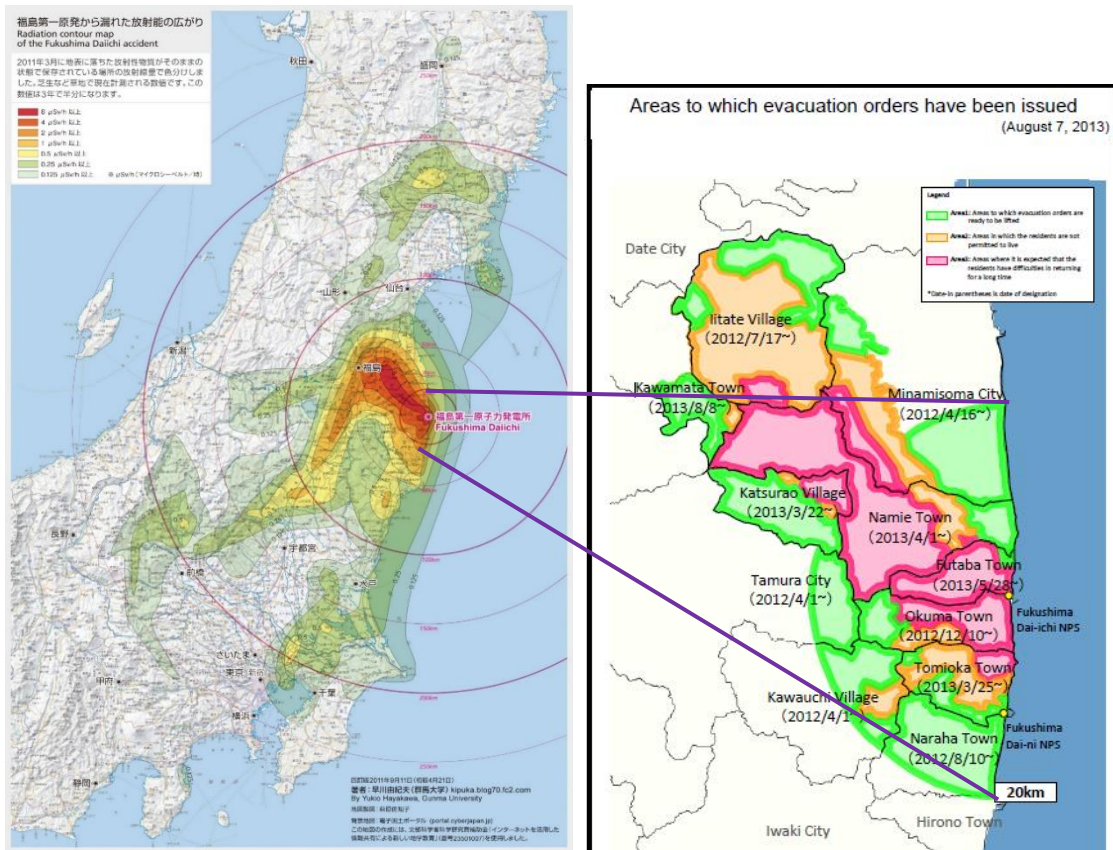
<sup>45</sup> The term was introduced by Stephen C Lubkemann, ‘Involuntary Immobility: On a Theoretical Invisibility in Forced Migration Studies’ (2008) 21 *Journal of Refugee Studies* 454.

The post-Fukushima relief and protection programme was thus oriented toward mandatory evacuees, largely disregarding “voluntary” evacuees and trapped residents. In fact, mandatory evacuees represented only 7% of the population affected by Fukushima fallout and living in the contaminated territories.<sup>46</sup> As such, the post-accident scheme relieved the plight of only a small fraction of accident victims, leaving many without adequate support and constrained to live with radiological contamination. The comparison of two maps below (Figure 2) demonstrates this discrepancy well. The map on the right is the official Fukushima evacuation zones and the map on the left shows the area affected by the radiation released by the accident. As seen from these two maps, the Fukushima fallout affected a much larger territory than the evacuation zones designated by the Japanese government.

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<sup>46</sup> According to Sawano, 1.6 million persons were living in the contaminated territories (with doses equivalent to more than 5 mSv/year) following the Fukushima accident. The percentage (7%) was thus calculated from the number of mandatory evacuees (110,000) out of 1.6 million. See Sawano (n 14).

Figure 2: The Comparison of Maps: Fukushima Radiation Fallout<sup>47</sup> and Evacuation Zones<sup>48</sup>



These plights indeed represent the distinct feature of nuclear disaster displacement. In regular disasters such as armed conflicts and natural disasters, people flee spontaneously when they feel their lives are at risk, to be then assisted by national governments or the international community. In contrast, in the event of nuclear disasters, national governments decide who is at risk and in need of evacuation regardless of individuals' perception, willingness, or circumstance. In this respect, nuclear disaster management is a top-down, state-centred and collective-oriented exercise which tends to exclude instead of include many victims in its protection.

<sup>47</sup> The map was published on 11 September 2011 by Yukio Hayakawa, a professor of geology (volcanology) at Gunma University (Japan), and found at his website <<http://kipuka.blog70.fc2.com/blog-category-20.html>> accessed 31 January 2023.

<sup>48</sup> Source: Japanese Ministry of Economy, Trade and Industry (METI) <[https://www.meti.go.jp/english/earthquake/nuclear/roadmap/roadmap/evacuation\\_areas.html](https://www.meti.go.jp/english/earthquake/nuclear/roadmap/roadmap/evacuation_areas.html)> accessed 29 March 2023

### C. The Contested “Fukushima Status” and Legal Challenges

The reference dose of 20 mSv/year ultimately determined who had the right to State protection, in other words, who were the legitimate victims of the accident in the eyes of the authorities and the TEPCO.<sup>49</sup> It also became the fundamental basis to determine what this thesis calls “the Fukushima status” which gave victims access to specific social assistance and compensation. This status is not, however, a legal status defined by a law or an international convention as in the case of refugees, but a normative status defined by policies and guidelines established by the Japanese government. As mentioned earlier, the Fukushima compensation scheme largely followed the government’s evacuation instructions and post-accident policies, which resulted in creating multiple categories of this victim status. Indeed, the victims were divided into nine categories of status, six of which were directly linked to respective evacuation orders.<sup>50</sup>

The most notable aspect of this “Fukushima status” is the huge compensation gap found between mandatory evacuees and the rest of the affected population including out-of-zone evacuees and trapped residents. In some cases, such a gap reached 45-fold among victims living in very similar radiological circumstances. This triggered a strong feeling of injustice, jealousy, and indignation among the affected, creating profound divisions and tensions within,

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<sup>49</sup> Reiko Hasegawa and others, ‘Politics of Zoning: Making Risks (In)Visible and Manageable in Disasters’ (The SDN 2017) Conference Paper presented at the Science and Democracy Network (SDN) the 16th Annual Meeting, 29 June-1 July 2017, Harvard University, Cambridge (USA).

<sup>50</sup> Kenji Fukuda and Kenichirou Kawasaki, ‘子ども・被災者支援法の成立と現状 (The Enactment and Status of the Nuclear Disaster Victims’ Support Act)’ in Institute of Disaster Area Revitalization, Regrowth and Governance, JCN and SAFRAN (eds), *原発避難白書 (White Paper on Nuclear Evacuation)* (Jinbun Shoin 2015); Masafumi Yokemoto and Michiko Hiraoka, ‘原発賠償の仕組みと問題点—生活再建と地域再生に向けた課題 (The System and the Problems of Nuclear Compensation: The Issues Related to the Reconstruction of Lives and the Restoration of Communities)’ in Masafumi Yokemoto and Toshihiko Watanabe (eds), *原発災害はなぜ不均等な復興をもたらすのか—福島事故から「人間の復興」、地域再生へ (Why does nuclear disaster induce imbalanced reconstruction? : Toward the “Reconstruction of Human Lives” and Community Revival from the Fukushima Accident)* (Minerva Shobo 2015).

outside, and in-between different zones and categories of the status.<sup>51</sup> As a result, there was a surge of nation-wide group civil lawsuits in 2014, three years after the accident. More than 30 group actions involving 12,000 plaintiffs have been filed against TEPCO and the State all over Japan, demanding a total amount of 1 billion USD as compensation for various forms of damage.<sup>52</sup> In addition to civil suits, a criminal action against TEPCO former executives (the ex-CEO and two former vice-presidents) was also filed by 14,000 plaintiffs in July 2015.

Among these actions, there were two groups which specifically challenged the legal validity of the 20 mSv/year reference dose chosen by the government. One of them was filed at Fukushima District Court by a group of 201 parents in June 2015, so-called ‘Group Action Against Radiation Exposure of Children’<sup>53</sup>, and the other was brought to Tokyo District Court by 808 residents of Minamisoma city in April 2015, so-called “Group Action Against the 20 mSv/year”<sup>54</sup>. Both actions demanded the retraction of government measures which were decided on the basis of the 20 mSv/year dose reference.

Despite these protests and legal actions, the government retained the reference dose at 20 mSv/year and has never revised it until today (more than 10 years after the accident).

## II. Existence of Normative Conflicts in Nuclear Disasters

In search of international validation, the Japanese government also requested the IAEA to review its post-accident policies, especially its decision on the 20 mSv/year reference dose.

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<sup>51</sup> Yokemoto and Hiraoka (n 50); Hasegawa, ‘Disaster Evacuation from Japan’s 2011 Tsunami Disaster and the Fukushima Nuclear Accident’ (n 42); Fassert and Hasegawa (n 42).

<sup>52</sup> Hironori Tsuchie, ‘東日本大震災5年 原発事故原告1万2,539人 訴訟全国31件 (Five Years from the Great East Japan Disaster: 31 Group Legal Actions Across Japan and 12,539 Nuclear Accident Plaintiffs)’ *Mainichi Shimbun* (16 March 2016).

<sup>53</sup> Translation of 子ども脱被ばく裁判 by R. Hasegawa. The website of the plaintiff’s team (Japanese only) <<https://fukushima-sokaisaiban.blogspot.com/>> accessed 28 March 2023

<sup>54</sup> Translation of 南相馬・避難20ミリシーベルト基準撤回訴訟 by R. Hasegawa. The website of the plaintiff’s team (Japanese only) <<http://minamisouma.blogspot.com/>> accessed 28 March 2023



In response, the IAEA conducted a field mission in October 2013 and published a report which largely approved the 20 mSv/year reference dose by emphasising that in post-accident situations, ‘any level of individual radiation dose in the range of 1 to 20 mSv per year is acceptable and in line with the international standards and the recommendations from the relevant international organisations, e.g. ICRP, IAEA, UNSCEAR and World Health Organization (WHO)’.<sup>55</sup> The UNSCEAR also published a report on the Fukushima accident in 2013, concluding, only two years after the accident, that no radiation-related health effects would be expected among the population in the future.<sup>56</sup> This statement was made despite the fact that initial exposure doses of affected residents remain largely unknown to the Japanese authorities.<sup>57</sup> Just like at the time of the Chernobyl accident, both the IAEA and the UNSCEAR reports identified the most important health effect from the accident as psychological problems among the affected population due to unwarranted fear and stigma related to radiation exposure.

Meanwhile, the Japanese government’s Fukushima policies were severely criticised by other international organisations, namely the UN Human Rights Council and international human rights treaty bodies such as Human Rights Committee (CCPR) and Committee on Economic, Social and Cultural Rights (CESCR). Inside Japan, legal expert organisations such as the JFBA and Human Rights Now (HRN)<sup>58</sup> called for the government to conform its policies

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<sup>55</sup> IAEA, ‘Final Report: The Follow-up IAEA International Mission on Remediation of Large Contaminated Areas Off-Site the Fukushima Daiichi Nuclear Power Plant, 14-21 October 2013’ (2014) 11, 17, 18 <[https://www.iaea.org/sites/default/files/final\\_report230114\\_0.pdf](https://www.iaea.org/sites/default/files/final_report230114_0.pdf)> accessed 15 April 2019. Indeed, this sentence is repeated three times in the report.

<sup>56</sup> UNSCEAR, ‘Sources, Effects and Risks of Ionizing Radiation: United Nations Scientific Committee on the Effects of Atomic Radiation : UNSCEAR 2013 Report to the General Assembly with Scientific Annexes.’ (UN Scientific Committee on the Effects of Atomic Radiation 2013) Vol I Scientific Annex A 10–11.

<sup>57</sup> Study2007, *見捨てられた初期被ばく (Abandoned Initial Exposure Dose)* (Iwanami Shoten 2015). The Fukushima Residents Health Survey, based on which the government had made the estimation of initial public exposure dose, has been responded by only 27% of Fukushima residents according to the Fukushima Prefecture in March 2016. This means that initial exposure doses of 70% of the affected residents remain unknown. <<https://www.pref.fukushima.lg.jp/uploaded/attachment/158522.pdf>> accessed 20 May 2019

<sup>58</sup> Established in 2006 by a group of human rights lawyers, scholars, and journalists, Human Rights Now (HRN) is the first international human rights NGO based in Japan with UN special consultative status. Source: HRN website (<https://hrn.or.jp/eng/>)

to Japanese radiation regulations, the Constitution, and international obligations under human rights conventions and other normative instruments.

The mission report of the UN Special Rapporteur on the right to health, one of the special procedures of the UN Human Rights Council, went even further to suggest that nuclear and radiation protection principles did not conform the human rights framework and, therefore, the nuclear disaster response should be made on a rights-based approach rather than the nuclear framework.<sup>59</sup> Another Rapporteur expressed serious concerns over the chosen reference level of 20 mSv/year, qualifying the Japanese government's decision as "deeply troubling",<sup>60</sup> and strongly recommended that Fukushima evacuees should 'return only when the radiation dose has been reduced [...] to levels below 1mSv/year'.<sup>61</sup> Moreover, the Rapporteurs urged the government to recognise Fukushima evacuees, both forced and voluntary, as internally displaced persons (IDPs), for whom it has specific obligations under the provisions of the 1998 Guiding Principles on Internal Displacement.<sup>62</sup>

These two views stand in a head-on opposition to one another. It notably suggests that there currently exists a conflict of legitimacy, "regime-collisions"<sup>63</sup> or "normative conflicts"<sup>64</sup>

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<sup>59</sup> UNHRC, 'Report of the Special Rapporteur on the Right of Everyone to the Enjoyment of the Highest Attainable Standard of Physical and Mental Health, Anand Grover' (Human Rights Council 2013) UN Doc A/HRC/23/41/Add.3 (2 May 2013).

<sup>60</sup> OHCHR, 'Japan Must Halt Returns to Fukushima, Radiation Remains a Concern, Says UN Rights Expert' *OHCHR Press Release* (25 October 2018) <<https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=23772&LangID=E>> accessed 3 January 2023.

<sup>61</sup> UNHRC, 'Report of the Special Rapporteur on the Right of Everyone to the Enjoyment of the Highest Attainable Standard of Physical and Mental Health, Anand Grover' (n 59) 49, 78(a).

<sup>62</sup> UNHRC, 'Joint Communication from Special Procedures (The Special Rapporteur on Toxics and Human Rights; The Special Rapporteur on the Human Rights of IDPs)' (Human Rights Council 2018) JPN 6/2018 (5 September 2018); UNHRC, 'Joint Communication from Special Procedures (The Special Rapporteur on Toxics and Human Rights; The Special Rapporteur on the Right to Health; The Special Rapporteur on the Human Rights of IDPs)' (Human Rights Council 2017) JPN 2/2017 (20 March 2017).

<sup>63</sup> Andreas Fischer-Lescano and Gunther Teubner, 'Regime-Collisions: The Vain Search for Legal Unity in the Fragmentation of Global Law' (2003) 25 *Michigan Journal of International Law* 999.

<sup>64</sup> Martti Koskenniemi, 'Study on the Function and Scope of the Lex Specialis Rule and the Question of "Self-Contained Regimes": Preliminary Report by Martti Koskenniemi, Chairman of the Study Group' (UN

between two international normative regimes as regards the protection of persons in nuclear disasters.<sup>65</sup> Indeed, both nuclear law and human rights law can be described as *lex specialis*, or “self-contained regimes”,<sup>66</sup> subsystems of general international law equipped with specific primary rules (e.g., rights and obligations) with specific secondary rules (e.g., enforcement mechanisms, compensation mechanisms, etc), which exist in quasi “autonomy” from principles of general international law and are not in a hierarchical relationship to one another. Each regime may thus ‘create solutions entirely opposite to the solutions of another system’ and may interpret and apply general international law in different ways.<sup>67</sup>

But why is the nuclear regulation regime always applied after nuclear disasters instead of the other regime despite the advice from the UN Rapporteurs? What is the difference between these two protection regimes? Are these norms adequate or appropriate to protect individuals from the effects of nuclear accidents? What are the potential gaps of these normative regimes in addressing the need of nuclear disaster victims? This doctoral thesis investigates these questions by examining in detail the international nuclear and radiation regulation regime currently applied in the event of nuclear disasters and other international normative regimes

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International Law Commission 2004) A/CN.4/ILC(LVI)/SG/FIL/CRD.1 (7 May 2004) 4; Anja Lindroos, ‘Addressing Norm Conflicts in a Fragmented Legal System: The Doctrine of *Lex Specialis*’ (2005) 74 *Nordic Journal of International Law* 27.

<sup>65</sup> Fassert and Hasegawa (n 42) 176.

<sup>66</sup> Bruno Simma, ‘Self-Contained Regimes’ (1985) 16 *Netherlands Yearbook of International Law* 111; Bruno Simma and Dirk Pulkowski, ‘Of Planets and the Universe: Self-Contained Regimes in International Law’ (2006) 17(3) *European Journal of International Law* 483; Koskenniemi (n 64). As Simma and Pulkowski explain, the phrase “self-contained regime” was first coined by the Permanent Court of International Justice in the *Wimbledon* case (*S.S. Wimbledon* [1923] PCIJ Rep Series A, No. 1), whose concept was extended to the secondary norms by the ICJ judgement in the *Tehran Hostages* case (*Case concerning United States Diplomatic and Consular Staff in Tehran (United States of America v. Iran)* (Judgement) [1980] ICJ Rep 1980). According to the ICJ judgement, “self-contained regime” shall contain enforcement measures that are “entirely efficacious”. Based on such judgement, Simma and Pulkowski defined the regimes as ‘those that embrace a full, exhaustive and definitive, set of secondary rules’ (p. 493). Typical examples of these regimes include international trade law, diplomatic law, European Community law, environmental law, and human rights law.

<sup>67</sup> Lindroos (n 64) 31.

which would or shall also apply in nuclear disasters and challenge the normative monopoly of the nuclear regime.

### **A. Nuclear Safety and Radiological Protection Framework**

Today, the international nuclear and radiation safety institutions provide specific guidelines concerning the protection of persons in nuclear accidents. The IAEA is in effect authorised under its Statute (Article III. A.6) to ‘establish or adopt...standards of safety for protection of health and minimization of danger to life and property’ in nuclear emergencies.<sup>68</sup> Since its inception, the IAEA has played the role of authority in setting international standards for nuclear related activities, especially in the field of nuclear safeguards – non-proliferation of nuclear weapons.

However, it took a long time for the Agency to come up with the standard dealing with nuclear safety – the civil use. With its core mandate fixed on the promotion of “peaceful” use, some scholars argue that the IAEA has long downplayed the risks related to civil nuclear programmes.<sup>69</sup> Moreover, its Member States, major nuclear powers in particular, had long considered any international control on the safety of their installations as interference onto their sovereignty, thus fending off any internationalisation of safety standards including accident management. As a result, the first international conventions on nuclear accident, the Convention on Early Notification of a Nuclear Accident (the Early Notification Convention) and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (the Assistance Convention), were established only after the Chernobyl accident in 1986,<sup>70</sup> and the

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<sup>68</sup> Statute of the International Atomic Energy Agency (adopted 26 October 1956, entered into force 29 July 1957) 276 UNTS 3

<sup>69</sup> Menno T Kamminga, ‘The IAEA Convention on Nuclear Safety’ (1995) 44 *International & Comparative Law Quarterly* 872.; Abe (n 4)

<sup>70</sup> The Convention on Early Notification of a Nuclear Accident (adopted 26 September 1986, entered into force 27 October 1986) 1439 UNTS 275; the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (adopted 26 September 1986, entered into force 27 October 1986) 1457 UNTS 133

first convention on nuclear safety, Convention on Nuclear Safety (CNS)<sup>71</sup>, was signed only in 1994, eight years after the Chernobyl accident and 37 years after the creation of IAEA. As for the IAEA guidelines (Safety Standard Series), the first guideline on nuclear emergency preparedness and response was only published in 2002 and the guideline on the protection of people in severe accidents was issued only after the Fukushima accident in 2013.<sup>72</sup>

The protection principles adopted by these IAEA guidelines are justification, optimisation and dose limit, drawn from the core radiological protection principles established by the ICRP. The recommendations of the ICRP have become over the years the most influential radiation protection standards, which have been incorporated into many national legislations and guidelines of international organisations such as International Labour Organisation (ILO), Nuclear Energy Agency of the Organisation for Economic Co-operation and Development (NEA/OECD), European Atomic Energy Community (EURATOM) and IAEA.

Among the three protection principles, justification and optimisation play the most important roles in the event of nuclear accidents since the principle of dose limit only applies in so-called “planned exposure situations” that exclude nuclear emergency situations. According to the ICRP, the principle of justification means that any action to apply or reduce radiation dose should *do more good than harm*, that is to say, ‘produce(s) sufficient net benefit to the exposed individuals or to society to offset the radiation detriment it causes’, which would be achieved through a risk-benefit analysis.<sup>73</sup> The optimisation, on the other hand, is defined as an action to keep individual exposure doses *as low as reasonably achievable* (so-called

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<sup>71</sup> The Convention on Nuclear Safety (adopted on 20 September 1994, entered into force on 24 October 1996) 1963 UNTS 293 (CNS)

<sup>72</sup> IAEA, ‘IAEA Safety Requirement: Preparedness and Response for a Nuclear or Radiological Emergency’: (Jointly Sponsored by FAO, IAEA, ILO, OECD/NEA, PAHO, OCHA, WHO 2002) IAEA Safety Standards Series, No. GS-R-2; IAEA, ‘Actions to Protect the Public in an Emergency Due to Severe Conditions at a Light Water Reactor’ (IAEA 2013) EPR-NPP-PPA (2013).

<sup>73</sup> ICRP, ‘The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.’ (n 28) 89.

ALARA principle) by taking into account economic and societal factors. It is a process of arriving at ‘the best level of protection under the prevailing circumstances’ by using a method of cost-benefit analysis.<sup>74</sup> ICRP explains that the best protective action thus is not necessarily the one to achieve the lowest dose but to balance out the detriment from radiation exposure (i.e. health effect) with economic and social costs of protection measures (e.g. evacuation, decontamination, etc), which would ‘ensure an overall benefit in the broadest sense to society and thus *not necessarily to each individual*’.<sup>75</sup> In effect, the notion of individual rights is largely absent in the radiation protection framework. The nuclear regime indeed represents one of the rare international normative frameworks which do not adopt or refer to human rights principles in protecting individuals in disaster situations.

This can also be observed from the primary objective of radiation protection fixed by the ICRP and the IAEA. The 2007 ICRP Recommendations (Publication 103) describes its goal as ‘to *contribute to an appropriate level* of protection for people and the environment against the detrimental effects of radiation exposure *without unduly limiting the desirable human actions* that may be associated with such exposure’.<sup>76</sup> The IAEA is even more explicit, specifying that the protection of people and the environment from ionising radiation ‘*has to be achieved without unduly limiting the operation of facilities* or the conduct of activities that give rise to radiation risks’.<sup>77</sup> What becomes clear from these objectives is that human protection is not a pre-eminent notion: it is always put in balance with safeguarding nuclear activities. In other words, the protection of persons is rather a relative notion hinged upon the protection of nuclear activities. Ultimately, it is the system which protects people from radiation exposure to

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<sup>74</sup> *ibid* 91.

<sup>75</sup> *ibid* 90. Emphasis added.

<sup>76</sup> *ibid* 41. Emphasis added.

<sup>77</sup> IAEA and others, ‘Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards’ (IAEA 2014) GSR Part 3 ix. Emphasis added.

a certain degree and at the same time, imposes such exposure to people for the sake of preserving the nuclear energy use.<sup>78</sup>

Radiation regulation, or more globally, nuclear law has always accompanied the development of atomic energy, either for military or industrial purposes, and played a major role in forging the social acceptance of nuclear programmes among the public.<sup>79</sup> As Nobert Pelzer, a nuclear law expert, affirms that nuclear law's mission is to render the development of nuclear energy possible by removing 'inadequate legal restrictions' and at the same time, to 'ensure safety in order to minimize the risk to a level which is *tolerable*'.<sup>80</sup> This was also achieved in part by downplaying the risks so as to elude criticisms and calm public anxieties.<sup>81</sup> The nuclear and radiation safety regime is thus inherently susceptible to political, defence and economic parameters of the State, where the protection of people and the environment is relegated to rather a relative or secondary concept.

## **B. Humanitarian and Human Rights Frameworks**

To protect people in times of disasters, the international community has developed over the years an authoritative legal and normative framework under the auspices of the UN or other international organisations based on international humanitarian law (IHL) and human rights laws (HRL). The origin of humanitarian law can be traced back to as early as the first Geneva Convention of 1864<sup>82</sup> which has evolved into the current Geneva Conventions of 1949

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<sup>78</sup> Yasuo Nakagawa, *放射線被曝の歴史：アメリカ原爆開発から福島原発事故まで (The History of Radiation Exposure: From the American Atomic Bomb Development to the Fukushima Nuclear Accident)* (Enlarged Version of the 1991 Original Edition, Akashi Shoten 2012).

<sup>79</sup> Soraya Boudia, 'Sur Les Dynamiques de Constitution Des Systèmes d'expertise Scientifique. La Naissance Du Système d'évaluation et de Régulation Des Risques Des Rayonnements Ionisants' (2008) 70 *Genèses* 26, 12.

<sup>80</sup> Pelzer, 'The Present State of Research Carried Out by the English-Speaking Section of the Centre for Studies and Research' (n 17) 207. 214. Emphasis added.

<sup>81</sup> Soraya Boudia, 'Global Regulation: Controlling and Accepting Radioactivity Risks' (2007) 23 *History and Technology* 389.

<sup>82</sup> Convention for the Amelioration of the Condition of the Wounded in Armies in the Field (22 August 1864) 18 *Martens Nouveau Recueil* (ser. 1) 607, 129 *Consol. T.S.* 361 (Red Cross Convention)

and their additional Protocols,<sup>83</sup> which aim to protect civilians, victims, and non-combatants during wars. Following the World War II, especially after the experience of Nazi persecution of their own nationals, two more sets of international protection regimes were established under the UN system in order to protect persons from intra-state violence and persecution where their lives are threatened by the action or inaction of their own governments: international human rights law and refugee law. The first is anchored in the Universal Declaration of Human Rights<sup>84</sup> and two International Human Rights Covenants<sup>85</sup>, and the second is grounded on the Refugee Convention of 1951 and its Protocol<sup>86</sup>.

Initially developed to protect persons in armed conflicts, the model of this international protection has evolved over the years to cover, or is in the process of being extended to, other types of disasters such as natural disasters, industrial accidents, development projects and, more recently, climate change. Generally called international humanitarian regime or forced migration regime, it is today the international normative, operational, and institutional framework led by the UN and international humanitarian agencies such as the International Committee of the Red Cross (ICRC) and the International Federation of Red Cross and Red

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<sup>83</sup> The 1949 Geneva Conventions are composed of four conventions: Geneva Convention on Wounded and Sick in Armed Forces in the Field (adopted 12 August 1949, entered into force 21 October 1950) 75 UNTS 31; Convention for the Amelioration of the Condition of Wounded, Sick and Shipwrecked Members of Armed Forces at Sea (adopted 12 August 1949, entered into force 21 October 1950) 75 UNTS 85; Geneva Convention relative to the Treatment of Prisoners of War (adopted 12 August 1949, entered into force 21 October 1950) 75 UNTS 135; Geneva Convention relative to the Protection of Civilian Persons in Time of War (adopted 12 August 1949, entered into force 21 October 1950) 75 UNTS 287. Their additional Protocols are consisted of two: Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I) (adopted 8 June 1977, entered into force on 7 December 1978) 1125 UNTS 3; Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of Non-International Armed Conflicts (Protocol II) (adopted 8 June 1977, entered into force 7 December 1978) 1125 UNTS 609

<sup>84</sup> UNGA, 'Universal Declaration of Human Rights' (UN General Assembly, 10 December 1948) UN Res 217A(III), UN Doc A/810.

<sup>85</sup> International Covenant on Civil and Political Rights (adopted 16 December 1966, entered into force 23 March 1976) 999 UNTS 171 (ICCPR); International Covenant on Economic, Social and Cultural Rights (adopted 16 December 1966, entered into force 3 January 1976) 993 UNTS 3 (ICESCR)

<sup>86</sup> Convention Relating to the Status of Refugees (adopted 28 July 1951, entered into force 22 April 1954) 189 UNTS 137 (Refugee Convention); Protocol Relating to the Status of Refugees (adopted 31 January 1967, entered into force 4 October 1967) 606 UNTS 267 (Protocol)



Crescent Societies (IFRC), which is routinely applied in events of conflicts, natural disasters, and other human-made disasters.<sup>87</sup>

The key normative document of the regime is the Guiding Principles on Internal Displacement.<sup>88</sup> Based on the principles anchored in IHL and HRL, the Guiding Principles prescribe, though non-legally binding, State obligations and set the minimum standards for the protection of persons displaced by disasters within a national border.<sup>89</sup> It notably provides that national authorities have a duty to ‘establish conditions, as well as provide the means’ for the IDPs to ‘return voluntarily, in safety and with dignity, to their homes or places of habitual residence’, or ‘resettle voluntarily in another part of the country’ (Principle 28). Furthermore, it specifies that the repatriation or resettlement of IDPs should never be forced or encouraged ‘to any place where their life, safety, liberty and/or health would be at risk’ (Principle 15 (d)). According to the IDP protection regime, ‘the rights, needs and legitimate interests of IDPs should be the primary considerations guiding all policies and decisions related to internal displacement and durable solutions’.<sup>90</sup>

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<sup>87</sup> An international law scholar B.S. Chimni points to the fact that refugee and forced migration regimes have also been constructed to serve the interests and strategies of Western states in different geopolitical eras. For example, during the Cold War, it was used to discredit the communist regime by accepting refugees from the East bloc and in the post-Cold War era, it also functioned to contain the movement of people from the south to the north by emphasising the state responsibility of protecting internally displaced persons (IDPs) within their borders. For details, see BS Chimni, ‘The Geopolitics of Refugee Studies: A View from the South’ (1998) 11 *Journal of Refugee Studies* 350; BS Chimni, ‘The Birth of a Discipline: From Refugee to Forced Migration Studies’ (2009) 22 *Journal of Refugee Studies* 11.

<sup>88</sup> UNCHR, ‘Report of the Representative of the Secretary-General, Mr. Francis M. Deng, Submitted Pursuant to Commission Resolution 1997/39 Addendum: Guiding Principles on Internal Displacement’ (UN Commission on Human Rights 1998) UN Doc E/CN.4/1998/53/Add.2 (11 February 1998).

<sup>89</sup> Walter Kälin, ‘The Future of the Guiding Principles on Internal Displacement’ [2006] *Forced Migration Review* (Special Issue) 5.

<sup>90</sup> IASC, ‘IASC Framework on Durable Solutions for Internally Displaced Persons’ (Inter-Agency Standing Committee/The Brookings-Bern Project on Internal Displacement 2010) 11.

In fact, nuclear accidents were already assumed by one of the Guiding Principles' drafters as those disasters to which the guidelines apply from the outset.<sup>91</sup> Moreover, following the Fukushima accident, the UN human rights system, for the first time, clearly recognised the nuclear accident victims as IDPs and strongly advised to apply the Guiding Principles in its disaster response.

As a matter of fact, the UN human rights institutions were the only entity within the UN which reacted and criticised the handling of accident victims by the Japanese government after the Fukushima nuclear accident. While the UN nuclear institutions validated and praised the post-accident actions of the Japanese government, the UN Human Rights Council and treaty bodies gave a highly critical assessment of them. Notably, the UN Special Rapporteur on the right to health, Anand Grover, concluded that the government's post-accident policies, especially the reference dose of 20 mSv/year, were inconsistent with recent results of epidemiological studies, the precedent established in the Chernobyl accident, the ICRP's position on the low-dose risk (i.e., LNT model), and even its own radiation-related legislation.<sup>92</sup> As such, it strongly recommended that the return of evacuees be only facilitated when radiation dose is reduced 'to levels below 1 mSv/year'.<sup>93</sup> The UN Rapporteur on toxics and human rights, Baskut Tuncak, even suggested that the return policy at the 20 mSv/year reference dose would constitute a violation of certain provisions of the Convention on the Rights of the Child (CRC)

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<sup>91</sup> See the postscript article on the Guiding Principles of Internal Displacement written by Roberta Cohen, 'The Guiding Principles on Internal Displacement: An Innovation in International Standard Setting' (2004) 10 *Global Governance* 459.

<sup>92</sup> UNHRC, 'Report of the Special Rapporteur on the Right of Everyone to the Enjoyment of the Highest Attainable Standard of Physical and Mental Health, Anand Grover' (n 59).

<sup>93</sup> *ibid* para 49.

to which Japan is party, and strongly urged the government to ‘halt returns’ of children and women of reproductive age to areas where radiation levels remain higher than 1 mSv/year.<sup>94</sup>

Furthermore, the Rapporteur’s report made a direct reference to the ICRP protection principles, for the first time, declaring that the concepts such as “maximizing good over harm” and “a risk-benefit analysis” were not compatible with human rights protection framework because they give ‘precedence to collective interests over individual rights’.<sup>95</sup> Under the human rights framework, the Rapporteur recalled, ‘every individual has the right to be protected’ and strongly urged the government to formulate policies ‘based on human rights rather than on a risk-benefit analysis’.<sup>96</sup>

The 2017 country review (UPR)<sup>97</sup> of Japan by the Human Rights Council was equally critical. The outcome report notably advised the Japanese government to restore the permissible dose of radiation to the 1 mSv/year limit, recognise all evacuees (mandatory and voluntary) as IDPs, and apply the Guiding Principles on Internal Displacement for their protection.<sup>98</sup> The follow-up reports published by Special Rapporteurs and treaty bodies all expressed their regret, stating that ‘Japan appear to all but ignore the 2017 recommendation of the UN human rights

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<sup>94</sup> OHCHR, ‘Japan Must Halt Returns to Fukushima, Radiation Remains a Concern, Says UN Rights Expert’ (n 60); Also see UNHRC, ‘Report of the Special Rapporteur on the Implications for Human Rights of the Environmentally Sound Management and Disposal of Hazardous Substances and Wastes’ (Human Rights Council 2018) UN Doc A/73/567 (15 November 2018).

<sup>95</sup> UNHRC, ‘Report of the Special Rapporteur on the Right of Everyone to the Enjoyment of the Highest Attainable Standard of Physical and Mental Health, Anand Grover’ (n 59) para 47.

<sup>96</sup> *ibid.*

<sup>97</sup> UPR stands for Universal Periodic Review, the peer review mechanism of the Human Rights Council, which was installed by the Commission on Human Rights (the former body of the HRC) in 2008. On a four-and-a-half-year cycle, the Council assesses the human rights record of each UN Member State and produces a report.

<sup>98</sup> UNHRC, ‘Report of the Working Group on the Universal Periodic Review: Japan’ (Human Rights Council 2018) UN Doc A/HRC/37/15 (4 January 2018) para 161.215, 161.216.

monitoring mechanism (UPR)<sup>99</sup> and that the needs of IDPs and other vulnerable groups had not been sufficiently met.<sup>100</sup>

Despite these repeated calls, the 20 mSv/year reference dose has been never revised by the Japanese government and the forced migration and human rights frameworks have never been applied or reflected in the Fukushima post-accident policies.

However, the needs of nuclear disaster victims cannot be entirely addressed by the Guiding Principles or the IDP protection regime alone. As observed in the Fukushima case, a nuclear accident not only displaces but also traps people in a contaminated environment. Moreover, the protection in nuclear disasters always involves the question of risk threshold, or “tipping point” in the environmental migration jargon: How much risk is risky enough? From which degree of degradation or which threshold of contamination, is a movement of individuals considered displacement, no longer voluntary, thus in need of protection? These questions get even more complex when there are scientific controversies on the risk assessment such as the case of low-dose radiation effect. The problems of forced immobility and risk assessment are the typical issues of environmental disaster displacement, which are notably missing in the IDP protection framework. To fill this protection gap, this thesis looks into the emerging protection norms for environmentally displaced persons and international environmental law principles.

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<sup>99</sup> OHCHR, ‘Japan Must Halt Returns to Fukushima, Radiation Remains a Concern, Says UN Rights Expert’ (n 60).

<sup>100</sup> UNHRC, ‘Joint Communication from Special Procedures (The Special Rapporteur on Toxics and Human Rights; The Special Rapporteur on Human Rights and the Environment; the Special Rapporteur on the Right to Food; the Special Rapporteur on Freedom of Peaceful Assembly and of Association; The Special Rapporteur on the Right to Health; The Special Rapporteur on the Human Rights of IDPs; the Special Rapporteur on the Rights to Water and Sanitation)’ (Human Rights Council 2021) JPN 1/2021 (13 January 2021); OHCHR, ‘Japan Must Halt Returns to Fukushima, Radiation Remains a Concern, Says UN Rights Expert’ (n 60); OHCHR, ‘Japan Must Step up Efforts to Solve Human Rights Fallout from Fukushima Disaster: UN Experts’ *OHCHR Press Release* (11 March 2021) <<https://www.ohchr.org/en/press-releases/2021/03/japan-must-step-efforts-solve-human-rights-fallout-fukushima-disaster-un>> accessed 3 January 2023.

## C. Environmental Law Framework

A normative conflict with the nuclear regime is also posed by another *lex specialis*, international environmental law. Despite the professed “complementarity” between nuclear law and environmental law,<sup>101</sup> several principles of international environmental law confront the nuclear framework: notably, precautionary principle, polluter pays principle, procedural rights, and the principle of equity.<sup>102</sup> Nevertheless, the “peaceful” use of nuclear energy and nuclear accidents are said to fall in a gap of international environmental law.<sup>103</sup> This gap precisely involves ‘the protection of human life and dignity from threats associated with environmental degradation, especially when such threats result as a consequence of actions or inactions taken by an individual’s own national government’.<sup>104</sup> Typically, many Fukushima accident victims found themselves in such a situation particularly when the government decided not to evacuate them from radiation-affected areas by raising the dose criterion 20 times the prescribed dose limit. According to Luis E. Rodriguez-Rivera, a jurist of international environmental law, this is precisely where human rights law comes in to intersect with environmental law, implicating the notion of the right to a safe and healthy environment.<sup>105</sup> His suggestion was also collaborated by Michel Prieur who argued that the protection of persons in ecological disasters

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<sup>101</sup> Sam Emmerechts, ‘Environmental Law and Nuclear Law: A Growing Symbiosis’ (2008) 82 Nuclear Law Bulletin 91; Patrick Reyners, ‘Le droit nucléaire confronté au droit de l’environnement – Autonomie ou complémentarité?’ (2007) 1 Revue québécoise de droit international 149.

<sup>102</sup> Ved P Nanda, ‘International Environmental Norms Applicable to Nuclear Activities, with Particular Focus on Decisions of International Tribunals and International Settlements’ (2006) 35(1) Denver Journal of International Law and Policy 47; Anguel Anastassov, ‘The Sovereign Right to Peaceful Use of Nuclear Energy and International Environmental Law’ in Jonathan L Black-Branch and Dieter Fleck (eds), *Nuclear Non-Proliferation in International Law - Volume I* (TMC Asser Press 2014).

<sup>103</sup> Luis E Rodriguez-Rivera, ‘Is the Human Right to Environment Recognised under International Law - It Depends on the Source’ (2001) 12 Colorado Journal of International Environmental Law and Policy 1; Luis E Rodriguez-Rivera, ‘The Human Right to Environment and the Peaceful Use of Nuclear Energy’ (2006) 35 Denver Journal of International Law and Policy 173.

<sup>104</sup> Rodriguez-Rivera, ‘Is the Human Right to Environment Recognised under International Law - It Depends on the Source’ (n 101) 9. Rodriguez-Rivera is a professor of international environmental law at the University of Puerto Rico.

<sup>105</sup> Rodriguez-Rivera, ‘The Human Right to Environment and the Peaceful Use of Nuclear Energy’ (n 103).

concerns both classic human rights as well as ‘the new human rights to the environment’.<sup>106</sup> In his view, ‘a new global recognition of a human right to a safe environment should undoubtedly accompany a new universal recognition of the human rights of environmental victims’.<sup>107</sup>

Accordingly, this doctoral research explores international environmental law principles which would challenge the nuclear and radiation protection framework, especially the notion of environmental rights, with an aim to fill the protection gap left by the forced migration (IDP) framework for the protection of nuclear disaster victims.

## **1. Environmental Law Principles Applicable in Nuclear Disasters**

The core principles of international environmental law are articulated in the 1992 Rio Declaration on Environment and Development.<sup>108</sup> These include the principle of sustainable development, the principle of prevention, the polluter pays principle, the precautionary principle, procedural environmental rights, and the principle of intergenerational equity. In environmental law, these principles function as policy guidance for environmental regulation as well as legal concepts which would guide judicial decision-makings. Some of them have been incorporated into international environmental conventions, thus reflecting rules of customary law (e.g., the prevention principle).<sup>109</sup> Some nuclear law experts assert that certain

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<sup>106</sup> Michel Prieur, ‘Draft Convention on the International Status of Environmentally- Displaced Persons’ (International Centre of Comparative Environmental Law 2016) Report submitted to Executive Committee of the Warsaw International Mechanism for Loss and Damage, UNFCCC 1 <[https://unfccc.int/files/adaptation/groups\\_committees/loss\\_and\\_damage\\_executive\\_committee/application/pdf/prieur-convention\\_on\\_the\\_international\\_status\\_of\\_environmentally.pdf](https://unfccc.int/files/adaptation/groups_committees/loss_and_damage_executive_committee/application/pdf/prieur-convention_on_the_international_status_of_environmentally.pdf)> accessed 20 May 2019. Emphases added

<sup>107</sup> *ibid* 10.

<sup>108</sup> UNGA, ‘Report of the United Nations Conference on Environment and Development: Annex I Rio Declaration on Environment and Development’ (UN General Assembly 1992) UN Doc A/CONF.151/26 (Vol. I) (12 August 1992).

<sup>109</sup> Nicolas de Sadeleer, *Environmental Principles: From Political Slogans to Legal Rules*, vol Second edition (OUP Oxford 2020); Philippe Sands and Jacqueline Peel, *Principles of International Environmental Law* (4th edition, Cambridge University Press 2018).

principles have already been incorporated into the nuclear safety framework, and nuclear law and environmental law are in “a growing symbiosis”.<sup>110</sup>

One such “symbiosis” is indeed observed in the principle of sustainable development. Initially designed to invoke the issue of environmental protection into economic and social development projects, the principle has evolved over the years to become rather an ambivalent concept. The notion is increasingly accompanied by the principles of integration and conciliation in which social and economic considerations (often costs) must be put in balance with environmental protection. This, according to some legal scholars, led to the “*économisation*” of environmental law,<sup>111</sup> where economic interests are often prioritised in such balancing acts and environmental requirements end up being put aside.<sup>112</sup> Similarly, the principle of proportionality enshrined in the EU policy (Article 5 (1) (4), TEU) which is often applied to moderate environmental protection measures, for example, shows an interesting parallel with ICRP’s principle of optimisation. Under the principle, the level of preventive measures ‘do not necessarily have to be the highest that is technically possible’ if the economic cost of such measures exceeds consequent environmental gain<sup>113</sup>. Not surprisingly, three subject matters whose provisions under the EU Charter of Fundamental Rights (CFR) are ‘drafted as political statement rather than as individual rights’ and are constantly tempered by the principle of integration are environment, consumer and health protections.<sup>114</sup>

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<sup>110</sup> Reyners (n 101); Emmerechts (n 101).

<sup>111</sup> Raphaël Romi, ‘La “Transversalité”, Caractéristique, Moteur et Frein Du Droit de l’environnement.’, *Confluences. Mélanges en l’honneur de J. Morand-Deville* (Montchrestien 2007).

<sup>112</sup> Patrick Thieffry, *Handbook of European Environmental and Climate Law* (2nd edn, Bruylant 2021).

<sup>113</sup> *ibid* 79. The citation is from two case-laws of the European Court: Case C-284/95 *Safety hi-Tech Srl v S.&T. Srl* (1998) ECR I-04301, paras. 49 and 59; Case C-341/95 *Gianni Bettati v Safety hi-Tech Srl* (1998) ECR I-04355.

<sup>114</sup> Nicolas De Sadeleer, ‘Enforcing EUCHR Principles and Fundamental Rights in Environmental Cases’ (2012) 81 *Nordic Journal of International Law* 39, 43; Alexandre Kiss, ‘Environmental and Consumer Protection’, In S. Peers and A. Ward (eds), *The European Union Charter of Fundamental Rights* (Oxford, Hart 2004), cited by De Sadeleer (*ibid*). In the article, Kiss calls provisions of EUCFR relating to environmental protection (Article 37) and consumer protection (Article 38) as “*les parents pauvres*” of the Charter, provided with much less weight compared to other provisions (247).

However, many environmental law scholars argue that the nuclear regime has in fact many gaps with environmental law principles, especially the polluter-pays principle – nuclear liability regime – and provides extremely inadequate protection against nuclear risks.<sup>115</sup>

This incompleteness of secondary rules would also call into question the autonomy of nuclear law from the general international law,<sup>116</sup> implicating the applicability of state responsibility for transboundary damage. Though the nuclear regime is recognised as a strong form of *lex specialis*, or “self-contained regime”, the application of the general principle of state responsibility may not be precluded in the absence of ‘a full, exhaustive and definitive, set of secondary rules’.<sup>117</sup> The thesis will thus examine these gaps in detail and identify some environmental principles which could reinforce or complement the protection of population in the event of nuclear disasters, namely precautionary principle and polluter-pays principle.

## **2. The Right to a Safe and Healthy Environment**

The human right to environment – more broadly, environmental rights – is a concept which emerged during the 1960s and 1970s when the environmental movement was at its height in the US and other Western countries. But it is the Stockholm Declaration of 1972, the outcome document of the UN Conference on the Human Environment, which first incorporated the concept in the text, albeit non-binding in nature, galvanising the attention of the international community. Since then, the right to a safe, healthy, clean, sustainable, and ecologically-balanced (or other adjective) environment has been incorporated into 110 national constitutions in the

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<sup>115</sup> Nanda (n 102); Jon M Van Dyke, ‘Liability and Compensation for Harm Caused by Nuclear Activities’ (2006) 35 Denver Journal of International Law and Policy 13; Duncan EJ Currie, ‘The Problems and Gaps in the Nuclear Liability Conventions and an Analysis of How an Actual Claim Would Be Brought Under the Current Existing Treaty Regime in the Event of a Nuclear Accident’ (2006) 35 Denver Journal of International Law and Policy 85; Alexandre Kiss, ‘State Responsibility and Liability for Nuclear Damage’ (2006) 35 Denver Journal of International Law & Policy 67.

<sup>116</sup> Simma and Pulkowski (n 66). According to the authors, “self-contained regimes” shall be equipped with ‘a full, exhaustive and definitive set of secondary rules’ (p.493).

<sup>117</sup> *ibid* 493.



world<sup>118</sup> and recognised in several regional human rights and environmental instruments such as the African Charter on Human and Peoples' Rights<sup>119</sup> and the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention).<sup>120</sup> Nearly 50 years from the Stockholm Declaration, the UN General Assembly also adopted a resolution (76/300) in August 2022, clearly recognising this right and urging States, the international community, business, and other stakeholders to step up efforts to ensure a clean, healthy and sustainable environment for all.<sup>121</sup> The UN Human Right Council had adopted a similar resolution a year earlier.<sup>122</sup>

Based on the premise of Rodriguez-Rivera, the thesis will explore the way in which the right to a safe environment could be operationalised or practically applied in protecting persons in nuclear disasters. Building on the notion of “the right to a non-toxic environment”,<sup>123</sup> a substantive element of the right to a safe environment, this doctoral study will propound a new concept of right: namely, *the right to displacement*.<sup>124</sup> Alternatively called “the right to

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<sup>118</sup> UNHRC, ‘Right to a Healthy Environment: Good Practices; Report of the Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment’ (Human Rights Council 2019) UN Doc A/HRC/43/53 (30 December 2019).

<sup>119</sup> African Charter on Human and Peoples' Rights (adopted 27 June 1981, entered into force 21 October 1986) 1529 UNTS 217

<sup>120</sup> Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention) (adopted 25 June 1998, entered into force 30 October 2001) 2161 UNTS 447

<sup>121</sup> UNGA, ‘Res 76/300 The Human Right to a Clean, Healthy and Sustainable Environment’ (UN General Assembly 2022) UN Doc A/RES/76/300 (1 August 2022).

<sup>122</sup> UNHRC, ‘Resolution Adopted by the Human Rights Council on 8 October 2021’ (Human Rights Council 2021) UN Doc A/HRC/RES/48/13 (18 October 2021). The four abstaining countries are China, India, Japan and Russian Federation.

<sup>123</sup> UNHRC, ‘The Right to a Clean, Healthy and Sustainable Environment: Non-Toxic Environment - Report of the Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment’ (General Assembly, 12 January 2022) A/HRC/49/53.

<sup>124</sup> The term “the right to displacement” was also used by the CRIDEAU-OMIJ (University of Limoges) in the third version (2013) of the Draft Convention on the Status of Environmentally Displaced Persons. In the fourth version (2018), it was changed to ‘the right to travel’. See CRIDEAU-OMIJ (University of Limoges), ‘Draft Convention on the Status of Environmentally Displaced Persons’ (CIDCE 2013) Third Version.

evacuation”<sup>125</sup>, “move”<sup>126</sup>, or “travel”<sup>127</sup>, the establishment of such a right could be instrumental in addressing the specific plight of nuclear disasters victims in the situation of “voluntary” evacuation and the displacement-in-place.

### **III. The Objective, Methodology, and Structure of the Research**

In its 1996 Advisory Opinion, the ICJ described that nuclear weapons had ‘the potential to destroy all civilization and the entire ecosystem of the planet’.<sup>128</sup> Similarly, a nuclear accident is a peculiar human-made environmental disaster which, in the worst-case scenario, could potentially threaten the existence itself of a nation, directly or indirectly implicating the responsibility of the State, and thus quickly become a matter of extreme political sensitivity. Nuclear energy programmes, due to its sheer scale of political and financial stakes, its historic or continued link with weapons programmes, and its material sensitivity for national security, have always been part of the State project. As such, nuclear disaster response is very distinct from other disasters insomuch that the State intervenes in every aspect just as in post-war reconstruction. Against this, the current international regime of control run by the IAEA is rather toothless and even complicit as the Agency repeatedly emphasises the primacy of “a national responsibility” in all matters related to nuclear safety.<sup>129</sup>

In such a context, there is a need to establish a robust, effective, and authoritative international normative regime which would ensure the protection of individuals from the acts

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<sup>125</sup> Fukuda and Kawasaki (n 50).

<sup>126</sup> Richard Black and others, ‘Migration, Immobility and Displacement Outcomes Following Extreme Events’ (2013) 27 *Environmental Science & Policy* S32, S39.

<sup>127</sup> CRIDEAU-OMIJ (University of Limoges), ‘Draft Convention on the Status of Environmentally Displaced Persons’ (CIDCE 2018) Fourth Version.

<sup>128</sup> *Legality of the Threat or Use of Nuclear Weapons* (cited above) para 35

<sup>129</sup> IAEA and others, ‘Fundamental Safety Principles’ (IAEA 2006) Safety Fundamentals No. SF-1 para 1.2.; The European counterpart, Euratom, adopts the same approach on nuclear safety. See Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations OJ L 172/18, (8).

or omissions attributable to States which are often under the sway of political, economic, national security and industrial interests in nuclear disasters.

### **A. Main Objective of the Research**

Calling into question the adequacy and legitimacy of the nuclear regulation framework in providing relief and protection to nuclear disaster victims, this doctoral research aims to deconstruct current disaster response norms and propose a paradigm shift in dealing with nuclear disasters: in other words, the “denuclearisation” of nuclear disaster protection. It suggests detaching the protection aspect of nuclear disaster response from the nuclear regulation framework and aligning or incorporating it into the humanitarian and human rights frameworks, which are today regarded by the international community as the norm in managing disasters.

To realise this denuclearisation, this research identifies nuclear disaster victims as environmentally displaced and trapped persons and proposes a new set of protection norms that place human rights protection at the heart of disaster response and conforms to environmental law principles, thus filling the protection gap created by the nuclear normative framework. The proposal notably propounds a new concept – “the right to displacement” – derived from the right to a safe and healthy environment, which would address the specific plight of nuclear disaster victims, especially those in situations of “voluntary” evacuation and forced immobility.

This proposal does not, however, intend to formulate draft articles of a convention or a normative document, nor make a policy recommendation which entails practical and administrative guidance as to how to implement and finance protection measures. Instead, this normative proposal aims to contribute to a new international reflection and policymaking for the protection of persons in nuclear disasters by identifying key normative principles and

actions deemed indispensable for respecting, protecting, and ensuring the human rights of nuclear disaster victims.

Here, some terms used in this thesis need to be clarified. First, the term “victim” is used throughout the thesis beyond the strict legal definition of the term<sup>130</sup> in order to encompass potential victims who have not yet been recognised as such by courts or the government. In this thesis, “victims” are thus used interchangeably with “affected persons” and “affected population”. Secondly, the term “contaminated areas” or “contaminated territory” is generally used in this thesis to designate the areas where the effective dose<sup>131</sup> of a person, excluding medical or occupational exposure and the normal local natural background radiation, is expected to exceed 1 mSv per year in accordance with public dose limit. Finally, the term “nuclear disaster” is used in this thesis to designate nuclear accidents (unintentional) from both civil and military nuclear facilities (e.g. power plants, enrichment plants, waste management facilities, etc) in theory, but the focus of analysis will be largely placed on the former. Therefore, the protection norms that this thesis will propose are primarily designed for nuclear accidents at land-based civilian facilities.

## **B. Methodology and Originality of the Research**

To achieve these objectives, the doctoral research uses a case study of the 2011 Fukushima nuclear accident. The case indeed offers a unique opportunity to study a real-life

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<sup>130</sup> According to the Dalloz’s legal lexicon dictionary, criminal law does not provide any definition of the term “victim”. See Serge Guinchard and Thierry Debard (eds), *Lexique des termes juridiques (édition 2018/2019)* (26e édition, Dalloz 2018). Instead, the dictionary offers the definition made in the Council Framework Decision of 15 March 2001 on the standing of victims in criminal proceedings (2001/220/JHA): ‘a natural person who has suffered harm, including physical or mental injury, emotional suffering or economic loss, directly caused by acts or omissions that are in violation of the criminal law of a Member State’ (Article 1 (a)).

<sup>131</sup> As explained in the earlier footnote, effective dose is the total exposure dose of a whole body from both external and internal exposures, adjusted by calculating both the radiation and tissue weighting factors.

nuclear disaster management undertaken by a major nuclear country<sup>132</sup> which aligns itself with international nuclear safety norms established by the IAEA and ICRP. It notably allows the thesis to obtain a realistic picture as to how citizens are protected from a large nuclear accident by their governments today. In fact, the Fukushima response has since become the model for the nuclear disaster plan of many nuclear nations. As such, it is an ideal case to showcase today's "default" norm of nuclear disaster management and protection.

Secondly, the Fukushima case helps to unravel, despite some national specificities, the core underlying principles, or what Christine Fassert and Reiko Hasegawa call, the "implicit grounds" of the nuclear framework – a set of common assumptions, elements not clearly pronounced but always insinuated – adopted by many nuclear power nations and international nuclear institutions.<sup>133</sup> The Fukushima accident indeed offers a rare opportunity for researchers to access sensitive information regarding some of the key government decision-makings and closed-door discussions between the Cabinet members, ministry officials, the operator, and local government officials on the disaster management, contrary to the Chernobyl accident or any other nuclear disasters. This is largely because Japan is a functioning democracy where the access to information and freedom of expression are guaranteed by national laws and the Constitution, which obliges the government to disclose some internal information upon public request and to be generally transparent and accountable in its actions. Consequently, the official reports and the scholarly literature are abundant on the accident and most importantly, three comprehensive and independent accident investigation reports commissioned by the parliament,

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<sup>132</sup> At the time of the accident, Japan had a total of 54 nuclear power reactors with a total output of 48,847 MW, making the country the third-largest civil nuclear power in the world after the United States (98 reactors) and France (58 reactors). Japan is not a military nuclear power.

<sup>133</sup> Fassert and Hasegawa (n 42) 139.

the cabinet, and a civil society organisation respectively are available to the public.<sup>134</sup> And this accessibility is fully exploited by the author of this thesis, whose mother tongue is Japanese and who is also fluent in English and French.

This linguistic advantage of the author further enhances the originality of the case study. In fact, the analysis of this study is not only based on the secondary source of information but also the primary source, the data collected from field interviews with stakeholders. The author of this thesis has conducted more than 60 interviews with the affected persons, both evacuees and stayers, municipal and government officials, NGOs, experts and scholars in Japan between 2012 and 2018 under two research projects:<sup>135</sup> a French-Japanese joint research project, DEVAST (2011-2013),<sup>136</sup> funded by the French National Research Agency (ANR), and another French-Japanese research collaboration project, SHINRAI (2015-2018),<sup>137</sup> among Sciences Po, Tokyo Institute of Technology (Tokyo Tech), and l'Institut de radioprotection et de sûreté nucléaire (IRSN)<sup>138</sup>. This allows this research to gain a rare hands-on knowledge about the

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<sup>134</sup> NAIIC (n 20); Cabinet Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company, 'Final Report' (The Cabinet of Japan 2012); Cabinet Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company, 'Interim Report' (The Cabinet of Japan 2011); Rebuild Japan Initiative Foundation, 福島原発事故独立検証委員会：調査・検証報告書 (*The Independent Investigation Commission on the Fukushima Nuclear Accident: Investigation Report*) (Discover 21 2012).

<sup>135</sup> The field interviews were conducted in collaboration with Christine Fassert (sociologist/anthropologist, IRSN at the time) et Rina Kojima (post doctoral fellow, LATTTS/Université Gustave Eiffel). The questionnaire and the list of these field interviews are registered in respective project reports: Hasegawa, 'Disaster Evacuation from Japan's 2011 Tsunami Disaster and the Fukushima Nuclear Accident' (n 42); Fassert and Hasegawa (n 42).

<sup>136</sup> The Disaster Evacuation and Risk Perception in Democracies (DEVAST) project is a study aimed at examining two types of population displacement, one following Japan's 2011 tsunami and the other after the Fukushima nuclear accident, and making a comparative analysis between them. The project was implemented by IDDRI-Sciences Po in France, Tokyo Institute of Technology (Tokyo Tech) and Waseda University in Japan.

<sup>137</sup> SHINRAI means *trust* in Japanese. The project aims to examine the notion of trust toward public authorities and experts in the aftermath of the Fukushima nuclear accident and the question of return to the zones affected by the disaster.

<sup>138</sup> The Institute of Radiological Protection and Nuclear Safety is a French public expert institute whose mission is to provide technical expertise to public authorities, particularly the French Nuclear Safety Authority (ASN), and the public at large.

plight and lived experience of nuclear accident victims as well as the views and positions of the concerned authorities who were involved in the post-accident decision-makings.

In this doctoral thesis, the theoretical analysis is thus complemented and corroborated by the empirical study on the primary source. This hybrid method of analysis – theoretical and empirical – is intended to reinforce the robustness of arguments and the viability of normative proposals which will be made in the thesis. For the theoretical analysis, literature review is conducted from grey literature including court decisions, policy papers, and reports published by national governments, parliaments, local governments, NGOs, national and international courts, the UN and other international organisations, and media reports, as well as the secondary source in international legal studies (nuclear, human rights, humanitarian, refugee, disaster, and environmental laws), forced migration and environmental migration studies, and science and technology studies (STS), written in Japanese, English and French languages.

But the most unique aspect of this doctoral thesis is found in the way to look at nuclear disaster protection, through the “de-nuclearised” lens. Indeed, this research represents one of the rare concrete scholarly attempts to identify nuclear disaster victims as environmentally displaced and trapped persons, and to define, frame and theorise nuclear disaster displacement and immobility from the normative framework of forced migration, environmental migration in particular, which is founded on humanitarian, human rights and environmental law principles. In essence, it is the research which attempts to induce a paradigm shift – what this thesis calls the “de-nuclearisation” – in the conceptualization, normative regime, and institutional framework in dealing with nuclear disasters and the protection of their victims.

As a matter of fact, the international humanitarian (forced migration) and human rights communities had long been largely silent on nuclear disaster management and the civil nuclear

risk in general. Likewise, nuclear accidents had rarely been tackled by forced migration and human rights scholarly debates, resulting in a knowledge vacuum in understanding the specific plight and protection needs of nuclear disaster victims. In this vacuum, international nuclear institutions established themselves as the only legitimate authority to define protection norms and deal with the protection of the affected after nuclear accidents. The 2011 Fukushima accident brought a dramatic change to this status quo where the UN human rights regime intervened and gave a scathing review of not only the Fukushima nuclear accident management undertaken by the Japanese government but also the nuclear regulatory framework itself. Although these criticisms have not brought about an immediate change or an overhaul of nuclear disaster management model established by international and national nuclear authorities, they constitute an important first step to alter the way to look at and engage with nuclear accidents, especially as regards the protection of their victims, to which this thesis intends to make a meaningful contribution.

### **C. Structure of the Research**

To navigate the research, the thesis is divided into two parts. Part One, *Review of Current Protection Norms*, examines the current protection norms applied to nuclear disasters in the world, which are established by the international nuclear and radiation regulation regime. This Part conducts a theoretical analysis of the regime, tracing the history, philosophical and legal foundations, institutional setup, and the evolution of protection principles and norms (Title I). This analysis is then complemented by an empirical study of the Fukushima accident case (Title II). Part One of the thesis thus establishes the state of affairs of current nuclear disaster protection norms, based on which Part Two makes the normative appraisal and proposal.



Part Two, *Proposal of New Protection Norms*, conducts the legal critique of the above nuclear normative regime and proposes new alternative protection norms for nuclear disaster victims. This Part first examines international legal and normative frameworks which directly and indirectly challenge the nuclear normative framework: namely, humanitarian/forced migration, human rights, DRR, and environmental law regimes (Title I). After these probes, the thesis explores national laws and jurisprudence which have established the precedents for nuclear disaster victim protection from past disasters, namely the Hiroshima/Nagasaki atomic bombing, the Chernobyl accident, and the Fukushima accident, and finally proposes a new protection model which would incorporate lessons learned from the above-examined international normative principles and national precedents (Title II).



# Part One: Review of Current Protection Norms

As a first step towards defining new protection norms for nuclear accident victims, the doctoral research begins by examining the current ones. Nuclear disaster response and protection is today guided exclusively by the nuclear safety and radiation protection framework established by international nuclear and radiation regulation institutions such as the IAEA, ICRP and UNSCEAR – the international nuclear regime<sup>139</sup>. The essential question that the thesis asks in Part One is whether or not this nuclear framework is adequate and effective in protecting citizens against nuclear accidents. To probe this, the doctoral research conducts an in-depth case study of an actual disaster: the Fukushima Daiichi Nuclear Power Plant accident in 2011. The Japanese government’s post-accident management of Fukushima indeed reveals, despite some national specificities, the core underlying principles – what Christine Fassert and Reiko Hasegawa called the “implicit grounds” of the nuclear framework. A set of common assumptions, not clearly pronounced but always insinuated, is adopted by many nuclear power nations and international nuclear institutions, and thus represents a model of response ‘any other country would make’ in the event of a nuclear accident.<sup>140</sup>

With this in mind, the thesis first embarks on a thorough examination of the nuclear and radiation protection framework – its historic background, evolution, legal and institutional setup, and core principles and norms (Title I). This first Title identifies the initial motives, triggering events, core legal instruments, main policymakers and major tensions of the normative framework. It also conducts a critical analysis of current protection norms by

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<sup>139</sup> In this thesis, the term “regime” is used throughout in the sense defined by Stephen D. Krasner in 1982. It signifies “a set of implicit or explicit principles, norms, rules, and decision-making procedures around which actors’ expectations converge in a given area of international relations”. See Stephen D Krasner, ‘Structural Causes and Regime Consequences: Regimes as Intervening Variables’ (1982) 36 *International Organization* 185, 186.

<sup>140</sup> Fassert and Hasegawa (n 42) 139.

assessing the core principles, both explicit and implicit, and protection measures designed for nuclear disasters. The latter examination is conducted not only on international protection norms but also those of major nuclear countries in order to give an overall picture of the nuclear paradigm.

After reviewing the current nuclear protection norms, the thesis looks at a concrete example of implementing such norms in practice. The second half of Part One is thus dedicated to examining the case of the Fukushima nuclear accident (Title II). It first traces the introduction of the civil nuclear programme in Japan and the subsequent development of legal and institutional systems for nuclear regulation including the emergency preparedness and response (EP&R hereafter) mechanism. Against this background, the government response to the Fukushima disaster will be analysed: how was the existing EP&R implemented in an actual disaster? How did the authorities make decisions on post-accident policies and protection measures? Were these measures effective or robust enough to protect citizens from the disaster's effects? If not, what were the main causes for such gaps? The post-Fukushima protection scheme established by the Japanese government led to a creation of what this thesis calls "the Fukushima status" which provides access to specific social assistance and compensation upon meeting certain criteria. This status is not, however, a legal status defined by a specific law, but a normative status defined by policies and guidelines fixed by the Japanese authorities, which are non-binding in nature. The thesis makes an in-depth analysis of the criteria and scope of such a status and its consequences on the population and communities affected by the accident.

## **Title I: Protection Norms of the International Nuclear Regulation Regime**

Concern for protecting human life from nuclear risks only emerged following the discovery of radioactivity and nuclear fission by scientists during the first half of the 20<sup>th</sup> century. The nuclear regulation regime is essentially founded on two pillars: radiological protection and nuclear safety. The first aims to protect humans and the environment from adverse effects of ionising radiation, while the latter has an objective to prevent accidents and mitigate their effects when they do occur. These two systems in effect form today's nuclear disaster protection norms, with the principal role attached to the former.

This Title thus begins the examination of the first pillar, the international radiation protection framework, especially focused on the principles and norms established by the ICRP, which are today adopted by many nuclear powers and considered the international authoritative standards of radiation protection (Chapter 1). The second half of the Title then explores the international nuclear safety framework, especially its disaster response standards, established by the IAEA (Chapter 2). Chapter 2 also looks into national emergency preparedness & response (EP&R) systems installed by major nuclear powers such as the US and France with a view to cross-examine the international standards with national realities.

The objective of this Title is to deconstruct the nuclear regulation framework, or more broadly the international nuclear regime, founded on nuclear law principles since its inception. By doing so, the thesis attempts to decipher the core philosophical underpinning of the framework and identify its ambiguities and limits for protecting persons from the effects of nuclear disasters.



## **Chapter 1: Protection from Radiation Risk (Radiological Protection Regime)**

Radiation protection forms a major part of the nuclear disaster protection system today since the principal risk and damage emanating from a nuclear accident is to do with radiation. Protecting humans from radiation hazards was first conceptualised during the 1920s, a few decades after the discovery of radioactivity. However, safety norms were only applied to the professionals who handled radioactive materials at the time. After the Second World War, radiation safety began to concern the receiving end: patients, workers and, more broadly, members of the public. The discovery of nuclear fission and the subsequent development of atomic bombs and civil nuclear programmes changed the landscape surrounding radiation regulation. Radiation protection system was gradually transformed from a simple set of internal rules among doctors and scientists to a complex web of norms and principles applied to workers and ordinary citizens in both normal and disaster situations. The purpose of radiation protection has also evolved as the stakeholders of nuclear activities have changed. As the nuclear industry has grown into global enterprises with the development of civil nuclear programmes under state support, radiation protection norm-making has increasingly become susceptible to political pressures and industry lobbying.

This chapter aims to assess the effectiveness and adequacy of the radiation regulation regime in protecting persons from radiation hazards, especially in the event of nuclear accidents. To do this, it first traces the history of radiation regulation, identifies major actors of norm-making, and examines legal and normative structure of the regime (Section 1). Here, the history of radiation regulation is explored in depth since it constitutes a key aspect in understanding today's nuclear normative framework, especially its ambiguities and limits. The second half of the chapter dives into a web of current radiation protection norms established by these main actors (Section 2). It conducts an in-depth analysis of the core principles and philosophical

underpinnings of the regime as well as its dilemma and contradictions. Finally, the thesis tackles the ambiguities and uncertainties of scientific bases on which these norms were founded, and the limits of the radiation protection paradigm in protecting the population in nuclear disasters.

### **Section 1: Institutional and Legal System**

The history of ionising radiation began with scientific awe and public fascination in the late 19<sup>th</sup> century and evolved into a subject of scientific controversy and public fear in the latter half of the 20<sup>th</sup> century. The benefits of radiation, especially in medical diagnostics and treatments, have always been counterbalanced by the health hazard it produces. The debate has thus been centred around whether the hazard from radiation exposure outweighed the benefit that it produced.<sup>141</sup> Since scientific evidence over radiation effects, especially in low doses, is inconclusive, such questions find no clear answers and lead to constant and often heated debates. When the question of radiation safety was weighed against the development of nuclear armament or civil nuclear industry, such debate became further conflictual and politicized, pitting scientists against each other and triggering controversies well beyond the scientific sphere.

This first section of the chapter attempts to elucidate the origin and the development of the radiation regulation regime, especially focusing on the geopolitical context by which it has been shaped. It traces the transformation process of the radiation safety paradigm, shifting gradually from the purely scientific field to a hybrid platform where political and economic considerations weigh as much as scientific evidence. This historic analysis is crucial to understand today's radiation protection regime, whether in regard to its core principles, philosophical underpinnings and institutional structure, or to its protection standards. The

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<sup>141</sup> J Samuel Walker, *Permissible Dose: A History of Radiation Protection in the Twentieth Century* (University of California Press 2000).



section is thus composed of three paragraphs which examines the historic background (§1), major institutional actors (§2), and legal framework (§3) of the regime.

## **§1. History of Radiation Protection**

The history of radiation regulation bears not only on the current nuclear disaster response model but also on the ethos of today's entire nuclear regime. As such, the thesis makes a detailed probe into the history of radiation protection since its inception. This section is thus divided into four periods which profoundly shaped the development of the radiation protection regime. The first period is from the discovery of radioactivity until the atomic bombing of Hiroshima and Nagasaki (1895-1945) (A). The second period is from the end of the Second World War until the "lucky dragon" incident (1945-1956) (B), which will be followed by the third period shaken by the fallout controversy and the scientific alert on low-dose risk (1960s) (C). The fourth period will cover the civil nuclear energy rush and the transformation of radiation protection ethics (1970s-today).

### **A. Discovery of Radioactivity and Belated Recognition of Risk**

Health risk from exposure to ionising radiation was initially unknown to scientists, even among those who had discovered and manipulated it. Radioactivity was first discovered in the late 19<sup>th</sup> century. A German physicist, Wilhelm Konrad Roentgen, first discovered x-rays in 1895 and a year later French physicist Henri Becquerel discovered penetrating rays, similar to x-rays, from uranium. His work was further refined by Marie and Pierre Curie who discovered radium and polonium in 1898 and gave the term "radioactive" to describe the energy emissions from these materials. These discoveries brought significant advancement in medical treatment, physics research and industrial development but also led to numerous radiation

injuries, some of them lethal, to its handlers and receivers due to careless uses.<sup>142</sup> This is owing to the fact that radiation typically escapes all human senses: one can neither touch, see, hear, smell, nor taste radioactivity when one is exposed. The idea of regulating and protecting humans from radiation risk took more than 20 years to emerge following the discovery of radioactivity. Its norm-making has since been shaped by some major geopolitical events and public controversies.

The birth of radiation regulation can be traced back to the public outcry over “radium girls” in 1920s in the United States when the causal link between radium exposure and health problems afflicted on radium paint factory workers was established by medical scientists.<sup>143</sup> In the same period, the scientific community also established evidence of the harmful effect of ionising radiation on human cell structure. In 1928, the Nobel laureate geneticist Hermann J Muller demonstrated via the experiments using fruit flies that the exposure to x-rays caused genetic mutation, particularly in reproductive cells. According to his study, the mutagenesis occurred even with a small radiation dose, based on which he later argued that there was no threshold dose in ionising radiation that did not produce genetic mutation. This study notably contributed to the linear-no-threshold (LNT) hypothesis in radiological protection (which will be dealt with in detail in Section 2).

In the same year, the first global organisation on radiation regulation, the International X-Rays and Radium Protection Committee (IXRPC), was established at the Second

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<sup>142</sup> For example, Marie Curie died of aplastic anaemia, believed to be caused by her prolonged exposure to radioactive materials. The American inventor, Thomas A. Edison, who was fascinated by x-rays, made numerous experiments which later caused him eye and skin injuries. His assistant, Clarence M. Dally, suffered skin injuries to his hands and later died from metastatic carcinoma at the age of only 39 years old.

<sup>143</sup> Walker (n 141). Radium paint factories mostly employed young female workers who painted dials of watches and clocks with radium paint which glowed in dark. In order to make precise brush movements, workers were instructed to point the brush with their lips before dipping it into the paint. After a few years of working at the plant, many began to have problems with teeth and gums. Later, they developed face swelling, jawbone decay, and anaemia, which frequently led to a gravely paralysing state or painful death.

International Congress of Radiology held in Stockholm with an aim to formulate advice on radiation safety.<sup>144</sup> Since the IXRPC (later International Commission on Radiological Protection, or ICRP) was an international association of scientists, its recommendations had no legally binding effect but through the years they became the norm and authority in radiation protection. A year later in 1929, the American counterpart, the Advisory Committee on X-Rays and Radium Protection (ACXRP, later National Committee on Radiation Protection and Measurements, or NCRP) was created under the chairmanship of a physicist, Lauriston S. Taylor.<sup>145</sup> However, their initial advice only concerned the protection of physicians, x-rays technicians and other professionals who used and manipulated radioactive materials and not that of patients or members of the public who received radiation treatment.

## **B. Radiation Regulation under the Military/State Control**

The discovery of nuclear fission by German scientists Otto Hahn and Fritz Strassmann during the 1930s and the development of the first nuclear weapons by the US Manhattan Project<sup>146</sup> in the 1940s dramatically changed the context surrounding radiation safety. When the US dropped its first atomic bombs in Hiroshima and Nagasaki, thus ending the war in 1945, the world was at the dawn of the atomic era. The end of WWII was in fact the beginning of yet another global conflict – the Cold War – between the US and the Soviet Union. When the latter succeeded in developing its own atomic bomb in 1949, the American nuclear monopoly suddenly ended, and the nuclear arms race intensified between the two countries. In the US, the Atomic Energy Commission (AEC) was created in 1946 by the Atomic Energy Act (McMahon

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<sup>144</sup> The First International Congress of Radiology was held in London in 1925 inviting scientists and physicians around the globe (most participants were from the U.S. and European countries) to exchange knowledge and harmonise regulation of radiation use.

<sup>145</sup> Taylor was the American representative at IXRPC and later played the key role in reorganising IXRPC to ICRP in post-WWII. He was the Chairman of ACXRP and then NCRP for the following 49 years.

<sup>146</sup> The Manhattan Engineering District Project (the Manhattan Project) was a secret US military project in cooperation with the UK and Canada to develop the first nuclear weapons during World War II. It was led by Major General Leslie Groves of the U.S. Army Corps of Engineers.

Bill),<sup>147</sup> taking over the Manhattan Project and the mission to develop ever-more powerful nuclear weapons to win the arms race against the East Bloc. It was given absolute authority over all matters related to nuclear power including radiation regulation of fissionable materials. Under this militarisation of nuclear matters, radiation risks especially from fission products (i.e., bomb explosions) became an extremely sensitive issue as the AEC was eager to test newly developed weapons without arousing public concerns. At one point, the subject of radiation risk became so sensitive that government and military officials even used codenames to talk about radioactive materials.<sup>148</sup>

This competition between two nuclear superpowers triggered another consequential decision on the part of the US, which would determine the atomic age we all live in today. With the Soviet Union's possession of atomic bombs, America shifted its defence strategy from keeping the fission technology secret to exporting it to the world for a "peaceful" purpose – electricity generation – so as to control and contain nuclear proliferation, especially among the East Bloc. This change was announced by President Dwight D. Eisenhower at the 470th Plenary Meeting of the UN General Assembly in December 1953, which later came to be known as the "Atoms for Peace" speech. In the end, this strategy shift did not achieve its goal of containment but instead led to the proliferation of civil nuclear reactors and waste around the globe and a new era for radiation protection standard-making.

To deal with this new situation, both the American and international radiation protection committees were reorganised: the American committee (AXCRP) became National Committee on Radiation Protection (NCRP) in 1946 and the IXCRP was restructured to

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<sup>147</sup> Atomic Energy Act of 1946, Pub. L. 79-585, 60 Stat. 755

<sup>148</sup> For example, US officials used a codename "sunshine" to talk about Strontium-90 because they considered it to be the most harmful fissionable material produced from bomb test explosions. See Bo Lindell and David Sowby, 'The 1958 UNSCEAR Report' (2008) 28 *Journal of Radiological Protection* 277.; Lindell is former chair of ICRP and UNSCEAR and Sowby is former member of UNSCEAR.

International Commission on Radiological Protection (ICRP) in 1950. With a multiplication of bomb tests and a development of civil nuclear projects, the committees were facing a new challenge: the protection of the public against radiation exposure. Indeed, many radiation experts were very concerned with the genetic effects of radiation at the time. The 1928 findings of H.J. Muller and other works of geneticists demonstrated that radiation exposure induced mutations even with small doses (no threshold), whose effect is irreversible and cumulative over a lifetime and transmittable to offspring from a parent with no apparent radiation-induced injuries during his/her lifetime. When a large population is exposed to radiation, genetic damage done to human cells, no matter how small it is individually, could end up altering and harming the well-being of the entire population over generations. For this reason, the first ICRP recommendations (the 1951 and 1954 Recommendations) were extremely precautionary, strongly advising ‘that every effort be made to reduce exposures to all types of ionising radiation to the lowest possible level’.<sup>149</sup>

But radiation regulation was still under a tight control of the military. In the US, the AEC continued to control radiation regulation despite the creation of the NCRP.<sup>150</sup> The AEC conducted its own research on radiation effects in parallel to NCRP by authorising various experiments, often on human subjects, conducted in hospitals and universities. These notorious experiments included plutonium injections to hospital patients, and radioactive iron and calcium feeding to mentally disabled children.<sup>151</sup> The AEC was also the instigator of radiation effect research conducted on Hiroshima and Nagasaki bomb survivors in Japan. After the bomb

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<sup>149</sup> ICRP, ‘International Recommendations on Radiological Protection. Revised by the International Commission on Radiological Protection at the Sixth International Congress of Radiology, London, July 1950’ (1951) 24 Br. J. Radiol. 46, 1.

<sup>150</sup> Walker (n 141).

<sup>151</sup> *ibid*; Karl Z Morgan and Ken M Peterson, *The Angry Genie: One Man’s Walk through the Nuclear Age* (University of Oklahoma Press 1999).; The Bill Clinton administration (1993-2001) formed the Advisory Committee on Human Radiation Experiments which produced its report in 1995, which can be accessible at <https://www.osti.gov/opennet/servlets/purl/16141769/16141769.pdf>, consulted 16 November 2020.

attack, the US established the Atomic Bomb Casualty Commission (ABCC) in Hiroshima to study the long-term effects of radiation exposure on humans, namely the Life Span Study (LSS), which later became the authoritative scientific basis for international radiological protection norms.<sup>152</sup>

### C. Lucky Dragon and Radiation Fallout Controversies

This state/military grip on the information regarding radiation risk sparked both public and scientific controversies during the 1950s and 60s. It all began when a small Japanese fishing boat *Daigo fukuryu-maru* (Lucky Dragon Number 5) was heavily affected by the fallout from the American hydrogen bomb test, codenamed Castle Bravo, conducted in Bikini Atoll, Marshall Islands, in March 1954. The detonated bomb was 700 times more powerful than the A-bombs dropped in Hiroshima and Nagasaki. All 23 fishermen on board were exposed to high doses of radiation between 1.7 and 6.9 Gray (Gy) and manifested acute radiation syndromes such as nausea, skin burns, bleeding gums, and loss of hair upon return to the port, as a result of which the ship captain died six months later at the age of 40 (his estimated absorbed dose was 5.1–5.9 Gy).<sup>153</sup> This occurred despite the fact that the ship stayed out of the security perimeter zone set up by the US military for the test. The incident triggered a worldwide public concern over radiation effect from nuclear tests, which ultimately led to a bitter scientific controversy, a global anti-nuclear movement, and a major norm change in radiological

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<sup>152</sup> It was created in 1946. Japan was under the US military occupation between 1945 and 1952. Hiroko Takahashi, *封印されたヒロシマ・ナガサキ：米核実験と民間防衛計画 (The Classified Hiroshima and Nagasaki: The US Atomic Bomb Tests and the Civilian Defense Plan)* (2013 Edition (Original in 2008), Gaifusha 2013); Nakagawa (n 78).

<sup>153</sup> Source: Japan Atomic Energy Agency (JAEA) ATOMICA website ([https://atomica.jaea.go.jp/data/detail/dat\\_detail\\_09-03-02-16.html](https://atomica.jaea.go.jp/data/detail/dat_detail_09-03-02-16.html)); Gray is a unit expressing the amount of dose absorbed by an object or a person, but it does not describe the biological effects on a person. The effects are then expressed in sievert (S) which calculates the absorbed dose (gray) multiplied by the “radiation weighting factor” (e.g., for X-rays and gamma rays such as Caesium, the factor is 1) and “tissue weighting factor” (e.g., 0.12 for stomach, 0.08 for gonads, etc.).

protection. The Lucky Dragon incident effectively forced the issue of radiation risk out of the closed scientific and military circles and to enter the arena of public debates and scrutiny.

The AEC who oversaw the test published a report a year later in an attempt to calm down the controversy, which ended up instead fuelling it. It notably explained that radiation doses diffused from the test were too low to seriously threaten public health and that ‘the degree of risk must be balanced against the great importance of the test programs to the security of the nation’.<sup>154</sup> In other words, public health could be ultimately sacrificed to a certain degree for the sake of national security (i.e. winning the nuclear arms race against the Soviet Union). The AEC report was criticised even by the scientists who were once part of the Manhattan Project.<sup>155</sup> In the end, the incident compelled the AEC to turn to the scientific community in search of validation and restoration of public confidence. The AEC called for the scientific authority, the National Academy of Sciences (NAS), to investigate the effect of fallout and low-dose radiation. Subsequently, the NAS formed the Biological Effects of Atomic Radiation (BEAR) committee gathering more than 100 prominent experts, including those critical of AEC as well as those from government agencies and industry, and produced its first report (BEAR report) in 1956.<sup>156</sup>

The BEAR report, though it adopted a rather reassuring tone over the risk from bomb tests, sounded a serious alarm on the overall radiation effect to the future of humanity and other species on earth. According to the report, the proliferation of radioactivity, either by all-out nuclear war or nuclear waste accumulation from the global atomic power industry, would cause genetic mutations of humans over ‘hundreds of generations’ and lead to dire consequences for

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<sup>154</sup> Walker (n 141) 20.

<sup>155</sup> For example, Ralph E. Lapp, a physicist from the Manhattan Project, dismissed the report as containing ‘reckless or unsubstantiated statements’. See *ibid.*

<sup>156</sup> National Research Council/National Academy of Sciences, ‘The Biological Effects of Atomic Radiation: A Report to the Public’ (US National Academy of Sciences 1956) (BEAR Report).

the entire human race. It concluded that ‘[f]rom the point of view of genetics, they [radiation exposures] are all bad’.<sup>157</sup>

Following the publication of the BEAR report, both NCRP and ICRP drastically revised their protection standards by lowering the maximum permissible dose to one third of its previous recommendation:<sup>158</sup> from 150 mSv/year to 50 mSv/year for workers, and from 15 mSv/year to 5 mSv/year for the public. It also recognised for the first time the radiosensitivity of children and pregnant women (i.e. foetus).

Following the BEAR report, alarming articles on the danger related to low-dose radiation were also published by some renowned scientists, namely Arthur R. Tamplin and John W. Gofman, a former Manhattan-project biophysicist working at an AEC-funded laboratory of the University of California Berkeley. Their 1969 article notably expressed concern with the carcinogenic effects of low-dose exposure among the population from radioactive fallouts and the widespread commercial use of nuclear energy, urging the AEC to lower the public permissible dose to, at least, one tenth of the current standard.<sup>159</sup> The article also prompted another study by the NAS to review the scientific knowledge on low-dose radiation effects. This time the NAS created the Biological Effects of Ionizing Radiation (BEIR) committee, the successor of the BEAR committee, which published a report in 1972.<sup>160</sup> The conclusion was largely in line with Tamplin and Gofman’s arguments on the dangers of low dose radiation

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<sup>157</sup> *ibid* 20.

<sup>158</sup> ICRP, ‘Recommendations of the International Commission on Radiological Protection. ICRP Publication 1.’ (Pergamon Press 1959); The previous publication: ICRP, ‘Recommendations of the International Commission on Radiological Protection’ (1955) Suppl. 6 Br. J. Radiol.

<sup>159</sup> John W Gofman and Arthur R Tamplin, ‘Low Dose Radiation, Chromosomes, and Cancer’ (1969) IEEE Nuclear Science Symposium, San Francisco, 29 October 1969 <<https://ratical.org/radiation/CNR/GT-Reports/GT-101-69.pdf>> accessed 2 December 2020. In the article, Tamplin and Gofman suggested that if the entire American population received the permissible dose value fixed by the AEC and other federal agencies at the time, 17,000 additional cancer incidences would occur among the population annually and would cost the health service 170 million USD annually.

<sup>160</sup> National Research Council/National Academy of Sciences, ‘Effects on Populations of Exposure to Low Levels of Ionizing Radiation’ (US National Academy of Sciences 1972) (BEIR Report).



effects. Under the scientific uncertainty regarding low-dose effects, the BEIR report urged the adoption of the linear hypothesis, the dose-effect relationship, at low doses since it is ‘the only workable approach to numerical estimation of the risk in a population’.<sup>161</sup> Together with Tamplin and Gofman’s study, this pushed for a globalised adoption of the linear non-threshold dose-response (LNT) model as a protection paradigm in estimating somatic effects at low doses, which remains the baseline philosophy of radiation protection today.

#### **D. Civil Nuclear Energy Boom and Nuclear Industry’s Growing Influence**

Despite President Eisenhower’s ‘Atoms for Peace’ speech, the civil nuclear programme did not take off quickly in the US. The industry was trepid over liability insurance, safety, and economic prospects of such potentially dangerous activities. To address these concerns, the US government passed the Price–Anderson Nuclear Industries Indemnity Act (Price–Anderson Act) in 1957,<sup>162</sup> protecting in effect companies from ruinous claims in case of accidents and ensuring the viability of such activities. As a result, the civil nuclear sector boomed in the US during the mid-1960s where utility companies placed orders for the construction of about 50 nuclear installations just during the year 1966-67.<sup>163</sup>

By the 1970s,<sup>164</sup> the US nuclear industry had grown into a powerful business enterprise that often succeeded in pressuring the AEC to make the regulation more flexible.<sup>165</sup> Karl Morgan, an ex-Manhattan Project radiation expert who also served for both NCRP and ICRP, asserts that the nuclear industry had grown into ‘a multibillion-dollar enterprise with

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<sup>161</sup> *ibid* 89.

<sup>162</sup> Price-Anderson Act of 1957, Pub. L. 85-256, 42 U.S.C. 2210. Formally, An Act to amend the Atomic Energy Act of 1954, as amended, and for other purposes. The Act notably added Section 170 to the Atomic Energy Act of 1954, which established accident liability limits for the nuclear industry

<sup>163</sup> Walker (n 141).

<sup>164</sup> Most of the existing U.S. nuclear reactors were commissioned during the 1970s. Source: the US Energy Information Administration website (<https://www.eia.gov/todayinenergy/detail.php?id=30972>)

<sup>165</sup> Walker (n 141).

virtually unlimited resources and immense political influence' by the mid-1970s, and radiation experts including ICRP members were increasingly in its grip, remaining mindful of the preservation of the nuclear power business in their recommendations.<sup>166</sup> This was in part owing to the fact that some members were partially employed, or their research projects were funded by government agencies responsible for nuclear sector development, and thus hesitant to set standards which would put themselves at odds with them. Others may have done so to avoid defamatory attacks from the nuclear proponents, retain political recognition and credentials of their work, or follow the national priorities set by their governments.<sup>167</sup> In all cases, voicing concerns on radiation risks and challenging the government's protection standards became a risky task for radiation safety experts and those who did so often ended up being ousted or leaving their institutions. The earlier cited Gofman is one of these cases. Two years after the publication of the article, he lost the AEC's funding for his project and left the laboratory in 1971.<sup>168</sup> According to Morgan, 'anyone who challenges nuclear power must be prepared to withstand political, economic, and professional attacks'.<sup>169</sup> And this was not only the case in the US or in the past.<sup>170</sup> It still proves to be the reality in many nuclear power countries even today.<sup>171</sup>

Around the same time, ICRP and the US regulator (AEC) came up with a new concept of protection: the ALARA principle. During the 1950s, ICRP recommended that all exposures

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<sup>166</sup> Morgan and Peterson (n 151).

<sup>167</sup> Boudia (n 81).

<sup>168</sup> Source: UC Berkeley Press Release/Obituary

([https://www.berkeley.edu/news/media/releases/2007/09/04\\_GofmanObit.shtml](https://www.berkeley.edu/news/media/releases/2007/09/04_GofmanObit.shtml)), accessed 14 January 2023

<sup>169</sup> Morgan and Peterson (n 151) 83.

<sup>170</sup> For some examples in the French context, Sezin Topçu, *La France nucléaire. L'art de gouverner une technologie contestée* (Seuil 2013).

<sup>171</sup> For example, a sociologist working for the French IRSN was laid off after publishing a critical report on the Fukushima nuclear accident management in 2020. See Mouterde Perrine, 'Des chercheurs sur le nucléaire s'inquiètent après le licenciement d'une spécialiste de Fukushima' *Le Monde* (Paris, 6 January 2021) <[https://www.lemonde.fr/planete/article/2021/01/06/nucleaire-des-chercheurs-s-inquietent-apres-le-licenciement-d-une-specialiste-de-fukushima\\_6065304\\_3244.html](https://www.lemonde.fr/planete/article/2021/01/06/nucleaire-des-chercheurs-s-inquietent-apres-le-licenciement-d-une-specialiste-de-fukushima_6065304_3244.html)> accessed 14 January 2023.

to radiation should be kept ‘to the lowest possible level’ in order to avoid harmful effects of radiation.<sup>172</sup> But when it entered 1960s when commercial nuclear projects took off in the US and other countries, this principle was changed to a more relaxed and conditional one: doses shall be kept ‘as low as readily achievable (ALARA), economic and social considerations being taken into account’ (ICRP, 1966).<sup>173</sup> ICRP even published a report dedicated to the new concept (Publication 22, 1973) and advised the use of cost-benefit analysis as a medium to attain the ‘readily achievable’ dose level (this later became the basis for the principle of optimisation).<sup>174</sup> The publication also adjusted and replaced the adverb “readily” by “reasonably” and this ALARA – as low as reasonably achievable – rule was firmly established as a core radiation protection principle by both international and national regulators.

## **§2. Major Actors of International Norm-Making**

Today’s international regime of radiological protection is led by a triangular system composed of ICRP, IAEA and UNSCEAR. Among them, the ICRP is regarded as the international authority specialised on issues related to radiation protection. The ICRP makes recommendations based on the scientific reports issued by UNSCEAR and national research institutions such as the US National Academy of Sciences (BEAR/BEIR reports) and the Japan-US Radiation Effects Research Foundation (RERF).<sup>175</sup> Subsequently, the IAEA formulates its radiation protection guideline, ‘Radiation Protection and Safety of Radiation Sources:

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<sup>172</sup> ICRP, ‘International Recommendations on Radiological Protection. Revised by the International Commission on Radiological Protection at the Sixth International Congress of Radiology, London, July 1950’ (n 149) 1.

<sup>173</sup> ICRP, ‘Recommendations of the International Commission on Radiological Protection. ICRP Publication 9.’ (Pergamon Press 1966).

<sup>174</sup> ICRP, ‘Implications of Commission Recommendations That Doses Be Kept as Low as Readily Achievable. ICRP Publication 22.’ (Pergamon Press 1973).

<sup>175</sup> The RERF is the successor institute of the ABCC which was reorganised in 1975. It is jointly funded by the Japanese and US governments while the ABCC was the entity created and funded by the US government (AEC).

International Basic Safety Standards’ (so-called the BSS)<sup>176</sup>, based on these ICRP recommendations and the UNSCEAR reports.

Outside of the tripartite system, other international organisations play a more limited but still important role in defining international radiation protection norms. The International Commission on Radiation Units and Measurements (ICRU), created at the same time as ICRP, defines the units of ionising radiation, based on which the ICRP calculates and formulates dose standards. Also, the Euratom, a European nuclear regulatory authority, creates binding obligations for its member states based on the ICRP and IAEA recommendations. Among the UN agencies, the WHO establishes protection standards for medical uses of radioactivity. The International Labour Organization (ILO), the Food and Agriculture Organization (FAO), and the World Meteorological Organization (WMO) contribute, respectively, to the protection of radiation workers, food safety from radiological contamination, and the study of fallout effects and its atmospheric contaminations.

With a multiplication of international bodies in radiation protection, ICRP has signed specific agreements with most of these organisations, notably the IAEA, the WHO, and the UNSCEAR to formalise their working relationships. This tripartite norm-setting system supported by a web of cooperation agreements with other radiation-related agencies led to a harmonisation of protection standards across the globe but also to a monopoly of scientific views on radiation risk, fending off different opinions and criticisms from larger scientific communities.<sup>177</sup> A circulation and dual assignments of experts among the core three

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<sup>176</sup> IAEA and others, ‘Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards’ (n 77).

<sup>177</sup> Boudia (n 79); Christine Fassert and Tatiana Kasperski, ‘Risques Nucléaires : À Quand La Fin Du Monopole Des Experts Internationaux ?’ [2021] The Conversation <<http://theconversation.com/risques-nucleaires-a-quand-la-fin-du-monopole-des-experts-internationaux-159410>> accessed 9 April 2023.

organisations are also a common practice and this “consanguinity” of radiation experts enforced a monolithic regime of international radiation protection.<sup>178</sup>

The following are short presentations of the major actors in international radiation protection norm-making.

## A. ICRP

The International Commission on Radiological Protection was originally created as the International X-ray and Radium Protection Committee (IXRPC) at the 2nd International Congress of Radiology (ICR) in 1928 and reorganised to the current form in 1950. The first Chairman was Rolf Sievert, a Swedish medical physicist, after whom a unit of ionising radiation to measure the effect of low-dose radiation on the human body was named.<sup>179</sup>

The Commission is composed of the main commission, the scientific secretariat, four standing committees, and task groups. The main commission and the secretariat are the governing body deciding policy orientations and organising the work of the Commission. Committees are divided into four themes: 1) effects (to humans and the environment), 2) doses (dosimetric methodology), 3) medicine, and 4) application (of ICRP recommendations). Task groups, created by each committee to work on specific topics, prepare and develop ICRP reports. Some members occupy several posts among different committees and task groups while others work for only one committee or group. The Commission has around 250 members who are scientists, policymakers, and practitioners in radiation protection from more than 30 countries, predominantly those in possession of nuclear reactors.<sup>180</sup>

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<sup>178</sup> Boudia (n 81); Fassert and Kasperski (n 177).; Boudia provides an example of Swedish expert, Bo Lindell, who was the secretary of both ICRP and UNSCEAR at the same time in 1957, and another Swedish expert, Rolf M. Sievert, who became the President of UNSCEAR in 1958 after being the President of ICRP.

<sup>179</sup> After the assignment as the ICRP Chairman, Sievert became the Chair of the UNSCEAR for three years (1958-1960).

<sup>180</sup> Source: ICRP website on membership <[https://www.icrp.org/icrp\\_membership.asp](https://www.icrp.org/icrp_membership.asp)> consulted 4 April 2023

But the most distinct features of this international authority on radiation protection are its status and membership. While other main actors of the regime are intergovernmental agencies related to the UN family, ICRP is a non-governmental private organisation registered as a “charity” in England and Wales. It is financed by voluntary contributions from national nuclear regulatory and research institutions, related UN agencies, and other private entities supported by the nuclear industry.<sup>181</sup> As for the membership, the Commission adopts the co-optation system. This most likely results in assembling like-minded experts, keeping off those who have different or opposite views, and assuring relatively homogeneous views on radiation risk. Furthermore, the members are composed of not only scientists but also policymakers and practitioners, which would mean that their recommendations also accommodate other factors such as political and economic considerations in addition to scientific evidence. In summary, the most respected and authoritative radiation safety norms are made by a private charity registered in England and Wales with the closed membership of around 250 experts predominantly European and North American males, financed mostly by national nuclear authorities.

## **B. UNSCEAR**

The controversy triggered by the Lucky Dragon incident in the mid-1950s led to the creation of the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) in 1956. The idea to establish the Committee was initiated by Sweden and India who asked the UN to investigate the effects of bomb tests by gathering scientists around the globe, especially from non-nuclear weapon countries so as to provide impartiality and appease public fear.<sup>182</sup> Furthermore, UNSCEAR was also created purportedly with the intention of

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<sup>181</sup> ICRP, ‘ICRP 2021 Annual Report’ (International Commission on Radiological Protection 2022).

<sup>182</sup> Boudia (n 81).

major nuclear powers at the time ‘to deflect a proposal calling for an immediate end to all nuclear explosions’ by some UN Member States.<sup>183</sup> But in the final and current form, the Committee is represented only by 31 countries, the majority of which are nuclear power countries (only six non-nuclear States).<sup>184</sup> The UNSCEAR is composed of scientists selected by these Member States, instead of hiring their own through an open recruitment system. This means that they are vetted by respective governments before being sent to the Committee, most of which have nuclear programmes, possessing vested interests in the outcome of its deliberation.

For a comparison, let’s take the example of the Intergovernmental Panel on Climate Change (IPCC). It has 195 Member States and the experts are selected by the IPCC Bureau on the basis of their expertise and CVs following a call to governments and Observer Organizations.<sup>185</sup> For the nomination, the IPCC ‘tak[es] into account the range of scientific, technical and socio-economic views and backgrounds, as well as geographical and gender balance’, ensuring that ‘reports are not biased towards the perspective of any one region and that questions of importance to particular groups are not overlooked’.<sup>186</sup> None of this is the case with the UNSCEAR. The Committee’s setup is thus finally not as impartial and representative of the international scientific community as it had been hoped for by the original instigators.

UNSCEAR’s mission is defined as harmonising the knowledge on effects of ionising radiation by collating and reviewing national reports submitted by Member States, and thus not

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<sup>183</sup> Source: UNSCEAR website on its historical milestones <<https://www.unscear.org/unscear/en/about-us/historical-milestones.html>> accessed 4 April 2023.

<sup>184</sup> Source: UNSCEAR website on its Member States <<https://www.unscear.org/unscear/en/about-us/member-states.html>> accessed 4 April 2023. The non-nuclear countries that are members of the UNSCEAR are Algeria, Australia, Norway, Peru, Poland, and Sudan.

<sup>185</sup> Source: IPCC website <<https://www.ipcc.ch/about/structure/>> accessed 4 April 2023

<sup>186</sup> *ibid*

making recommendations on radiological protection as ICRP does. Since its inception, the Committee has issued 20 major reports on health effects from radiation. Its first report came out in 1958 but it lacked some key information regarding the status of environmental contamination because nuclear weapon states refused to release comprehensive data on the tests. For example, the information on carbon-14, a radionuclide released from thermonuclear explosions, was absent in the entire report due to the cold war secrecy and would not appear until the 1962 report.<sup>187</sup> Or, the 1957 Windscale accident in the UK was not mentioned at all in the 1958 UNSCEAR report because a delegate refused to use the data which were allegedly not submitted through “proper channels”.<sup>188</sup> Though these incidents represent a specific geopolitical context of the 1950s under the Cold War, UNSCEAR is not immune to political and diplomatic pressures of its Member States exercised through their nominated delegates.

Despite these aspects, UNSCEAR is today regarded as the international scientific reference and authority on radiation effects on humans and its environment. The Committee’s reports form the scientific basis for many radiation protection norms established by ICRP, IAEA, and other international and national regulators.

### **C. IAEA**

The 1953 Atoms for Peace address led to the creation of the International Atomic Energy Agency (IAEA) in 1957 which was assigned to promote the “peaceful” use of atomic energy, establish its safety standards, and control the proliferation of the technology for military

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<sup>187</sup> Lindell and Sowby (n 148).

<sup>188</sup> *ibid* 282.



use around the globe. It is an intergovernmental organisation with its own statute and belongs to the UN family as a Related Organisation.<sup>189</sup>

The Agency is given a mandate by its Statute (Article III.A.6) to establish safety standards for protection of health in collaboration with other UN or relevant organisations. Pursuant to the provision, it has issued a series of safety guidelines called Safety Standards Series including the one on radiation protection, the BSS.<sup>190</sup> The BSS and its complementary guides are formulated based on the ICRP and UNSCEAR reports. But these guidelines are primarily advisory since the Statute does not provide the IAEA with legal power to impose them on Member States unless they enter a cooperation agreement with the Agency.<sup>191</sup> (This point will be further elaborated in the next chapter on the nuclear safety regime.)

Notwithstanding, the BSS had largely been incorporated, in one way or another, into national regulations and legislations of many nuclear powers either through regional and international regulatory instruments, bilateral agreements, or simply peer pressures exercised by IAEA review missions and processes. As such, IAEA Safety Standards/BSS play a crucial role in establishing international radiation protection norms.

## **D. WHO**

The World Health Organisation also contributes to setting radiation protection standards, particularly around the medical uses of radiation. The WHO was created as a

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<sup>189</sup> Related Organizations of the UN are intergovernmental organisations which signed specific agreements with the United Nations. According to the agreement (INFCIRC/1130, October 1959), IAEA reports annually to the General Assembly and, when need arises, to the Security Council.

<sup>190</sup> IAEA and others, 'Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards' (n 77).

<sup>191</sup> Bernhard G Bechhoefer and Eric Stein, 'Atoms for Peace: The New International Atomic Energy Agency' (1956) 55 Michigan Law Review 747.; Under the NPT (Article III), each non-nuclear-weapon State Party is required to accept safeguards implemented by the IAEA in accordance with its Statute and safeguards system 'with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices'.

Specialised Agency of the UN in 1948,<sup>192</sup> whose Constitution sets its objective as ‘the attainment by all peoples of the highest possible level of health’ and recognises that ‘(t)he enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being’.<sup>193</sup> Despite this mandate, WHO produces a very limited number of stand-alone guidelines regarding radiation risk. And they are mainly concentrated on the iodine thyroid blocking (ITB) use in radiological emergencies, radon in dwelling, and the imaginary use for children.<sup>194</sup> All other topics related to radiation protection, from radiotherapy and other medical applications to the protection of people during nuclear emergencies, are issued by the IAEA within Safety Standards Series documents in which WHO is listed among other UN agencies as a co-sponsor.

The reason for this WHO’s passive or secondary role in radiation protection norm-making may be attributed to the cooperative agreement that the Organization has signed with IAEA in 1959: the WHA 12-40 agreement.<sup>195</sup> Article I of such agreement, Co-operation and Consultation, notably states that:

Whenever either organization proposes to initiate a programme or activity on a subject in which the other organization has or may have a substantial interest, the first party shall consult the other with a view to adjusting the matter by mutual agreement.<sup>196</sup>

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<sup>192</sup> Specialized Agencies of the UN are intergovernmental organisations which signed specific agreements with the United Nations and their work is coordinated by the Economic and Social Council (ECOSOC) of the UN. Their relationship is prescribed in the UN Charter (Article 57, 63 and others) while that of Related Agencies is not.; WHO’s publications on radiation-related topics include WHO, ‘Effect of Radiation on Human Heredity: Investigation of Areas of High Natural Radiation (First Report of the Expert Committee on Radiation)’ (World Health Organization 1958) EB23/24; WHO, ‘Medical Supervision in Radiation Work (Second Report of the Expert Committee on Radiation)’ (World Health Organization 1960); WHO, ‘Radiation Hazards in Perspective (Third Report of the Expert Committee on Radiation)’ (World Health Organization 1962).

<sup>193</sup> Constitution of the World Health Organization (adopted 22 July 1946, entered into force 7 April 1948) 221 UNTS 185, Article 1 and the Preamble.

<sup>194</sup> Source: WHO website <[https://www.who.int/health-topics/radiation#tab=tab\\_1](https://www.who.int/health-topics/radiation#tab=tab_1)> accessed 4 April 2023

<sup>195</sup> WHO, ‘Twelfth World Health Assembly, Geneva, 12-19 May 1959: Resolutions and Decisions: Plenary Meetings: Verbatim Records: Committees: Minutes and Reports: Annexes’ (World Health Organization 1959) 533.

<sup>196</sup> *ibid* 533, Article I.3.

Critics argue that the clause restrained WHO from working and communicating independently on matters related to radiation risk, creating a situation of subordination to the IAEA. They contend that WHO often recuses itself from engaging in the subject and thus fails to fulfil its core statutory responsibility – ‘attainment by all peoples of the highest possible level of health’.

Vivid controversies arose especially following the 1986 Chernobyl and the 2011 Fukushima nuclear accidents.<sup>197</sup> WHO was accused of being complicit in underestimating the health effects of the Chernobyl accident when its 2006 reports affirmed the IAEA’s account recognising only 50 radiation-induced deaths and 4,000 thyroid cancer cases among children in total.<sup>198</sup> It also created a controversy when WHO did not react to the decision of the Japanese government to raise the dose reference to 20 mSv/year, 20 times the public dose limit, for the population including children after the Fukushima accident. The editor of the medical journal *The Lancet* thus wrote in 2014, ‘...when it comes to Chernobyl and Fukushima and the threat of radioactive contamination, the truth may not have been fully told. And WHO has a responsibility to get to that truth, however uncomfortable it might be for member-states or related agencies’.<sup>199</sup> WHO defended its position by issuing a statement in 2001 and refuted

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<sup>197</sup> Inquiries on the WHO-IAEA agreement were also made by European and French parliament members. For example, WRITTEN QUESTION No. 2832/97 by Nuala AHERN to the Commission, ‘Agreement between the World Health Organization (WHO) and the International Atomic Energy Agency (IAEA) approved by the WHO Assembly on 28 May 1959’, OJ C 117, 16 April 1998 (p.75), available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A91997E002832>, consulted 13 December 2020.; Question orale n 0847S de Mme Aline Archimbaud (Seine-Saint-Denis -ECOLO), published in le JO Sénat on 31 July 2014 (p.1784), available (in French only) at <https://www.senat.fr/questions/base/2014/qSEQ14070847S.html>> accessed 13 December 2020

<sup>198</sup> For example, WHO, ‘Health Effects of the Chernobyl Accident and Special Health Care Programmes’ (World Health Organization 2006).; Also see the WHO’s news release on the topic dated on 5 September 2005, found at <https://www.who.int/news/item/05-09-2005-chernobyl-the-true-scale-of-the-accident>> accessed 12 December 2020

<sup>199</sup> Richard Horton, ‘Offline: The Day Bill Gates Crossed the Road’ (2014) 383 *The Lancet* 2110, 2110.; cited by the *Independent WHO* website (<https://independentwho.org/en/who-and-iaea-agreement/>)

such allegations by referring to the point 2 of Article I which acknowledges the IAEA's mandate 'without prejudice to the right of' the WHO to pursue its own mission.<sup>200</sup>

## **E. Euratom**

One year following the creation of IAEA, the European Atomic Energy Community (EAEC or Euratom) was established in the same spirit, with an aim to harmonise safety standards and radiation protection, promote nuclear research, and safeguard from developing the military atomic technology among European countries (except the ones who have already possessed it). It is a regional intergovernmental agency bound by the Treaty.<sup>201</sup> The most important difference from IAEA is that the Euratom has a stronger statutory power to make their safety standards obligatory. Once adopted as Council Directives, Member States are required to enact laws to achieve the result prescribed in the directives. Some of these major binding Euratom directives are explained in the following section (§3 B).

### **§3. Legal and Normative Framework of Radiation Regulation**

The international nuclear regulation regime is essentially governed by soft-law instruments – recommendations, guides, codes, basic standards, etc – which are non-binding in nature.<sup>202</sup> The regime of radiation protection is no exception. But the recommendations of the ICRP, non-binding instrument, form in reality the basis of all international and many national

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<sup>200</sup> WHO, 'Interpretation of WHO's agreement with the international Atomic Energy Agency (IAEA)', Statement WHO/06, 23 February 2001, found at <[https://www.who.int/ionizing\\_radiation/pub\\_meet/statement-iaea/en/](https://www.who.int/ionizing_radiation/pub_meet/statement-iaea/en/)> consulted on 11 December 2020.; Constitution of the World Health Organization, available at <https://apps.who.int/gb/bd/PDF/bd47/EN/constitution-en.pdf?ua=1>, consulted on 13 December 2020.

<sup>201</sup> The Treaty establishing the European Atomic Energy Community [1957] (the Euratom Treaty). It was adopted on the same day as the Treaty establishing the European Economic Community [1957] (EEC Treaty or the Treaty of Rome).

<sup>202</sup> Katia Boustany, 'The Development of Nuclear Law Making or the Art of Legal "Evasion"' (1998) 61 Nuclear Law Bulletin 39; cited by Emma Durand-Poudret, 'La Prise En Compte de l'environnement Dans Le Cadre Des Accidents Nucléaires: Quel Rôle Pour Le Droit International Après Fukushima?' in Mathilde Hautereau-Boutonnet (ed), *Après-Fukushima, regards juridiques franco-japonais* (Presses Universitaires d'Aix-Marseille 2014).

radiation protection regulations. Notably, the IAEA incorporated them into its Safety Standards on radiation protection, which resulted in adding further political weight to the ICRP recommendations due to the IAEA's Statute and the authority as an inter-governmental organisation.

The international regime of radiation protection has two legally binding instruments, but the extent of their coverage is rather limited due to the low number of signatories or the geographical restriction. The radiation safety regime is thus mainly governed by international normative documents and national legislations. This paragraph presents the cartography of both non-binding and legally binding instruments which constitute the international framework of radiological protection. It first describes major non-binding documents (A), which will be followed by the presentation of binding instruments (B).

### **A. Non-Binding Instruments: ICRP Publications and IAEA Basic Safety Standards (BSS)**

As mentioned earlier, the international authority on issues related to radiation protection is the ICRP. Since its first recommendation published in 1928, the Commission has issued about 150 publications on the general and specific topics of radiation protection. The basic structure of current protection norms and principles was formed around the 1970s, especially with the 1977 Recommendations (Publication 26)<sup>203</sup>, which was further elaborated by the 1990 Recommendations (Publication 60)<sup>204</sup> and completed by the 2007 Recommendations (Publication 103)<sup>205</sup>. As for nuclear accidents, dedicated reports have been published detailing emergency and long-term protective actions and the dose criteria which

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<sup>203</sup> ICRP, 'Recommendations of the International Commission on Radiological Protection. ICRP Publication 26.' (Pergamon Press 1977) Ann. ICRP 1 (3).

<sup>204</sup> ICRP, '1990 Recommendations of the International Commission on Radiological Protection. ICRP Publication 60.' (ICRP 1991) Ann. ICRP 21 (1-3).

<sup>205</sup> ICRP, 'The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.' (n 28).

should trigger these actions. The latest recommendation is Publication 146 which came out in 2020,<sup>206</sup> entitled ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident’, updating the previous publications on nuclear accidents: Publications 109 (emergency measures)<sup>207</sup> and 111 (long-term measures)<sup>208</sup>.

Most of these ICRP recommendations have been incorporated into the IAEA’s Safety Standards Series, notably the BSS.<sup>209</sup> The BSS was jointly compiled with other UN agencies, notably WHO which establishes a protocol for the administration of iodine thyroid blocking in case of emergencies.<sup>210</sup> This guideline is complemented by the Safety Guide, *Radiation Protection of the Public and the Environment* (GSG-8).<sup>211</sup> As discussed earlier, while ICRP recommendations are strictly non-binding despite its authority, the IAEA guidelines including BSS have more political weight since they become contractual obligations upon States if they enter a cooperation agreement with the Organisation. Moreover, countries that became Contracting Parties to the Convention on Nuclear Safety (CNS, hereafter) are required under Article 5 to submit National Reports to periodic Review Meetings among the Parties, organised by the IAEA.<sup>212</sup> In the National Reports, countries are advised to refer to the IAEA Safety Standards to make self-assessment on the level of safety that they have achieved and whether

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<sup>206</sup> ICRP, ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.’ (n 38).

<sup>207</sup> ICRP, ‘Application of the Commission’s Recommendations for the Protection of People in Emergency Exposure Situations. ICRP Publication 109.’ (Elsevier 2009) Ann. ICRP 39 (1).

<sup>208</sup> ICRP, ‘Application of the Commission’s Recommendations to the Protection of People Living in Long-Term Contaminated Areas after a Nuclear Accident or a Radiation Emergency. ICRP Publication 111.’ (n 18).

<sup>209</sup> IAEA and others, ‘Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards’ (n 77).

<sup>210</sup> WHO, ‘Iodine Thyroid Blocking: Guidelines for Use in Planning and Responding to Radiological and Nuclear Emergencies’ (World Health Organization 2017).

<sup>211</sup> IAEA, ‘Radiation Protection of the Public and the Environment’ (International Atomic Energy Agency 2018) GSG-8.

<sup>212</sup> The Convention on Nuclear Safety (adopted on 20 September 1994, entered into force on 24 October 1996) 1963 UNTS 293 (CNS); The substance of CNS will be analysed in the following chapter.

they have met the obligations of the Convention.<sup>213</sup> These procedures incite many national governments to incorporate the Safety Standards into their legislation and regulation.

## **B. Legally Binding Instruments: ILO Convention and Euratom Directives**

The first global international instrument established on radiation protection is the International Labour Organisation (ILO) Convention No. 115, entitled ‘Convention concerning the Protection of Workers against Ionizing Radiation’, which was adopted in 1960.<sup>214</sup> The Convention is supplemented by Recommendation No.114, entitled ‘Radiation Protection Recommendation’, adopted also in 1960. But the Convention does not have any technical annexes which would fix numerical dose values for protection and simply advises Contracting Parties to refer to the ICRP recommendations for fixing maximum permissible levels (in today’s term, ‘dose limits’). Furthermore, the number of ratifications remains low, 50 countries in total, compared to the CNS which has 91 Parties. And some of the major nuclear powers such as the US, China and Canada are not parties to the Convention. Lastly, the Convention only deals with the protection of workers, not the general public. Therefore, it is difficult to say that the Convention represents a truly global regime of reference for radiation protection.

The second international binding document on radiation protection is a regional instrument which applies only among EU member states, but its scope and impact are more significant than the ILO Convention. The Euratom Treaty (Article 2 (b)) obliges the European Community to ‘establish uniform safety standards to protect the health of workers and of the general public’ against dangers arising from ionising radiation and to ‘ensure that they are applied’. As such, the European Commission adopted the first directive on radiation protection,

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<sup>213</sup> IAEA, ‘Guidelines Regarding National Reports under the Convention on Nuclear Safety’ (International Atomic Energy Agency 2015) INFCIRC/572/Rev.5.

<sup>214</sup> Convention (No. 115) concerning the Protection of Workers against Ionising Radiations (adopted 22 June 1960, entered into force 17 June 1962) 6208 UNTS 40

‘the Basic Safety Standards for the Protection of the Health of Workers and the General Public against Dangers Arising from Ionizing Radiation’ on 2 February 1959.<sup>215</sup> Since then, the directive has been revised and replaced by new ones as the ICRP recommendations and the IAEA’s BSS have been renewed. The latest version is the Council Directive 2013/59/Euratom adopted in 2013.<sup>216</sup> Once issued by the Commission, directives are binding on its member states, though with some discretion on the form and method to achieve the goal set out in the directives.<sup>217</sup>

In contrast with the ILO Convention, the Euratom directive prescribes radiation safety norms not only for workers but also for the general public in both normal and emergency situations, as well as contains 19 annexes which detail protection norms and dose values that roughly follow the ICRP and IAEA standards. The scope of application is limited to the European region but its member states in fact represent nearly half of the world’s civil nuclear powers with commercial reactors. The Euratom thus plays an important role in enforcing the safety norms established by the ICRP and IAEA among nuclear power nations.<sup>218</sup>

## **Section 2: Current Protection Norms and their Ambiguities**

After having studied the historic evolution and the institutional and legal system of the international radiation protection regime, this section presents the current radiation safety norms and principles established by the regime, particularly focusing on those of the ICRP. It explores their ideological underpinnings as well as their limits and contradictions. First, it navigates the current protection system built on a complex dose restriction mechanism and three

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<sup>215</sup> OJ P 11, 20.02.1959, 221.

<sup>216</sup> Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionizing radiation OJ L13/1 (Radiation Protection Directive)

<sup>217</sup> Source: Article 288 of the Treaty on the Functioning of the European Union (TFEU)

<sup>218</sup> Out of 31 countries with civil nuclear reactors, 13 are EU Member States (France, Germany, Sweden, Spain, Belgium, Czech Rep., Finland, Bulgaria, Hungary, Slovakia, Romania, Netherlands, and Slovenia) and two are Associated Members of the Euratom (Switzerland and the UK).



core principles (§1). After the analysis of the norms, the section deconstructs different conceptual terms used in the system and identifies the core ideologies of radiation protection with a view to grasp the ethos or “implicit grounds” of the radiation protection paradigm (§2). The overall objective of this section is to assess whether the current radiation protection system is sufficiently protective for the population and, if not, to find out possible reasons for this inadequacy.

## **§1. Protection Norms and Principles**

The current normative system was established by the 2007 ICRP Recommendations (Publication 103) whose foundation can be traced back to the 1977 Recommendations (Publication 26). The system relies on the method of dose restriction and the doctrine of optimisation and justification. The dose mechanism of radiation protection is quite complex since dose restriction policies and dose levels change according to the situation and category of radiation exposure. In addition, protection principles tend to introduce, rather than reduce, further ambiguities and conditionalities to the mechanism. This paragraph first describes the dose normative system (A), after which it elucidates the core doctrines of radiological protection (B).

### **A. Dose Norms and Restriction System**

The notion of “dose limit” originates from the “tolerance dose” or “maximum permissible dose”, the dose restriction concepts which had been used by the ICRP since its inception to regulate radiation hazards. They were neither definitive nor universal threshold value below which health effects would not occur but rather a sort of reference to reduce injuries in view of scientific knowledge available at the time. This basic idea remains relevant for today’s protection norms. Essentially, dose standards are something inconclusive, provisional

and possibly arbitrary since they have evolved not only in keeping with the latest scientific findings at the time but also in adapting to the political contexts and societal pressures of the time. For example, the dose restriction (constraint) level for workers has been changed from 500 mSv/year, the first dose standard fixed back in the 1930s, to 20 mSv/year today. For the public, it was initially set at 15 mSv/year in the 1950s and had been reduced to 1 mSv/year over 40 years. These significant reductions in dose levels over the years indicate that there is a scientific uncertainty around radiation risk, especially at low doses, and always a possibility to underestimate, rather than overestimate, radiation risks.

With these in mind, this sub-paragraph elucidates the current radiation protection system instituted by the ICRP and adopted by the IAEA. Over the years, the system has become a sort of flexible toolbox with different sets of dose restriction concepts and levels, which shifts and adapts to various situations. The thesis tries to deconstruct this complex mechanism by spelling out these different categories and dose restriction concepts.

### 1. Three Categories of Individuals

ICRP identifies three categories of individuals (and corresponding exposures) as the object of radiation protection: workers (occupational exposure), the public (public exposure), and patients (medical exposure). Workers are defined as ‘any person who is employed, whether full time, part time, or temporarily, by an employer and who has recognised rights and duties in relation to occupational radiological protection’.<sup>219</sup> In contrast, a member of the public is defined as ‘any individual who receives an exposure that is neither occupational nor medical’.<sup>220</sup> Here, one needs to pay attention to what is excluded from the “public exposure” in the ICRP

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<sup>219</sup> ICRP, ‘The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.’ (n 28) 84.

<sup>220</sup> *ibid* 86.

lexicon. “Public exposure” excludes, in addition to occupational and medical exposures, ‘the normal local natural background radiation’ (e.g. cosmic rays), thus accounting only the “abnormal” local artificial or natural radiation (e.g. new accidents, new fallouts, waste site, radon, etc).<sup>221</sup> In addition, the local *artificial background* radiation resulted from past bomb-test fallouts, past accidents (i.e. Chernobyl), and global circulation of effluent releases can be excluded from the scope of radiation protection because they are considered “not amenable to control” (the principle of exclusion and exemption in radiation regulation will be further examined in the following paragraph).<sup>222</sup> As such, the ICRP’s definition of exposure categories, notably “public exposure”, is quite specific, complex, exclusive and possibly arbitrary.<sup>223</sup>

The third category, a patient, is defined as ‘an individual who receives an exposure associated with a diagnostic, interventional, or therapeutic procedure’.<sup>224</sup> In medical exposure, the exposure is intentional and for the direct benefit of the patient and thus there is a separate guidance for this type of exposure.

## 2. Three Categories of Exposure Situations

ICRP then sets dose criteria for each category of individuals according to different exposure situations. In other words, the protection dose value changes according to the type of individuals or situations. There are three types of exposure situations, namely Planned Exposure Situations, Emergency Exposure Situations, and Existing Exposure Situations:

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<sup>221</sup> *ibid* 29.

<sup>222</sup> ICRP, ‘Scope of Radiological Protection Control Measures. ICRP Publication 104.’ (2007) Ann. ICRP 37 (5) 42.

<sup>223</sup> For example, the exposure from cosmic rays for commercial aircraft crews is recognised as occupational exposure while the exposure of frequent flyer passengers is not accounted for any radiation control. ICRP, ‘The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.’ (n 28) 86.

<sup>224</sup> *ibid* 87.

- *Planned exposure situations* are defined as situations where exposure occurs as anticipated (normal exposures), which also includes some unexpected exposure situations (potential exposures) such as entering an irradiation room by mistake. In the said situations, ‘radiological protection can be planned in advance, before exposures occur, and where the magnitude and extent of the exposures can be reasonably predicted’.<sup>225</sup> Examples of these circumstances include working at nuclear power plants under regular operations, medical facilities which use radiological equipment, and in industrial radiography, as well as living in the proximity of waste disposal sites or active (or former) uranium mines.

- *Emergency exposure situations* are defined as ‘unexpected situations that may require urgent protective actions, and perhaps also longer-term protective actions, to be implemented’. Examples of the situations are radiological emergencies and major accidents at nuclear facilities.<sup>226</sup>

- *Existing exposure situations* are those where radiation exposure already exists and has existed for a long time, and a decision on control is to be made. They include living in a long-term contaminated territory after major accidents and radon-affected environment. These are typically the circumstances where ICRP’s advice becomes quite ambiguous. It says that national authorities are the ones to decide whether or not to regulate such exposures by making judgement on the basis of ‘controllability of the source or exposure’ and ‘prevailing economic, societal, and cultural circumstances’.<sup>227</sup>

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<sup>225</sup> ibid 103.

<sup>226</sup> ibid 108.

<sup>227</sup> ibid 111.

### 3. Three Concepts of Dose Restrictions

Depending on the different exposure situations, ICRP applies three different concepts and numerical values of dose restriction: dose limits, dose constraints and reference levels. The first two notions are applied only in planned exposure situations (except medical exposures) while the last one is only used in existing and emergency exposure situations.

#### *Dose Limit*

ICRP defines dose limits as ‘a level of dose above which the consequences for the individual would be widely regarded as *unacceptable*’ in normal circumstances.<sup>228</sup> For occupational exposures, this limit is fixed as 20 mSv/year, averaged over 5 years (100 mSv in 5 years), and should not exceed 50 mSv in any single year. For public exposures, the level is established at 1 mSv/year. As described earlier, this public dose limit does not apply in the case of medical and occupational exposures. These norms are prescribed by the Euratom Directive (2013/59/Euratom), thus legally binding on the Member States of the Euratom, which represents about half of civil nuclear countries in the world. The ICRP emphasises that such limits are not absolute values and ‘it will never be appropriate to apply dose limits to all types of exposure in all circumstances’.<sup>229</sup> It especially advises against the use of dose limit in the event of a major nuclear accident (emergency exposure situations) since it ‘can be dealt with only by intervention’ (later called “protective action”).<sup>230</sup> The same explanation is given for the case of radon exposure in dwellings (existing exposure situation). According to the ICRP, such exposure is not considered “unacceptable” even though the doses often exceed public dose

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<sup>228</sup> ICRP, ‘1990 Recommendations of the International Commission on Radiological Protection. ICRP Publication 60.’ (n 204) 36. Emphasis added

<sup>229</sup> *ibid* 31.

<sup>230</sup> *ibid* 45. According to the publication (Publication 60), “intervention” in public exposure means implementing protective actions aimed at reducing doses. In the later recommendation (Publication 103, 2007), ICRP replaced the term “intervention” with “protective actions”.

limit because ‘the existence of these sources<sup>231</sup> may be undesirable, but it is not a matter of choice’.<sup>232</sup> In existing and emergency situations where radiation sources are partly or totally beyond one’s control, the optimisation of protection<sup>233</sup> is ‘the more appropriate course of action’ than the dose limit.

These explanations are quite cumbersome and unclear as to why the use of dose limit applies only for certain situations and not for others while it deals with the protection of the same human species. Also, it is not clear why the dose level which was previously considered “unacceptable” becomes somehow “acceptable” as soon as there is a nuclear emergency or radon in dwelling. These points will be further elaborated in the following paragraph on the ambiguities and limitations of radiation protection.

### *Dose Constraints and Reference Levels*

The other two dose restriction concepts are dose constraint and reference level. The ICRP defines “dose constraint” as ‘a level of dose above which it is unlikely that protection is optimized for a given source of exposure’ and “reference levels” as a level of dose ‘above which it is judged to be inappropriate to plan to allow exposures to occur’.<sup>234</sup> Both descriptions are quite clumsy and imprecise, thus open to different interpretations. In effect, dose constraints and reference levels are to be determined by national authorities through the optimisation process, that is, the selection of ‘the best level of protection that can be achieved under the

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<sup>231</sup> The term ‘source’ is used by ICRP as the cause of an exposure, and not necessarily a physical source of radiation (Publication 103, 2007).

<sup>232</sup> ICRP, ‘1990 Recommendations of the International Commission on Radiological Protection. ICRP Publication 60.’ (n 204) 45. According to the recommendation, the intervention (protective actions) in the case of radon in dwellings involves making modifications to the dwellings or to the behaviour of the occupants, without mentioning any other options including resettlement.

<sup>233</sup> The optimisation of protection is one of the three core radiological protection concepts developed by ICRP. It is defined as a process ‘to keep the likelihood of incurring exposures, the number of people exposed, and the magnitude of individual doses as low as reasonably achievable, taking economic and societal factors into account’ (ICRP Publication 103, 2007). For details, see the following sub-paragraph (B. Protection Principles).

<sup>234</sup> ICRP, ‘The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.’ (n 28) 94, 95.

prevailing circumstances'.<sup>235</sup> For this, the ICRP suggests a certain band of doses to choose from, depending on the type of exposure (occupational, public, or medical) and situations (planned, emergency, or existing), emphasising that both concepts do not represent 'a demarcation between "safe" and "dangerous" doses'.<sup>236</sup> In a way, they are like dose limits with more flexibility so that national regulatory authorities can have more options or time to deal with unexpected or uncontrollable exposure situations.

Indeed, these concepts do indicate the political sensitivity of the ICRP towards the governments of nuclear powers. For example, dose bands for reference levels had not been provided by the ICRP until the 1980s.<sup>237</sup> Prior to that period, it only suggested to refer to the recommendations made by the UK Medical Research Council (MRC) and the US Federal Radiation Council (FRC)<sup>238</sup> for selecting the action (reference) levels.<sup>239</sup> Effectively, "uncontrollable" exposure situations such as fallouts and reactor accidents were extremely sensitive topics during the 1960s, especially for nuclear powers such as the US and the United Kingdom who intensified weapon tests and strived to expand civil nuclear programmes. The vagueness of ICRP recommendations over reference levels in existing and emergency exposure situations can be interpreted as its political consideration reserved for these powerful nuclear

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<sup>235</sup> *ibid* 92.

<sup>236</sup> *ibid* 94.

<sup>237</sup> The dose values for action (reference) levels appear for the first time in 'Protection of the Public in the Event of Major Radiation Accidents: Principles for Planning. ICRP Publication 40.' (Pergamon Press 1984) Ann. ICRP 14 (2).

<sup>238</sup> Created by President Eisenhower in 1959 (Executive Order 10831/Public Law 86-373), the FRC was tasked to formulate radiation standards and advise all federal agencies related to radiation matters. But the Council was not a regulatory body and did not have any binding authority over other federal agencies. The function of FRC was then transferred to the Environmental Protection Agency (EPA), established in 1970, consolidating several environment-related agencies, who had an authority this time to regulate hazardous materials including radioactive materials. But the real authority to regulate radiation matters stayed with the AEC despite the creation of the EPA. For details, see Cynthia Gillian Jones, 'A Review of the History of U.S. Radiation Protection Regulations, Recommendations, and Standards' (2005) 88(2) *Health Physics* 105.

<sup>239</sup> ICRP, 'Recommendations of the International Commission on Radiological Protection. ICRP Publication 9.' (n 173).

nations, dodging potential cold-shoulder reactions from and stay relevant for these donor nations.

Though they share the baseline concept, dose constraint and reference level are used in a different manner and circumstance. Dose constraint is used only in planned exposure situations and set against one source of exposure. Its level is thus always fixed below the dose limit.<sup>240</sup> In contrast, reference level is devised only in case of emergency and existing exposure situations to trigger a protective action to reduce doses, whose level is usually fixed above the dose limit. The ICRP explains that dose constraint is something we can forecast and decide in advance and shall not generally be exceeded, while reference level can be fixed after an event and is more like a benchmark where efforts to reduce doses shall continue. To cite an example, dose constraint is to be set in case of residing in the proximity of a waste disposal site or a uranium mine (planned exposure situations), while reference level shall be established for evacuation of residents following a radiological emergency (emergency exposure situation).

As for dose constraint, the ICRP recommends a band of 1 mSv/year or less for public exposures by explaining that this exposure situation usually gives little or no benefit to individuals while it benefits the society in general. For occupational exposures, a dose range between 1-20 mSv/year is suggested because ‘individuals will usually receive benefit from the exposure situation but not necessarily from the exposure itself’.<sup>241</sup>

As for reference level, a band of 1-20 mSv/year is recommended for members of the public in existing exposure situations such as living in a long-term contaminated territory after an accident or in a radon-affected territory. In the most recent publications, the ICRP further

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<sup>240</sup> Dose limit is a sum of exposure doses from different sources while dose constraint is set against one source of exposure and shall therefore be fixed below the dose limit.

<sup>241</sup> ICRP, ‘The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.’ (n 28) 97.



specifies that the level for post-accident situations shall be selected from ‘the lower end’ or ‘the lower half’ of 1-20 mSv/year (i.e. less than 10 mSv/year).<sup>242</sup> Likewise for the case of radon exposure, the ICRP also recommends a dose band of less than 10 mSv/year. Therefore, the latest norm of public reference dose in existing exposure situations is between 1-10 mSv/year, rather than 1-20 mSv/year. For emergency exposure situations (e.g., nuclear accident), this band is raised as high as 20-100 mSv/year for the public. Protective actions are to be implemented upon predetermined “trigger” events or according to the reference level fixed from the said band of doses.<sup>243</sup>

The ICRP had long been quite vague on the “trigger” criteria for protective actions, leaving ample space for national authorities to determine as it fits to their capacities and disaster circumstances. But the latest publication finally admitted that the reference level for the public in nuclear emergencies would be most appropriate in *doses below 20 mSv*, instead of between 20-100 mSv. For workers and rescuers, reference dose levels beyond 100 mSv are also suggested by the ICRP as exceptional measures in view of preventing a catastrophic scenario or saving lives. But the ICRP alerts that dose levels higher than 100 mSv significantly increase the likelihood of deterministic effects and cancer risks, for which there is no individual or societal benefit except in extreme circumstances. The following table summarised this dose restriction system (Table 1).

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<sup>242</sup> ICRP, ‘Application of the Commission’s Recommendations to the Protection of People Living in Long-Term Contaminated Areas after a Nuclear Accident or a Radiation Emergency. ICRP Publication 111.’ (n 18); ICRP, ‘Application of the Commission’s Recommendations for the Protection of People in Emergency Exposure Situations. ICRP Publication 109.’ (n 207); ICRP, ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.’ (n 38).

<sup>243</sup> ICRP, ‘Application of the Commission’s Recommendations to the Protection of People Living in Long-Term Contaminated Areas after a Nuclear Accident or a Radiation Emergency. ICRP Publication 111.’ (n 18); IAEA, ‘Preparedness and Response for a Nuclear or Radiological Emergency’ (n 72).

Table 1: ICRP Dose Restriction System

<b>Type of Situation/Exposure</b>	<b>Occupational</b>	<b>Public</b>
<b>Planned</b>	<i>Dose limit</i> <ul style="list-style-type: none"> <li>• 20 mSv/year (average over 5 yrs)</li> </ul> <i>Dose constraint</i> <ul style="list-style-type: none"> <li>• Band of 1-20 mSv/year</li> </ul>	<i>Dose limit</i> <ul style="list-style-type: none"> <li>• 1 mSv/year</li> </ul> <i>Dose constraint</i> <ul style="list-style-type: none"> <li>• Band of 1 mSv/year or less</li> </ul>
<b>Emergency</b>	Reference level <ul style="list-style-type: none"> <li>• Less than 100 mSv, 500 mSv, 1,000 mSv or no restriction (depending on the situation)</li> </ul>	Reference level <ul style="list-style-type: none"> <li>• Band of 20-100 mSv/year (Lately, below 20 mSv/year)</li> </ul>
<b>Existing</b>	N.A. (It is treated as in Planned Exposure Situations)	Reference level <ul style="list-style-type: none"> <li>• Band of 1-20 mSv/year (Lately, less than 10 mSv/year)</li> </ul>

The striking or troubling aspect of this dose mechanism, by looking at the above table, is that dose restriction levels vary from 1 mSv/year to 100 mSv/year or even beyond 100 mSv/year, while the biological mechanism and the vulnerability of humans against radiation is unchanged through different situations. The same human being is “allowed” to be exposed to 20 to 100 times more radiation doses depending on the circumstances, suggesting that these norms are fundamentally ambiguous, unsettled, and somewhat arbitrary. Radiation science is certainly a science of more incertitude than exactitude, but such a system also leaves ample space for various interpretations and decisions on the part of decision-makers.

## **B. Protection Principles**

The foundation of today’s protection principles was also developed during the 1970s (notably, the 1977’s ICRP Publication 26 as mentioned above). Until then, radiation protection methods had been simply based on the limitation of doses since the inception of the radiation

regulation system.<sup>244</sup> From the ICRP's 1977 Recommendations onwards, the emphasis has been rather placed on two new concepts, justification and optimisation, which resulted in making the concept of dose limitation a sort of secondary or complementary principle in the overall system. Despite the ICRP assertion that the dose limitation remains one of its core principles, the scope of its application is so limited (only to planned exposure situations) that it exerts little weight. In contrast, the other two principles apply in all exposure circumstances and are regarded as the core doctrines of radiation protection today.

### 1. The Principle of Justification

According to the ICRP, the principle of justification means that any action to reduce radiation doses (e.g., protective actions in accidents) be justified ensuring that such an action will *do more good than harm*. The Commission further explains that any decision to reduce doses generally comes with detriments (e.g., economic costs of a protective action) and therefore such a decision must 'ensure an overall benefit in the broadest sense to society and thus not necessarily to each individual'.<sup>245</sup> This last statement would ultimately suggest that protective actions should serve the collective good even if such "good" may incur harm to certain individuals. In essence, it is the principle of collective interests dominance over individual rights (this point is further analysed in the following paragraph).

A demonstrative example of this principle is found in the comment made by the Director-General of the French nuclear regulator, the French Institute for Radiological Protection and Nuclear Safety (IRSN) in 2016. Speaking of lessons learned from the Fukushima nuclear accident, Jacques Repussard argued that evacuation, the protective action undertaken

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<sup>244</sup> RH Clarke and J Valentin, 'The History of ICRP and the Evolution of Its Policies: Invited by the Commission in October 2008' (2009) 39 *Annals of the ICRP* 75.

<sup>245</sup> ICRP, 'The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.' (n 28) 90.

by the Japanese government, caused more damage to the population in terms of their psychological and economic conditions than benefits of sparing them from radiation exposure.<sup>246</sup> To his eyes, the post-accident evacuation of residents was not “justified” in view of assumed psychological and economic detriments inflicted on the residents by the evacuation.

This comment in fact sheds light on an important element of the justification principle: who gets to judge or decide what constitutes “good” or “net benefit” to individuals as a whole or the society. The ICRP gives a clear answer to this question: the State authorities. However, the more recent publications increasingly emphasise the importance of stakeholder involvement in this decision-making process.<sup>247</sup>

## 2. The Principle of Optimisation

The principle of optimisation is defined as a ‘process to keep the likelihood of incurring exposures (where these are not certain to be received), the number of people exposed, and the magnitude of individual doses as low as reasonably achievable, taking economic and societal factors into account’.<sup>248</sup> Also called the ALARA principle, it is an attempt to achieve ‘the best level of protection under the prevailing circumstances’ through the cost-benefit analysis.<sup>249</sup> The ICRP emphasises that the best protective action is not necessarily the one to achieve the lowest dose but to balance the detriment from radiation exposure (i.e. health effect) against economic and societal costs of protection measures (e.g. evacuation, decontamination, etc). Overall, the principles of justification and optimisation converge in many aspects. Indeed, the ICRP

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<sup>246</sup> Richard Bellet, ‘Accident Nucléaire : Le Patron de l’IRSN Remet En Question « le Principe de Précaution Maximale »’ *Le Journal du Dimanche* (Paris, 5 March 2016) <<https://www.lejdd.fr/Societe/Accident-nucleaire-le-patron-de-l-IRSN-remet-en-question-le-principe-de-precaution-maximale-775999>> accessed 24 April 2023.

<sup>247</sup> For example, ICRP, ‘Application of the Commission’s Recommendations for the Protection of People in Emergency Exposure Situations. ICRP Publication 109.’ (n 207); ICRP, ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.’ (n 38).

<sup>248</sup> ICRP, ‘The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.’ (n 28) 91.

<sup>249</sup> *ibid* 91.

specifies that the duty to perform such a balancing act falls on national authorities with a possibility of stakeholder involvement.

According to Clarke and Valentin (both ICRP members), the origin of justification and optimisation principles can be traced back to the utilitarian principle of ethics, promoted primarily by Jeremy Bentham and John Stuart Mill in the 18<sup>th</sup> and 19<sup>th</sup> centuries.<sup>250</sup> Also called ‘consequence ethics’, the utilitarian principle aims to maximise the margin of good over harm for society as a whole and judges actions by their overall results – whether or not they produce a net benefit to the greatest number of persons by offsetting the cost of introducing such actions. The key questions to ask under the framework are: how much does it cost and how many lives (or health) would be saved by it? This line of thought notably clashes with values such as justice, equity, and individual rights because maximising *collective* good does not necessarily mean guaranteeing *individual* good in a society.<sup>251</sup> Indeed, the well-being or the life of some people may well be sacrificed in order to bring a net benefit to an overall society. If pushed to an extreme, such a moral framework could also be used to justify military attack and a war. Under the logic, individual rights can be trampled on in the name of collective interests, often State interests, and societal net benefit.

### 3. The Principle of Dose Limitation

The third principle is the limitation of doses. It is the most restrictive notion and powerful tool for protecting humans from harmful radiation effects. But as mentioned earlier, this notion is applied only for planned or normal situations. It means that as soon as a nuclear emergency occurs or radon source is discovered in dwelling, dose limits are simply ignored and replaced by more flexible dose restriction concepts, applied for the protection of human health

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<sup>250</sup> Clarke and Valentin (n 244).

<sup>251</sup> Geoffrey Scarre, *Utilitarianism* (Routledge 2020).

by incorporating socio-economic interests in the balance. According to the above ICRP authors, the concept of dose limits represents the deontological principle of ethics. Also called “duty ethics” proposed mainly by Immanuel Kant, it aims to primarily protect the rights of the individual, whatever the consequence would be for the collective good or society as a whole.<sup>252</sup> This ethics places the utmost importance on moral law and a sense of duty.<sup>253</sup> In an extreme interpretation, protecting individuals from a harmful radiation effect would be an absolute obligation which shall not be compromised even if that would cause a cost or harm to the society or a large segment of the population.

The same authors ultimately admit that the principle of dose limits was maintained because the principle of optimisation – a balancing act between costs and benefits – ‘is not necessarily sufficient to protect individuals’.<sup>254</sup> But these two opposite ethical principles, utilitarian and deontological, are fundamentally irreconcilable in practice. As it happens, the ICRP applies the duty principle – protecting the rights of individuals – conditionally, restricted to normal exposure circumstances. It means that a moral duty to protect individuals is only valid while there is little to no radiation risk, but as soon as such risk emerges, the protection of individuals is replaced by ensuring the assumed “good” of the society as a whole. This runs counter to the basic concept of human rights protection which not only apply in normal circumstances but also in emergencies and disasters in general.<sup>255</sup>

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<sup>252</sup> Clarke and Valentin (n 244).

<sup>253</sup> Kant distinguishes “duties” into “duties of right” and “duties of virtue”: the first are universally valid legal duties that are enforceable by others while the second is concerned with universally valid ethical duties that are not enforceable by others but oneself. See Will Dudley and Kristina Engelhard, *Immanuel Kant: Key Concepts* (Taylor & Francis Group 2014).

<sup>254</sup> Clarke and Valentin (n 244) 95.

<sup>255</sup> Michel Prieur, ‘人権の観点から見た破局的な原子力事故の管理 (Destructive Nuclear Accident Management From the Perspective of Human Rights)’ (2015) 49 (2) 比較法学 (Comparative Law Review) 244; Walter Kälin, ‘The Human Rights Dimension of Natural or Human-Made Disasters Focus: Disaster Preparedness and Response’ (2012) 55 German Yearbook of International Law 119. Both authors assert that human rights generally apply in disaster situations. In fact, international human rights instruments have derogatory clauses for

## **§2. Ambiguities and Limitations of Radiological Protection Norms**

After having closely examined today's radiological protection standards and principles, this last paragraph of the chapter tackles the inherent ambiguities, controversies, and limitations of this normative framework with an aim to assess the adequacy and effectiveness in protecting the population in the event of nuclear disasters. The paragraph addresses the following issues: the ambiguities of radiation protection science (A), the ambivalent objective of radiation protection (B), the limitation of justification principle (C), and the controversy of optimisation principle (D).

### **A. Ambiguities of Radiation Protection Science**

Radiation protection experts often assert that protection norms have been elaborated based on scientific knowledge. In reality, protection standards are dependent on some key scientific findings, specific risk calculation models, and some peculiar rules. They are not without bias, uncertainties, and ambiguities. This sub-paragraph presents three examples of such ambivalences in the radiation protection norms: the flaws of the Hiroshima/Nagasaki LSS data (1), the low-dose controversies (2), the bias of risk calculation models (2), and the rule of "exclusion" in radiation protection (3).

#### **1. Flaws of the Hiroshima and Nagasaki LSS Database**

The Life Span Study (LSS) of Hiroshima and Nagasaki bomb survivors is today regarded as one of the major scientific bases upon which many radiation protection norms have been established. Kenji Kamiya, Chairman of the Radiation Council at the Japanese Nuclear Regulation Authority, contends that it represents 'the most precise and reliable data available in

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public emergencies "which threaten(s) the life of the nation" (e.g. Article 4 of the ICCPR). However, certain rights are excluded from these derogation clauses (e.g. right to life).

the world' when it comes to radiation effect research.<sup>256</sup> International and national scientific authorities such as UNSCEAR, American National Academy of Sciences (NAS), and British Medical Research Council (MRC) have all relied on the LSS data to formulate its views on radiation effects, especially as to stochastic effects (mainly cancer and genetic effects), which have then been translated into official recommendations and regulations of international and national regulatory bodies. Initially, study missions on Hiroshima/Nagasaki bomb survivors were conducted by the occupying US forces, whose findings had been kept as military secret. The ABCC was then created in 1947 by the US AEC to start extensive health studies on the survivors and launched the LSS which, at the time, represented the largest cohort study on radiation effect, having 120,000 cohort – 100,000 *hibakusha* and 20,000 control cases – and 77,000 offspring of *hibakusha*. The study was carried over by the Radiation Effects Research Foundation (RERF) when it succeeded the ABCC in 1975 and is still on-going today.

The LSS result has notably contributed to establishing the threshold dose of 100 mSv for deterministic effects (skin injury, cataract, hair loss, etc) and the dose-effect relationship (linearly) for stochastic effects (cancer, leukaemia, hereditary effects, etc) at doses more than 100 mSv. For the latter, the study notably found that the excess fatal cancer risk was 0.5% at the dose level of 100 mSv. But at low doses (i.e. below 100 mSv), the data did not show a statistical significance for cancer mortality among the exposed cohort compared to the nonexposed even though they found excess relative risk per dose at all dose ranges.<sup>257</sup> This

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<sup>256</sup> Kenji Kamiya, '解明されつつある「がん発症」のメカニズム (Mechanism of "Cancer Induction" Being Elucidated; Translation by R. Hasegawa)' (2011) 208 *Healthist* 2; cited by Masae Yuasa, *Whistle in the Graveyard: Safety Discourse and Hiroshima/Nagasaki Authority in Post-Fukushima Japan* (Soeisha/Sanseidoshoten 2013).

<sup>257</sup> This is probably because in that low-dose range, the effect of radiation exposure in cancer mortality is blurred by other "noises", various factors non-related to radiation exposure which could contribute to cancer development. See Tetsuji Imanaka, '「100ミリシーベルト以下は影響ない」は原子力村の新たな神話か?' (Is "No Effect Under 100 Millisiervert" a New Myth of Nuclear Village?)' (2011) 81 (11) *Kagaku* 1150; cited by Yuasa (n 256).



result notably provided a strong argument to those who take a stance of the threshold theory (i.e. little or no stochastic effects below 100 mSv) in radiation risk.<sup>258</sup>

However, this epidemiological “authority” on radiation effect research has some important flaws in the database.<sup>259</sup> First, the *hibakusha* cohort was only assembled in 1950 by the ABCC and thus those who had died during the first five years following the bombs (1945-1950) are not included in the study. This possibly means that the cohort consists of those who may be more resistant to radiation effect than others. Secondly, the exposed cohort only represents one-fourth of direct bomb survivors acknowledged at the time of 1950<sup>260</sup> and mainly consists of those who were within 2.5 km radius from the epicentre, thus exposed to high doses. Potentially, there are not sufficient data of people who were exposed to low doses (less than 100 mSv). Thirdly, the case-control group for comparison, what the LSS programme calls “nonexposed” group, includes people who were between 2.5 km - 10 km radius from the epicentre at the time of the explosion and thus exposed to low doses of radiation.<sup>261</sup> So, when Watanabe and others reexamined the LSS data by changing the control group, the result suggested a statistically significant increase in cancer deaths among the exposed cohort group even at low doses below 100 mSv.<sup>262</sup>

As history and STS scholars such as Hiroko Takahashi and Yasuo Nakagawa showed in their studies, post-war American occupation forces in Japan were also very keen to deny the effect or the very existence of so-called “residual radiation” from atomic bomb explosions,

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<sup>258</sup> This is the model which the Japanese authorities have adopted after the Fukushima accident as shown in the Fukushima accident case study below (Title II).

<sup>259</sup> Nakagawa (n 78).

<sup>260</sup> The RERF contends that the exposed cohort may represent 50% of all survivors within 2.5 km radius from the epicentre (source: RERF website)

<sup>261</sup> Tomoyuki Watanabe and others, ‘Hiroshima Survivors Exposed to Very Low Doses of A-Bomb Primary Radiation Showed a High Risk for Cancers’ (2008) 13 *Environmental Health and Preventive Medicine* 264; Donald A Pierce and others, ‘Studies of the Mortality of Atomic Bomb Survivors. Report 12, Part I. Cancer: 1950—1990’ (2012) 178 *Radiation Research* AV61.

<sup>262</sup> Watanabe and others (n 261); cited by Yuasa (n 256).

insisting that all the casualties in Hiroshima and Nagasaki were caused by the heat, violent wind, and direct radiation exposure from bomb detonations which affected only 2 km radius from the epicentre.<sup>263</sup> The main reason behind this denial lay with the geopolitical context at the time – the beginning of cold war – where the US was eager to conduct more bomb tests without igniting public fear nor concern among soldiers who would participate in those tests.<sup>264</sup>

From these facts, the LSS data have inherent uncertainties and are probably not as “most reliable” as the Hiroshima doctor had asserted, with a possibility of underestimating carcinogenic effects at low doses.

## 2. Low-Dose Controversies

Radiation effect at low doses, generally doses below 100 mSv, has long stirred scientific disputes and controversies. As illustrated previously, the Hiroshima and Nagasaki LSS study became the source for two opposing views: one who argues for the existence of linear dose-response relationship, known as linear non-threshold (LNT) model, and the other who defends so-called the threshold model which considers that there is little to no effect below 100 mSv. The 2005 report of the French Academy of Medicine notably supported the latter view for the low-dose carcinogenic effect.<sup>265</sup> The French nuclear expert agency, IRSN, also

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<sup>263</sup> Takahashi, 封印されたヒロシマ・ナガサキ：米核実験と民間防衛計画 (*The Classified Hiroshima and Nagasaki: The US Atomic Bomb Tests and the Civilian Defense Plan*) (n 152); Nakagawa (n 78).

<sup>264</sup> Takahashi, 封印されたヒロシマ・ナガサキ：米核実験と民間防衛計画 (*The Classified Hiroshima and Nagasaki: The US Atomic Bomb Tests and the Civilian Defense Plan*) (n 152).

<sup>265</sup> Académie nationale de médecine/Académie des sciences, ‘La Relation Dose-Effet et l’estimation Des Effets Cancérogènes Des Faibles Doses de Rayonnements Ionisants’ (French Academy of Science 2005) <<https://www.academie-medecine.fr/wp-content/uploads/2013/12/Aurengo-rapport070405.pdf>> accessed 6 March 2021.

states on its website that ‘for a level below 100 mSv, no long-term health effect has been scientifically established’.<sup>266</sup>

In contrast, the LNT model has been adopted by most international and national regulatory authorities such as ICRP, IAEA, and US Environmental Protection Agency (EPA) as a practical basis to manage low-dose risks in radiation protection. In the context of scientific uncertainties shown by some epidemiological studies including the Hiroshima and Nagasaki LSS study, they consider the LNT to be the most cautious and workable model. UNSCEAR, the international scientific authority on radiation effects, has not clearly pronounced for the LNT theory, but has consistently stated that there are no data which irrevocably refute the validity of LNT and, on the contrary, the studies on DNA damage and response in relation to radiation exposure suggest a linear dose response.<sup>267</sup> Indeed, recent epidemiologic studies also tend to support the LNT model as the most plausible dose-response at low doses.

For example, the recent large-scale epidemiological study, the International Nuclear Workers Study (INWORKS), seems to support the LNT theory at low doses. It was conducted in 2011 to study the health effect of chronic low-dose radiation exposure among nuclear industry workers in France, the UK and the USA. The project was coordinated by the International Research Agency for Cancer, a specialised agency of WHO, and implemented by three national agencies: the French IRSN, the Public Health England (an agency of the UK

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<sup>266</sup> IRSN website, ‘FAQ Radioprotection de l’Homme’ <[https://www.irsn.fr/FR/connaissances/faq/Pages/Quelle\\_est\\_la\\_dose\\_de\\_radioactivite\\_dangereuse\\_pour\\_la\\_sante.aspx](https://www.irsn.fr/FR/connaissances/faq/Pages/Quelle_est_la_dose_de_radioactivite_dangereuse_pour_la_sante.aspx)> consulted 17 January 2022. Translation from French by R. Hasegawa. The original text in French: ‘Pour un niveau inférieur à 100 mSv, aucun effet à long terme sur la santé n’a été démontré’

<sup>267</sup> Andrzej Wojcik, ‘Reflections on Effects of Low Doses and Risk Inference Based on the UNSCEAR 2021 Report on “Biological Mechanisms Relevant for the Inference of Cancer Risks from Low-Dose and Low-Dose-Rate Radiation”’ (2022) 42 J. Radiol. Prot.; For example, the UNSCEAR in its recent document on low-dose effects also states that ‘even the lowest doses of radiation may induce DNA damage that may be converted into DNA sequence mutations’. See UNSCEAR, ‘Biological Mechanisms of Radiation Actions at Low Doses: A White Paper to Guide the Scientific Committee’s Future Programme of Work’ (UN Scientific Committee on the Effects of Atomic Radiation 2012) 3.

Department of Health and Social Care), and the National Institute for Occupational Safety and Health (a US federal agency). The cohort involved around 300,000 workers who were employed for more than one year in the industry and had the quantitative record of exposed doses measured by personal dosimeters throughout their employment. Their records were monitored between 1943 and 2005 and their mean accumulative exposed dose was 17.4 mGy (colon dose) and 15.9 mGy (red marrow dose).<sup>268</sup> The INWORKS attracted much attention as it contains a large cohort comparable to the LSS, which was composed of those exposed to low-dose radiation over a long period of time, in contrast to the LSS whose cohort mainly consisted of those who received acute exposure to high doses.<sup>269</sup> The outcome of this research thus has a significant implication for protecting people in post-accident chronic exposure circumstances. The result indeed suggested a positive association between cumulative dose and death from all cancers and leukaemia – a linear increase – even at the dose range of 1-100 mGy (colon/red bone marrow dose) although it was less precise than at higher dose ranges.<sup>270</sup>

The similar result came out from an independent study conducted in 2018 by the radiation experts of the UK Public Health England (aforementioned) on the cohort of 167,003 persons registered in the UK national registry of radiation workers.<sup>271</sup> The mean follow-up period was 32 years and the mean cumulative dose of the cohort was 25.3 mSv. The study

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<sup>268</sup> Klervi Leuraud, ‘Ionizing Radiation Epidemiology: Research for Radiological Protection’ (IRSN 2018). As explained earlier, mGy (milligray) expresses absorbed dose by these organs, not its biological effect on humans, which is expressed by mSv (millisievert).

<sup>269</sup> Klervi Leuraud and others, ‘Risk of Cancer Associated with Low-Dose Radiation Exposure: Comparison of Results between the INWORKS Nuclear Workers Study and the A-Bomb Survivors Study’ (2021) 60 *Radiation and Environmental Biophysics* 23.

<sup>270</sup> David B Richardson and others, ‘Risk of Cancer from Occupational Exposure to Ionising Radiation: Retrospective Cohort Study of Workers in France, the United Kingdom, and the United States (INWORKS)’ (2015) 351 *BMJ* h5359; Klervi Leuraud and others, ‘Ionising Radiation and Risk of Death from Leukaemia and Lymphoma in Radiation-Monitored Workers (INWORKS): An International Cohort Study’ (2015) 2 *The Lancet Haematology* e276.

<sup>271</sup> Richard GE Haylock and others, ‘Cancer Mortality and Incidence Following External Occupational Radiation Exposure: An Update of the 3rd Analysis of the UK National Registry for Radiation Workers’ (2018) 119 *British Journal of Cancer* 631; cited by Dominique Laurier, ‘Is LNT Sufficiently Scientifically Supported?’, *NEA Workshop on Optimisation “Rethinking the Art of Reasonable”* (2020) <<https://hal.archives-ouvertes.fr/hal-02869295>> accessed 7 March 2021.

showed a linear dose-response relationship even at the dose range of 0-100 mSv albeit with greater uncertainty than at higher dose range, similar to the result of INWORKS.

The link between childhood exposure to low-dose radiation and cancer risk, especially leukaemia, was also studied by several research groups in recent years, which also largely supported the LNT theory. The Australian study of cancer risk related to childhood exposure to CT scan, led by an epidemiologist Dr John D. Mathews of University of Melbourne, had a cohort of 11 million people of which 680,000 were in the exposed cohort.<sup>272</sup> It is the largest cohort study ever conducted concerning diagnostic medical radiation exposure. The team had access to Australian Medicare records (Australian governmental social security system) of children and adolescents between 0-19 years of age between 1985 and 2005 (11 million), among which those who had been exposed to CT scans were selected as the exposed cohort (680,000). The estimated average effective dose per scan was 4.5 mSv. The team found that overall cancer incidence was 24% greater for exposed cohort than for non-exposed cohort and there was a dose-response relationship between the exposed dose and the number of incidences.

These recent epidemiological findings thus provide stronger arguments for the LNT theory, but the radiation protection community has since remained silent on these findings, let alone changing or adapting its dose standards. The reason for this radio silence can be explained by the analysis once made by Soraya Boudia, a historian in science and technology, suggesting that the low-dose controversy was ‘as much scientific and technical as social and political in that it raises the question of the choice of the nuclear industry’.<sup>273</sup>

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<sup>272</sup> JD Mathews and others, ‘Cancer Risk in 680 000 People Exposed to Computed Tomography Scans in Childhood or Adolescence: Data Linkage Study of 11 Million Australians’ (2013) 346 *BMJ* f2360.

<sup>273</sup> Denis Delbecq, ‘Le Casse-Tête Des Faibles Doses de Radiations’ (2013) 478 *La Recherche* 56; cité par Christine Fassert, ‘Une Revue de La Littérature Sur Les Thèmes de La Confiance et de l’expertise En Radioprotection: Rapport Final de La Tâche 1 Du Projet SHINRAI.’ (IRSN 2018) IRSN/PSN-SRDS/SFOHREX

### 3. Nonuniversal Risk Calculation Models

Dose limitation norms are established as a result of risk estimation calculated on a certain type of human body. This model had long been called “reference man” by the ICRP. Originally called “standard man”, the term has evolved to a gender-neutral version “reference person” in the most recent publications. However, ICRP’s current dose restriction norms such as “dose limits” and “reference levels” were essentially developed based on a certain type of human body – reference man – which basically represents a Caucasian male between 20 and 30 years of age, weighing 70kg, measuring 170 cm of height, who lives in a climate with an average temperature of 10-20 °C and is a Western European or North American as living custom.<sup>274</sup>

The validity of this chosen model became increasingly questioned during the 1980s since more than half of the public indeed consist of adult females and children who, many studies have shown, are more sensitive to radiation exposure. Alice Stewart, an epidemiologist at Oxford University, demonstrated that children whose mothers had gone through a single prenatal X-ray were almost twice as likely to develop childhood cancer in the 1958’s study.<sup>275</sup> The 2006 BEIR VII report also recognised that cancer risk would be higher for females and those exposed at young ages from its own risk estimation model. Similarly, different anatomical and physiological characteristics influence the radiosensitivity of individuals. For example, the mass of bodily fat is reported to be around 50% less for Asian (Chinese) male adults compared to Caucasian male adults, which would significantly alternate risk calculations for the former

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2017-0009 59 <[https://www.irsn.fr/FR/Larecherche/Actualites\\_Agenda/Actualites/Pages/2018-07-18-Publication-Rapport-SHINRAI-confiance-expertise.aspx#.W896HfaYSUk](https://www.irsn.fr/FR/Larecherche/Actualites_Agenda/Actualites/Pages/2018-07-18-Publication-Rapport-SHINRAI-confiance-expertise.aspx#.W896HfaYSUk)> accessed 23 October 2018. The translation from French by R. Hasegawa. The original text in French: ‘autant scientifique et technique que sociale et politique dans la mesure où elle pose la question du choix de l’industrie nucléaire’

<sup>274</sup> ICRP, ‘Report on the Task Group on Reference Man. ICRP Publication 23.’ (Pergamon Press 1975).

<sup>275</sup> Alice Stewart, Josefine Webb and David Hewitt, ‘A Survey of Childhood Malignancies’ (1958) 1 Br Med J 1495.

since they are based on the body absorption rate of radioactive materials for the latter body type.<sup>276</sup> This all indicates that current dose restriction standards could be underestimating (more so than overestimating) risks for women and children as well as non-Caucasian population.

In 2002, ICRP updated reference values for general risk estimations and added those according to different age, gender, and race groups (where available), but the model of reference remained Western Europeans and North Americans due to the availability of data. This time the ICRP emphasised that the reference person does not represent an “average” individual of a specific population group but merely “points of reference” or “benchmarks”. Notwithstanding, none of the dose restriction values (i.e., dose limits, reference levels, etc) have been modified since, which would suggest that its dose standards may not still be adequately protective for women, children, and non-Caucasian populations.

#### 4. Conditional Dose Limits and the “Exclusion” Rule

What differentiates radiation safety standards from those of other risks is the flexibility or inconsistency of dose limitation levels which fluctuate according to exposure situations and the “category” of exposed individuals. Dose norms in the control of toxic substances are in general established for all humans at all situations, though different values could be applied to children, pregnant women, or people with specific medical conditions. But in radiation regulation, rules change when there is an accident, if a contamination already exists in the environment, and when the individual is a worker of nuclear activities. It is a peculiar “protection” system where dose limit itself will be adjusted, instead of devising protective actions, when doses exceed the dose limit. In this sense, the dose limit is nearly useless in the

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<sup>276</sup> ICRP, ‘Basic Anatomical and Physiological Data for Use in Radiological Protection Reference Values. ICRP Publication 89.’ (Pergamon Press 2002) ICRP 32 (3-4).

protection of the population in nuclear disasters. It is logically difficult to understand why dose limits, determined based on scientific and ethical considerations, suddenly cease to apply depending on exposure situations rather than the sensibility or vulnerability of individuals against radiation risks. As such, dose limitation in radiation protection is a conditional concept: it applies only when certain conditions are met.

This conditionality of radiation protection standards is also seen in the rule of exclusion established within the current protection system. It notably allows regulatory authorities to exclude certain radiation sources from radiation control. Both ICRP and IAEA respectively published a report entirely dedicated to the notion.<sup>277</sup> According to these publications, some exposure situations can be excluded from regulation on the basis that ‘they cannot be controlled by reasonable means, i.e. they are uncontrollable or unamenable to control with regulatory instruments’ (control cannot be regulated).<sup>278</sup> Similarly, some controllable exposure situations may be exempted from regulation ‘when such controls may be reasonably regarded as unwarranted’, i.e. ‘the effort to control is judged to be excessive compared to the associated risk (control need not be regulated)’.<sup>279</sup> For the latter (exemption), the IAEA guideline provides a clear criterion (numerical dose values): when exposure dose is expected to be in the order of 10  $\mu$ Sv (0.01 mSv) or less per year (one hundredth of annual dose limit), it could be exempted from radiation control.<sup>280</sup>

As for the concept of exclusion, things are not so clear. The ICRP explains that its concept of exclusion slightly differs from the one generally used in a legal context where it refers to defining the parameters of the legal control, while in radiation regulation, ‘excluded

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<sup>277</sup> ICRP, ‘Scope of Radiological Protection Control Measures. ICRP Publication 104.’ (n 222); IAEA, ‘Application of the Concepts of Exclusion, Exemption and Clearance’ (International Atomic Energy Agency 2004) Safety Standards Series No. RS-G-1.7.

<sup>278</sup> ICRP, ‘Scope of Radiological Protection Control Measures. ICRP Publication 104.’ (n 222) 25.

<sup>279</sup> *ibid* 28.

<sup>280</sup> IAEA, ‘Application of the Concepts of Exclusion, Exemption and Clearance’ (n 277).



exposure situations are those that are beyond any justifiable means of control'.<sup>281</sup> Examples of excludable exposure situations were cited as exposure to potassium-40 (<sup>40</sup>K) ingested into the human body (notably by consumption of bananas), exposure to cosmic rays at ground level, and 'unmodified concentrations of radionuclides in most raw materials'.<sup>282</sup> But things become questionable when the ICRP also identified artificial background radiation caused by fallout from nuclear tests and the Chernobyl accident as "not amenable", thus being subject to exclusion from radiation regulation.<sup>283</sup> The ICRP's explanation is not very clear as to how these exposure situations from past disasters are different from post-Fukushima and radon exposure situations, the existing exposure situations under radiation control. The definition of exclusion is even more ambiguous in the IAEA's guideline:

Exclusion, as described in the BSS, relates to the amenability of exposure to regulatory control *rather than to the actual magnitudes of exposures*. Amenability to control is a relative concept; it is a matter of practicability and implies recognition of the cost of exercising regulatory control and the net benefit to be gained by so doing.<sup>284</sup>

Does this ultimately suggest that when dose levels become too high, thus uncontrollable or too costly to regulate, such radiation doses can be simply excluded from control? The answer is unclear from the texts. The ICRP only states, in existing and emergency exposure situations, the question of scope of regulation becomes 'whether or not it is worthwhile to act with

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<sup>281</sup> ICRP, 'Scope of Radiological Protection Control Measures. ICRP Publication 104.' (n 222) 29.

<sup>282</sup> IAEA, 'Application of the Concepts of Exclusion, Exemption and Clearance' (n 277) 5. Examples of 'unmodified concentrations of radionuclides in most raw materials' include NORMs (naturally-occurring radioactive materials) such as monazite sands at beaches, uranium mines, oil and gas production residues, and so on. But not all NORMs are excluded from regulation.

<sup>283</sup> ICRP, 'Scope of Radiological Protection Control Measures. ICRP Publication 104.' (n 222) 42.

<sup>284</sup> IAEA, 'Application of the Concepts of Exclusion, Exemption and Clearance' (n 277) 8. Emphasis added.

interventional protective measures’ and such judgement shall be made by national authorities taking into account their domestic contexts.<sup>285</sup>

Curiously, the ICRP even took extra care to affirm, in the beginning of the Publication 104, that its advice ‘should not be construed as interfering with the sovereignty of national legislation and the indispensable rights of the national regulators for establishing the scope of radiological protection control measures’.<sup>286</sup> One may wonder why a private charity organisation, not an intergovernmental agency bound to a statute, needs to exert such an effort to safeguard the “sovereignty” and “indispensable rights of the national regulators” in making radiation protection recommendations. It indeed points to the very nature of the radiation protection regime: the State-centric system which attributes a full discretionary power to respective State authorities.

## **B. Ambivalent Objective: Protection of People or Nuclear Activities?**

Until the beginning of the 1960s when the electro-nuclear programme had not yet fully taken off, the principal objective of radiological protection was straightforward: the protection of human health against radiation. For example, the 1958 ICRP Recommendations defined the overall objective as ‘to prevent or minimize somatic injuries and to minimize the deterioration of the genetic constitution of the population’.<sup>287</sup> This slightly changed in the following publication in 1966 (Publication 9) which stated that the aim of radiation protection was ‘to prevent acute radiation effects, and to limit the risks of late effects to *an acceptable level*’.<sup>288</sup> It is a noteworthy paradigm shift exactly when commercial reactor projects finally took off in the

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<sup>285</sup> ICRP, ‘Scope of Radiological Protection Control Measures. ICRP Publication 104.’ (n 222) 32.

<sup>286</sup> *ibid* 13.

<sup>287</sup> ICRP, ‘Recommendations of the International Commission on Radiological Protection. ICRP Publication 1.’ (n 158) 9.

<sup>288</sup> ICRP, ‘Recommendations of the International Commission on Radiological Protection. ICRP Publication 9.’ (n 173) 1.; Emphasis added

United States following the enactment of the Price–Anderson Act. In the publication, the ICRP explains that any radiation exposure entails risk but humans cannot dispense with it altogether in view of the benefits that it brings to individuals and society. Based on this logic, it considers that there must be a degree of risk or dose which would be acceptable for individuals and the society.

There are two problems with this “acceptability” concept. First, as the ICRP itself admits, scientists still do not know the exact dose-effect relationship at low doses and thus the degree of risk involved is still uncertain. Second and most importantly, one must ask the question of who decides what is beneficial or acceptable to “individuals and the society”. As Luis E. Rodriguez-Rivera, a jurist in international environmental law, argued, it largely depends on ‘who controls the decision-making process, what criteria is taken into account, and whose interests deserve protection’.<sup>289</sup> As such, the acceptability of nuclear risks may be a plausible concept in theory but quite an ambiguous and debatable one in practice.

The paradigm shift in the objective of radiation protection was further affirmed in the 1970s. Notably in the 1977 ICRP Recommendations (Publication 26), the goal was stated as ‘protection of individuals, their progeny and mankind as a whole, *while still allowing necessary activities from which radiation exposure might result*’.<sup>290</sup> The last part of the statement had never appeared as the objective of radiation protection in any previous recommendations. The protection of nuclear activities officially entered into the objective of radiation protection. This trend then accelerates even further in the more recent publication, the 2007 Recommendations (Publication 103), which describes the primary objective as ‘to *contribute to an appropriate level* of protection for people and the environment against the detrimental effects of radiation

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<sup>289</sup> Rodriguez-Rivera, ‘The Human Right to Environment and the Peaceful Use of Nuclear Energy’ (n 103) 174.

<sup>290</sup> ICRP, ‘Recommendations of the International Commission on Radiological Protection. ICRP Publication 26.’ (n 203) 2.; emphasis added

exposure without unduly limiting the desirable human actions that may be associated with such exposure'.<sup>291</sup> Similarly, the 2014 edition of IAEA's BSS states, 'the fundamental safety objective of protecting people...and the environment from harmful effects of ionising radiation *has to be achieved without* unduly limiting the operation of facilities or the conduct of activities that give rise to radiation risks'.<sup>292</sup>

This is a significant transformation from the original concept of radiation protection: from the straightforward human protection to the ambiguous and relative human protection adjusted to the protection of nuclear activities and the industry. However, this apparent change of doctrine is not really a "shift" but rather the official affirmation of the baseline idea that had existed among many national and international radiation experts from the start of the civil nuclear era. For example, Louis Bougnat, a French doctor/engineer and a member of ICRP, described in 1955 the principal challenge facing radiation norm-setting as follows: 'they must arrive at something reasonable, on one hand, to protect the population, and on the other hand, not to hamper the development of atomic energy'.<sup>293</sup> In fact, this was exactly how nuclear law was founded in the 1950s. As Nobert Pelzer, a nuclear law expert, affirms, 'requirements of promoting nuclear energy have to be taken into account when dealing with the risks of nuclear energy'.<sup>294</sup>

In summary, radiation protection in the civil nuclear era has always been the framework to, first and foremost, enable the development of atomic energy and the continuation of nuclear activities while protecting human health *to a certain degree* so that the latter would

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<sup>291</sup> ICRP, 'The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.' (n 28) 41. Emphasis added.

<sup>292</sup> IAEA and others, 'Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards' (n 77) ix. Emphasis added.

<sup>293</sup> Soraya Boudia, 'Sur les dynamiques de constitution des systèmes d'expertise scientifique. La naissance du système d'évaluation et de régulation des risques des rayonnements ionisants' [2008] *Genèses*, 70, 2008 26, 8.

<sup>294</sup> Pelzer, 'The Present State of Research Carried Out by the English-Speaking Section of the Centre for Studies and Research' (n 17) 208.

not constrain the former. It is the regime in which the protection of humans is always a relative, instead of essential, notion.<sup>295</sup>

### **C. Collective/State Interests vs. Individual Rights (Critique of Justification)**

Under the logic of justification principle, radiation protection is for the protection of citizens as a mass, the society as a whole, not necessarily of each individual. This principle stands in direct opposition to one of international legal frameworks: human rights law. In effect, the UN Special Rapporteur on the right to health, Anand Grover, made an unequivocal remark in his Fukushima report, according to which radiation protection principles are ‘not in consonance’ with the human rights framework precisely because they ‘give(s) precedence to collective interests over individual rights’.<sup>296</sup> Under the rights-based regime, ‘the right of every individual has to be protected’.<sup>297</sup> Rodriguez-Rivera also argues that nuclear law ignores ‘the pre-emptive nature of recognised human rights’ and the decisions made by States following such principles pose threats to the lives and dignity of individuals including future generations as well as the environment.<sup>298</sup>

Indeed, the notion of human rights is largely absent in the framework of radiological protection.<sup>299</sup> While ethical notions such as dignity and equity were briefly mentioned in the latest ICRP publications, a reference to human rights conventions or principles is close to zero in all the guidelines established by the ICRP, the IAEA, and other nuclear regulatory

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<sup>295</sup> This point had already been well demonstrated by the works of Paul Jobin, a sociologist (Université Paris Diderot). See Paul Jobin, ‘Qui est protégé par la radioprotection ?’ [2012] *Ebisu. Études japonaises* 121; Paul Jobin, ‘Fukushima Ou La Radioprotection, Retour Sur Un Terrain Interrompu’ in Annie Thebaud-Mony and others (eds), *Santé au travail* (La Découverte 2012).

<sup>296</sup> UNHRC, ‘Report of the Special Rapporteur on the Right of Everyone to the Enjoyment of the Highest Attainable Standard of Physical and Mental Health, Anand Grover’ (n 59) para 47.

<sup>297</sup> *ibid.*

<sup>298</sup> Rodriguez-Rivera, ‘The Human Right to Environment and the Peaceful Use of Nuclear Energy’ (n 103) 181.

<sup>299</sup> Several legal scholars have already pointed out this issue. See Prieur (n 255); Rodriguez-Rivera, ‘The Human Right to Environment and the Peaceful Use of Nuclear Energy’ (n 103); Kohki Abe, ‘原子力災害と人権 (Nuclear Disasters and Human Rights)’ (2013) 32 *世界法年報* (Yearbook of World Law) 23.

organisations. This conceptual opposition between the nuclear regime and human rights regime, the central theme of this doctoral research, will be further scrutinised in the next Title dealing with legal challenges to the nuclear regime.

But what does “collective interests” or in the ICRP term, “an overall benefit in the broadest sense to society”, exactly mean in the nuclear regime? The term in fact invokes the notion of “general interest” which notably relates to the exercise of state power. By analysing the historic evolution of the concept, Jacques Chevallier, argues that general interest functions as a sort of “myth” or ideological “belief” in which the State actions are presented as being neutral and impartial, representing the common interests of all in the society.<sup>300</sup> Under the seal of “general interest”, the dominance of power inherent to the State and the influence by the particular interests of the dominant class in the exercise of State power are often obscured, which helps legitimise State actions.<sup>301</sup> The term “collective interests” used by the radiation protection regime function in a very similar manner. Atomic energy being almost always part of State projects, the “collective interests” under the nuclear regime are often inseparable from State interests, or the interests of the dominant class in the society, which would make individual rights at risk.

Some scholars even suggest that nuclear energy use was, by its very nature, only possible upon some forms of human sacrifices or violation of human rights. The work of Tetsuya Takahashi, a philosophy professor at University of Tokyo, found that nuclear energy always operates under the “sacrificial system” in which ‘the benefit of some is produced and maintained at the expense of others’ lives, health, properties, dignities, hopes and so on’, and

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<sup>300</sup> Jacques Chevallier, ‘Déclin ou permanence du mythe de l’intérêt général ?’, *L’intérêt général - Mélanges en l’honneur de Didier Truchet* (Daloz 2015) 83; Jacques Chevallier, ‘Réflexions Sur l’idéologie de l’intérêt Général’ in CURAPP-Faculté de droit et des sciences économiques de Reims (ed), *Variations autour de l’idéologie de l’intérêt général : Volume 1* (PUF 1978) 11. (Translation by R. Hasegawa)

<sup>301</sup> Chevallier, ‘Déclin ou permanence du mythe de l’intérêt général ?’ (n 300).

these sacrifices are ‘often either made invisible or praised as “noble sacrifice” for the sake of common interests such as that of the State, the population, the society or the economy’.<sup>302</sup> These nuclear sacrifices are thus encoded not only in the principle of justification but also in the system of differentiated exposure situations and the concept of “reference levels” which would essentially mean accepting excess mortality among certain segments of the population on behalf of them.<sup>303</sup>

#### **D. Economisation of Human Protection (Critique of Optimisation)**

The ALARA concept introduced during the 1970s has been firmly established as the pillar of optimisation principle in the radiation protection paradigm. Keeping doses as low as reasonably achievable, taking into account economic and societal factors, is achieved by cost-benefit analysis, calculating the social gain (mostly health benefit) expected of dose reduction measures against the costs (mostly economic) and resources available to undertake such measures. At the extreme end of the logic, human health could be compromised if its protection costs too much for the operator, the society, or the country.

This economisation of protection also functions through the “sister” concept of cost-benefit analysis: benefit-risk principle. To select the appropriate dose restriction level (e.g., reference levels) in existing and emergency exposure situations, the ICRP recommends the use of benefit-risk analysis according to which those who benefit from the exposure or nuclear activities can take more risks.<sup>304</sup> A typical and justifiable example of this principle is in the case of medical diagnosis and treatment. But things get questionable when the ICRP applies it

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<sup>302</sup> Tetsuya Takahashi, *犠牲のシステム 福島 沖縄 (Sacrificial System: Fukushima and Okinawa)* (Shueisha Shinsho 2012) 42.

<sup>303</sup> KS Shrader-Frechette, *Nuclear Power and Public Policy: The Social and Ethical Problems of Fission Technology* (D Reidel Publishing Company 1980).

<sup>304</sup> ICRP, ‘Implications of Commission Recommendations That Doses Be Kept as Low as Readily Achievable’ (n 174); ICRP, ‘The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.’ (n 28).

to other types of exposure situations such as occupational exposures and post-accident existing exposures. As shown earlier, the dose limit for workers is set 20 times higher than that for members of the public. This different treatment is justified by the ICRP on the basis of the benefit-risk principle: workers can accept more risks because they receive benefits from the exposure situation, not from the exposure itself but indirectly in the form of monetary remunerations.

The argument becomes more dubious when it comes to using the benefit-risk to justify reference levels after a nuclear accident. What do residents benefit from radiation exposure by living in contaminated lands after a nuclear disaster? The ICRP affirmed that members of the public receive little or no individual benefit from the exposure, but added that it ‘benefits to society in general’.<sup>305</sup> What does “society in general” mean in this context? The ICRP does not provide a clear answer, but Publication 111 (2009) hints at some ideas. It notably states that ‘worldwide experience following nuclear and non-nuclear accidents shows that neither nations nor individuals are very willing to leave affected areas’ and ‘countries generally cannot afford to lose a part of their territory, most inhabitants generally prefer to stay in their homes rather than to be relocated (voluntarily or not) to non-contaminated areas’.<sup>306</sup> But as the following case study will show, the experience from the Fukushima accident was quite the opposite.<sup>307</sup> The residents who wanted to remain in the affected territory after the accident represented only 30%. From this fact, the “benefit” of residents staying in contaminated territory after nuclear accidents seems to be for the State and not necessarily for individuals.

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<sup>305</sup> ICRP, ‘The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.’ (n 28) 97.

<sup>306</sup> ICRP, ‘Application of the Commission’s Recommendations to the Protection of People Living in Long-Term Contaminated Areas after a Nuclear Accident or a Radiation Emergency. ICRP Publication 111.’ (n 18) 26, 30.

<sup>307</sup> Hasegawa, ‘Returning Home after Fukushima: Displacement from a Nuclear Disaster and International Guidelines for Internally Displaced Persons.’ (n 42); Fassert and Hasegawa (n 42).



However, this benefit-risk ideology is not an invention of radiation protection regime but in fact the philosophical foundation of nuclear law since its inception. According to Pierre Strohl and Nobert Pelzer, both nuclear law experts, the nuclear legal regime must be designed to balance the risks and benefits of nuclear activities.<sup>308</sup> The regime's mission is to render the development of nuclear energy possible by removing 'inadequate legal restrictions'<sup>309</sup> and at the same time, to 'ensure safety in order to minimize the risk to a level which is *tolerable*'.<sup>310</sup> The statement indeed is well reflected in the today's objective of radiation protection established by the ICRP and the IAEA.

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<sup>308</sup> Hague Academy of International Law (ed), *The Hazards Arising out of the Peaceful Use of Nuclear Energy* (Martinus Nijhoff Publishers 1993).

<sup>309</sup> Pelzer, 'The Present State of Research Carried Out by the English-Speaking Section of the Centre for Studies and Research' (n 15) 207, 208.

<sup>310</sup> *ibid* 207, 214. Emphasis added.

## Conclusion of Chapter 1

Radiation is an essential composition of the universe and exists naturally on earth to which humans have been exposed since their origin. But when humans discovered the utility of such element and began to exploit it for the “advancement” and “benefits” for human life, radiation also became the threat from which humans need to be protected. Radiological protection is ultimately one of human struggles against nature which cannot be completely controlled. Originally developed to protect scientists and doctors who manipulated radioactive substances in their laboratories, radiological regulation has evolved over the years to become an ambivalent regime protecting humans mostly from artificial radioactive substances created by nuclear fission activities - nuclear weapons and civil nuclear programme – and at the same time protecting these very activities which create risks for humans.

Radiation regulation has always accompanied the development of atomic energy, either for military or industrial purposes, and played a major role in forging the social acceptance of nuclear programme among the public.<sup>311</sup> This was in part achieved by downplaying the risks so as to elude criticisms and calm public anxieties.<sup>312</sup> As the nuclear industry has grown into multibillion-dollar global enterprises with immense political influence, the regime became even more flexible and ambiguous in its protection norms. Typically, in the principles of justification and optimisation, one can see the trace of political compromise which radiation experts have made to provide some leeway for national regulators and the nuclear industry. Moreover, its guidelines are often written in a devious manner filled with technical and equivocal terms, which makes them less accessible to public scrutiny and allows different interpretations for national authorities. But the most symbolic aspect of the radiation protection

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<sup>311</sup> Boudia (n 79) 12.

<sup>312</sup> Boudia (n 81).

framework is lack of human rights notion. It represents one of the rare international normative frameworks which are not based on human rights principles in protecting individuals in disaster situations.

The radiation safety regime is thus built on the basis of scientific data but inherently susceptible to political, defence, and economic parameters of the State, where the protection of people and the environment is relegated to a relative concept. Marred by a constant conflict of interests, it functions more like a management toolbox than a human protection framework. The analysis of this chapter thus indicates that radiation protection regime is rather ill-equipped, inadequate, and ineffective to protect individuals in nuclear disasters.



## **Chapter 2: Protection from Nuclear Disasters (Nuclear Safety Regime)**

After having examined the protection norms against radiation hazards, the thesis focuses its analysis on the other pillar of the human protection system against nuclear risk: nuclear safety. The notion of nuclear safety only emerged in the 1950s with the launch of the civil nuclear reactor programme following the 1953 “Atoms for Peace” speech of the then US President Eisenhower at the UN. Until then, nuclear energy had been exploited solely for military ends and the safety issue had thus been treated as a military secret.

Due to such legacy, nuclear safety had long been considered as a matter of national affairs. Safety norms were thus first developed by respective nuclear precursor countries such as the US and the UK. But the internationalisation of these norms took many years to emerge due to the resistance from some major nuclear powers. Over time, the international regime of nuclear safety has been established by the IAEA which has developed a comprehensive set of safety guidelines and instituted international conventions on matters related to nuclear safety.

According to the IAEA, nuclear safety generally entails ensuring the safety of nuclear installations, the prevention of accidents, and the mitigation of accident effects. This chapter focuses its analysis on the last aspect of nuclear safety – protection of population during and after disasters – which is composed of emergency preparedness & response (EP&R), post-accident management, and damage compensation. To do this, the chapter first explores the historical background and institutional and legal frameworks for nuclear safety and disaster protection (Section 1). This first section tries to understand how the historic and geopolitical contexts of nuclear energy shaped the making of the international safety regime, and to identify some particularities and tensions of such normative framework. Based on such background analysis, the second section of the chapter explores the current disaster protection system –

EP&R, post-accident recovery, and compensation – established by the safety regime (Section 2). The review will be conducted not only on the international standard fixed by the IAEA but also national systems created by major nuclear countries, namely the U.S. and France.

As in the previous chapter, the aim of this chapter is to evaluate the effectiveness and adequacy of nuclear disaster response norms installed by the nuclear safety regime. It investigates major protective actions, dose criteria which trigger such actions, and protection principles designed to protect the population in events of nuclear accidents. To guide such evaluation, the thesis refers to another international normative framework established for the protection of persons in man-made disasters: the humanitarian and forced migration regime. This cross-examination enables the thesis to identify specific natures, ambiguities, and limitations of the nuclear safety norms.

## Section 1: Institutional and Legal System

As described in the previous chapter, nuclear safety is the twin of the nuclear regulation system.<sup>313</sup> International nuclear safety is one of the operational mandates of the IAEA which was created in 1957 to promote the “peaceful” use of atomic energy following the U.S.’ Atoms for Peace speech. However, the international regime for nuclear safety was very slow to develop, compared to the radiation regulation regime. It took the IAEA two major nuclear accidents in the 1970s and 80s, the TMI in the US and the Chernobyl in the USSR, to establish the first international conventions on nuclear safety. Despite this development, nuclear safety regulation largely remains to be a matter of national jurisdiction, in particular, as regards the management of a nuclear accident.<sup>314</sup> In contrast, other risky industrial activities such as transport of dangerous goods and toxic waste disposal have developed comprehensive international regimes imposing stringent safety norms and sanctions in case of non-compliance to the operators. The equivalent international control does not exist for civil nuclear reactor activities today.

This first section of the chapter examines the current international nuclear safety regime instituted by the IAEA, elucidating its historical, institutional, legal, and philosophical foundations. As was the case with the radiation protection regime, the historical and geopolitical background of nuclear energy is crucial to understanding today’s safety regime and the disaster protection system. The section thus starts with the historical analysis of nuclear regulation (§1),

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<sup>313</sup> According to the IAEA, nuclear energy regulation also includes the concept of “nuclear security” which is defined as ‘to prevent, or detect and respond, to intentional malicious acts involving radioactive substances or directed against facilities or activities where such substances are used’ (IAEA website: <https://www.iaea.org/resources/nuclear-security-series>, consulted on 7 April 2021). The difference between nuclear safety and security generally lies in the existence (or not) of malicious intent in its risk. Since the subject of protecting persons in the event of nuclear accidents is mainly covered by nuclear safety, this thesis focuses its analysis on nuclear safety.

<sup>314</sup> Patrick Reyners and Emyr Lellouche, ‘Regulation and Control by International Organisations in the Context of a Nuclear Accident: The International Atomic Energy Agency and the OECD Nuclear Energy Agency’ in Peter D Cameron, Leigh Hancher and Wolfgang Kühn (eds), *Nuclear Energy Law After Chernobyl* (Graham & Trotman and International Bar Association 1988).

followed by the identification of major institutional actors (§2) and the analysis of legal and normative instruments on nuclear safety, focusing on the issue of nuclear disaster protection (§3). Finally, it discusses major tensions, bottlenecks, and limits of the regime, which led to gaps in the protection of persons in nuclear disasters (§4).

## **§1. History of Nuclear Safety: The Case of the US**

The history of nuclear safety is in fact the history of “peaceful” nuclear energy. As the instigator of such use, the US was the country first confronted by the issue of nuclear safety in the 1950s. Impossible to test or experiment prior to the operation, nuclear reactor safety was initially formulated on the basis of theoretical estimations and, over time, through “trial and error”, learning from real accidents.<sup>315</sup> The initial reflections and definitions of nuclear safety norms led by the US regulatory authority majorly influenced today’s international nuclear safety regime. The analysis of this paragraph is thus focused on the historic evolution of nuclear safety standards developed in the US. It traces the history of atomic energy and the emergence of the notion of nuclear safety at the launch of the civil nuclear programme (A), the evolution of safety concepts or philosophies under political and industrial pressures (B), and the paradigm shift – from disaster mitigation to disaster prevention – which founded today’s nuclear safety system (C). Lastly, the paragraph also reviews the institution of the nuclear liability regime, the indispensable apparatus for the nuclear industry and the last-resort protection device for the population in case of nuclear accidents (D).

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<sup>315</sup> Sezin Topçu, ‘Organiser l’irresponsabilité? La Gestion (Inter)Nationale Des Dégâts d’un Accident Nucléaire Comme Régime Discursif’ [2014] *Ecologie & politique* 2014/2 (N°49) 95; Wolfgang Krohn and Peter Weingart, ‘Commentary: Nuclear Power as a Social Experiment-European Political “Fall Out” from the Chernobyl Meltdown’ (1987) *12 Science, Technology, & Human Values* 52.



## A. From Bombs to Power Generation

The history of nuclear energy began with atomic bombs. The discovery of nuclear fission in 1938 by German scientists was soon exploited by the Allied nations, led by the US, UK and Soviet Union, to develop the most destructive weapons humans have ever possessed. When the US-led secret military operation, the Manhattan Project, succeeded in developing world's first nuclear weapons and using them in Hiroshima and Nagasaki in 1945, the world witnessed the dawn of the atomic age.<sup>316</sup> The world public and media were caught in awe, particularly by a grim prospect of an all-out nuclear war which would unavoidably annihilate humanity. Such an existential threat was soon counterbalanced by the image, promoted by nuclear power countries, of potential benefits that the energy would bring in the future: an endless and “too cheap to meter”<sup>317</sup> source of energy for all, eradicating world hunger and poverty and contributing to world welfare and peace. But such vision soon hit the wall as fusion research and breeder reactor projects began to face considerable technological difficulties. More than 80 years after the discovery of fission, the atomic energy use remains within the realm of military and electricity generation exploiting the same fission technology which requires uranium (limited resource) as fuel and produces highly toxic wastes at the end of the cycle.

At the end of the Second World War, the world was entering another pernicious war, the Cold War, in which nuclear arms race intensified between the US and the Soviet Union, the latter having succeeded in developing its own nuclear weapons in 1949. Having lost its monopoly over atomic technology, the US shifted its geopolitical strategy from keeping the technology secret to exporting it to the world for the “peaceful” purpose – electricity generation

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<sup>316</sup> Strictly speaking, the world entered the atomic era when the US detonated its first nuclear weapon, nicknamed “The Gadget”, at the Trinity test in the desert of New Mexico on 16 July 1945, about a month before dropping the similar bombs in Hiroshima and Nagasaki.

<sup>317</sup> The phrase was coined by the then-Chairman of the US Atomic Energy Commission, Lewis L. Strauss, in a 1954 speech to the National Association of Science Writers, which was widely covered by the media at the time in the US.

– with an aim to control and contain nuclear weapons’ proliferation. Sharing the fission technology with non-nuclear states for civil use was the only way, Americans had believed, to dissuade them from pursuing the technology for military purposes. In December 1953, a few months before the execution of the Castle Bravo bomb test, President Dwight D. Eisenhower gave a famous speech at the 470th Plenary Meeting of the UN General Assembly, later known as the “Atoms for Peace” speech. This new American strategy finally did not achieve its primary goal – nuclear containment – but succeeded in the proliferation of a civil nuclear programme in certain regions of the world (only about 30 countries), creating as a result the globalised civil nuclear industry. The speech also led to the creation of an international nuclear energy agency, the IAEA, mandated to promote “peaceful” use and to contain military use around the globe.

The question of reactor safety and protection of the population from potential accidents emerged at this moment. Previously, the issue of safety was controlled by the military who prioritised the development of weapons over safety, applied certain rules to its engineers and workers, but largely ignored and downplayed the risks for soldiers assisting bomb tests as well as residents living close to bomb factories and test sites. The first nuclear reactors for power generation were successively constructed in the Soviet Union, Great Britain, and the US in the 1950s.<sup>318</sup> But it was in the US where safety debates were most advanced long before other countries.<sup>319</sup> Knowing all too well the destructive power of atomic energy, the US Atomic Energy Commission (AEC)<sup>320</sup> began its reflection on the safety of civil reactors and the protection of population as early as in 1947 and published its first safety guideline in 1950. The

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<sup>318</sup> The Soviet Union succeeded in operating the world’s first grid-connected nuclear power station in Obninsk in 1954. The UK followed the suit by transmitting electricity to the national grid from the Calder Hall nuclear power station in 1956. The US’ first commercial-scale nuclear power station went online at Shippingport in 1957.

<sup>319</sup> Cyrille Foasso, ‘Histoire de La Sûreté de l’énergie Nucléaire Civile En France (1945-2000): Technique d’ingénieur, Processus d’expertise, Question de Société’ (Thesis, Lyon 2 University 2003); cited by Sezin Topçu, ‘Catastrophes nucléaires et « normalisation » des zones contaminées : Enjeux politiques, économiques, sanitaires, démocratiques et éthiques.’ (2016) No.8 – Mai 2016. La Note de la Fondation de l’Écologie Politique 12.

<sup>320</sup> The AEC was created by the Atomic Energy Act of 1946 (aforementioned), making the Commission responsible for both military and civil nuclear programmes.

guideline notably recommended the installation of an exclusion zone (non-residential area) around a reactor facility according to the size of the reactor.<sup>321</sup>

## **B. Initial Safety Concepts: From ‘Exclusion Zone’ to Engineered Safeguards**

Impossible to test beforehand, the safety of nuclear power stations and the manageability of an accident are essentially theoretical estimations, a speculation.<sup>322</sup> Under the uncertainty, the AEC took a precautionary approach in the first safety guideline, recommending the operators to secure a fixed space around the facilities. According to the 1950 guideline, a reactor of 3000 MWth (1000 MWe)<sup>323</sup> shall have an “exclusion zone” of 17.3 miles (equivalent 30 km) in radius from populous zones or towns in order to protect the public from the consequences of a potential accident.<sup>324</sup>

However, the concept of “exclusion zone” soon encountered resistance not only from the industry but also within the AEC.<sup>325</sup> The companies interested in civil nuclear projects wanted to reduce or cancel the requirement of exclusion zones and build power plants close to cities in order to lower transmission costs as well as to save the expenditure related to land purchase. The AEC executives were also worried that this safety perimeter principle would hamper or delay the development of civil nuclear programmes in the US. Indeed, the revision of the Atomic Energy Act of 1954<sup>326</sup> placed utmost importance on the rapid growth of commercial nuclear projects and assigned the AEC to accomplish such tasks. By this revised

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<sup>321</sup> Pierre Tanguy, ‘Three Decades of Nuclear Safety: Nuclear Plant Safety Has Not Been a Static Concept’ (1988) 2 IAEA Bulletin 51.

<sup>322</sup> Krohn and Weingart (n 315); Topçu, ‘Organiser l’irresponsabilité? La Gestion (Inter)Nationale Des Dégâts d’un Accident Nucléaire Comme Régime Discursif’ (n 315).

<sup>323</sup> Megawatt Thermal (MWth) refers to the energy input required to produce electricity while Megawatt Electric (MWe) refers to the electricity output capacity of the plant.

<sup>324</sup> Foasso (n 319).

<sup>325</sup> *ibid.*

<sup>326</sup> Atomic Energy Act of 1954, Pub. L. 83-703, 68 Stat. 919; Formally, ‘An Act to amend the Atomic Energy Act of 1946, as amended, and for other purposes’.

Act, the AEC was made responsible for three irreconcilable missions: the pursuit of weapons programme, the swift development of civil nuclear programme, and the protection of population from this civil nuclear programme that the AEC was supposed to promote.

To circumvent the distance requirement, private companies began to emphasise the robustness of their engineered safeguard features for their planned reactors.<sup>327</sup> The AEC was also under the mounting pressure from the US Congress which was keen on preserving the American dominance over civil nuclear technologies, in the context of fierce competition against the Soviet Union and the UK, and on advancing rapidly on the industrial electronuclear programme in the country. The safety philosophy of the AEC thus arrived at a turning point around 1956 and was shifted from distance-based to technology-reliant protection.<sup>328</sup> It introduced a new concept of safety – reactor containment – in which a radiation release from accidents would be prevented by building multiple physical barriers around a reactor. It was considered the last rampart of “engineered safety features” which became the basis of today’s nuclear reactor safety concept “defence-in-depth”.<sup>329</sup> The UK also followed suit during the 1960s when the country launched a second civil reactor programme. In order to facilitate such a development, the UK regulatory authority – Atomic Energy Authority (AEA) – progressively

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<sup>327</sup> Samuel J Walker and Thomas R Wellock, ‘A Short History of Nuclear Regulation, 1946-2009’ (US Nuclear Regulatory Commission 2010); Foasso (n 319).

<sup>328</sup> Walker and Wellock (n 327); Foasso (n 319).; Nevertheless, the concept of exclusion zone was not completely abandoned in the US in contrast to other countries. The regulation code on siting criteria (10 CFR Part 100/27 FR 3509) was passed in 1962 obliging an applicant who seeks a plant construction permit to designate an exclusion area around the facility. The exclusion area must be of such a size that an individual located at any point in that area would not receive a total radiation dose to the whole body of 25 rem (250 mSv) or 300 rem (3000 mSv) to the thyroid for two hours following the onset of a ‘postulated design basis accident’. And the applicant is normally required to have ownership of such an area.

<sup>329</sup> Walker and Wellock (n 327).; The concept of “defence-in-depth” is to create multiple layers of independent and redundant safeguard features at the nuclear facility, including physical barriers, engineered fail-safe functions, and effective emergency response plans (source: NRC website). Notwithstanding, the 2011 Fukushima nuclear accident demonstrated how these engineered safety features including the concept of containment were toothless against severe accidents with core meltdowns and in avoiding radiation release into the environment.

relaxed the distance-based siting criteria and replaced it with technical safety standards of reactors to ensure safety of the population from accidental release of radioactive materials.<sup>330</sup>

This shift in safety principle was preliminarily driven by economic considerations for the industry rather than safety concerns for the population. Not much seems to have changed since then in the sphere of national nuclear safety regulation. For example, a former Chairman of the US Nuclear Regulatory Commission (NRC)<sup>331</sup>, Gregory B. Jaczko, who had resigned in 2012, described that the Commission was often ‘overwhelmed by the industry it is supposed to regulate’ and the Congress was behind the industry.<sup>332</sup> According to him, the nuclear power industry has developed too much control over regulatory authorities as well as the Congress in the US. A similar observation was made by the Japanese parliamentary investigation committee charged to examine the cause of the Fukushima nuclear accident in 2012.<sup>333</sup>

### **C. Focus on Prevention Instead of Mitigation**

The first attempt to “speculate” possible consequences of a major accident was also made by the AEC in 1957. The report entitled ‘Theoretical Possibilities and Consequences of Major Accidents in Large Nuclear Power Plants’ (also called “WASH-740” or “Brookhaven report”)<sup>334</sup> chose a hypothetical accident scenario of a water-cooled reactor of 500 MWth (100-200 MWe) located 30 miles (48.3 km) from a city of 1 million people with population density

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<sup>330</sup> FR Charlesworth and WS Gronow, ‘A Summary of Experience in the Practical Application of Siting Policy in the United Kingdom’ in IAEA (ed), *Proceedings of A Symposium, Vienna, 3-7 April 1967: Containment and Siting of Nuclear Power Plants* (IAEA 1967) 143.

<sup>331</sup> NRC was established by the Energy Reorganization Act of 1974, Pub.L 93-438, 88 Stat. 1233. By this Act, NRC took over the regulatory function of the AEC and the Energy Research and Development Administration (ERDA) was created to take over the development function of the AEC, which was later incorporated to the US Department of Energy (USDOE) in 1977. This Energy Reorganization Act effectively dissolved the AEC and separated the regulation of atomic energy from the development.

<sup>332</sup> Gregory B Jaczko, *Confessions of a Rogue Nuclear Regulator* (Simon & Schuster 2020) viii.

<sup>333</sup> NAIIC (n 20).

<sup>334</sup> AEC, ‘Theoretical Possibilities and Consequences of Major Accidents in Large Nuclear Power Plants: A Study of Possible Consequences If Certain Assumed Accidents, Theoretically Possible but Highly Improbable, Were to Occur in Large Nuclear Power Plants’ (US Atomic Energy Commission 1957) WASH-740 <<https://www.osti.gov/servlets/purl/4344308>> accessed 10 April 2021.

of 500 person per square miles. In the worst-case scenario where 50% of fission materials is released in the environment from the reactor, the report estimated that it would cause up to 3,400 deaths, 43,000 injuries, affected territories of 240,000 km<sup>2</sup>, and property damage of 7 billion US dollars. Although the AEC downplayed the conclusion of WASH-740 after its publication, it triggered a vivid reaction among the public as well as the industry. This notably led to an institution of the 1957 Price-Anderson Act (aforementioned), just seven months after the publication of the report, with a view to reassure both the public and industry, especially the latter by limiting the liability amount of operators in the event of accidents so as to make civil nuclear activities “insurable” and thus commercially viable.<sup>335</sup>

Afraid of stirring more public fear and opposition against the construction of power plants, nuclear authorities also began to downplay the risk of severe accidents. The philosophy of nuclear safety was thus shifted from precaution based on the premise of potential accidents to prevention assuming that accidents could be averted. Based on this new ideology, safety discussions have been dictated by technical and organisational prevention measures to avoid an accident at the expense of protection and mitigation measures after an accident. For example, there was no statutory obligation for plant operators to prepare for off-site emergency plans in the US until the Three Mile Island (TMI) accident occurred in 1979.<sup>336</sup> The first legislation on emergency preparedness was only adopted a year following the accident, requiring the operators to equip itself with an adequate emergency plan before obtaining an operation licence.<sup>337</sup>

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<sup>335</sup> Topçu, ‘Organiser l’irresponsabilité? La Gestion (Inter)Nationale Des Dégâts d’un Accident Nucléaire Comme Régime Discursif’ (n 315) 101.

<sup>336</sup> NEA/OECD, ‘Nuclear Legislation in OECD and NEA Countries: United States (2016 Update)’ (Nuclear Energy Agency 2016).

<sup>337</sup> 10 CFR 50.47, Aug. 8, 1980, as amended (the Code of Federal Regulations)

These shifts in safety priorities – technical safety over precautionary protection measures/prevention over preparation – which took place in the early years of civil nuclear development in the US finally became determinant for the design of international nuclear safety standards which was later established by the IAEA.

#### **D. Damage Compensation: The Double-Edged-Sword Protection**

The compensation scheme for nuclear damage forms the other pillar of nuclear disaster protection. Contrary to disaster preparedness and response, the nuclear damage liability regime was established even before nuclear reactor safety regulations. As explained earlier, the world's first nuclear liability regime was developed and instituted in the US as early as in 1957 (the Price-Anderson Act). After the Atoms for Peace address, the US government struggled to start the civil nuclear programme in the country due to reluctance expressed by potential operators, construction companies and suppliers who were all afraid of potential colossal financial liability arising from lawsuits in case of major accidents.<sup>338</sup> The fear was further exacerbated by the above-mentioned WASH-740 report published by the AEC in 1957, which estimated the cost of a potential accident as 7 billion US dollars. In view of such a figure, private companies were not convinced to invest in the enterprise without an insurance coverage or some sort of financial guarantee from the State.<sup>339</sup> In fact, no private insurance companies would have offered coverage to commercial reactor activities either without a certain guarantee or arrangement from the State. The development of the civil nuclear industry involving the private sector was almost impossible without a special liability regime which would provide certain protection for

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<sup>338</sup> Under ordinary tort law of many countries, liability is unlimited in amount. See NEA/OECD, 'Responsabilité et réparation des dommages nucléaires - Une perspective internationale' (Nuclear Energy Agency 1994).

<sup>339</sup> *ibid* 35.

the companies against such risks. The enactment of the Price-Anderson Act was thus indispensable for addressing this legal uncertainty and dissipating fear among investors.

As such, the nuclear liability regime is one of the most peculiar tort regimes that currently exist in the world, both in its origin and purpose. The regime was born out of a government's desire to develop a civil nuclear programme, which entails enormous risks. A major nuclear accident indeed causes substantial damage to persons, property and the environment, which could last over decades or several generations. In the words of a nuclear law expert, 'the range of damage suffered (after the Chernobyl accident) seems almost limitless'.<sup>340</sup> The cost of damage can thus be astronomic. Initially estimated as 7 billion USD by the AEC's WASH-740 report in the 1950s, the cost of a major accident is today estimated to reach as much as 430 billion euros (465 billion USD) on average, 760 billion euros (822 billion USD) in the worst cases.<sup>341</sup> The author of the report, the IRSN, explains that the worst case scenario is 45% of the French GDP and 19 years of the nation's economic growth.<sup>342</sup> The 2011 Fukushima Daiichi accident is proving this estimation to be rather accurate. The latest estimation made in March 2019 by a major Japanese economic think tank was 350-800 billion USD.<sup>343</sup> These figures easily exceed the financial capacity of any operator or even of one nation in some cases.

In addition to this potentially colossal liability cost, civil nuclear enterprise also faced another "obstacle": public fear of atomic energy. In the 1950s, the image emanating from atomic

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<sup>340</sup> Julia A Schwartz, 'International Nuclear Third Party Liability Law: The Response to Chernobyl' [2006] NEA/OECD International Nuclear Law in the Post-Chernobyl Period 38. Bracket added.

<sup>341</sup> IRSN, 'Méthodologie Appliquée Par l'IRSN Pour l'estimation Des Coûts d'accidents Nucléaires En France.' (IRSN 2013) PRP-CRI/SESUC/2013-00261 <[https://www.irsn.fr/FR/expertise/rapports\\_expertise/Documents/surete/IRSN-PRP-CRI-SESUC-2013-00261\\_methodologie-cout-accident.pdf](https://www.irsn.fr/FR/expertise/rapports_expertise/Documents/surete/IRSN-PRP-CRI-SESUC-2013-00261_methodologie-cout-accident.pdf)> accessed 19 January 2023.

<sup>342</sup> *ibid.*

<sup>343</sup> JCER, 'Accident Cleanup Costs Rising to 35-80 Trillion Yen in 40 Years' (Japan Center for Economic Research 2019) <<https://www.jcer.or.jp/english/accident-cleanup-costs-rising-to-35-80-trillion-yen-in-40-years>> accessed 25 November 2019.



energy was inevitably associated with the atomic bombing of Hiroshima and Nagasaki.<sup>344</sup> Governments were also aware of the potential magnitude of nuclear damage on human lives and the environment and the particular nature of radiation whose health effects could manifest in a person years or even generations after exposure.<sup>345</sup> Another nuclear law expert, Pelzer, also recognised these pernicious effects of radiation including its genetic effect and argued for a special liability regime which would protect the population from this particular nature of nuclear damage.<sup>346</sup>

The nuclear liability regime thus had to address the magnitude and specificity of risk related atomic energy and to offer adequate protection for the public against such risk so as to foster public acceptance. In order to reconcile these irreconcilable objectives – protection of victims against damage as well as operators causing the very damage, nuclear liability laws were established as a special regime in many countries, often separated from civil tort law or common law. The 1957 Price-Anderson Act of the US in effect became the model for these national regimes as well as international nuclear liability regimes.

A few years following the adoption of the Price-Anderson Act in the US, two major nuclear liability regimes were adopted at the international level: the Paris Convention in 1960 and the Vienna Convention in 1963. These conventions will be analysed in the following paragraph (§3).

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<sup>344</sup> Ximena Vasquez-Maignan, ‘The Japanese Nuclear Liability Regime in the Context of the International Nuclear Liability Principles’ in NEA/OECD (ed), *Japan’s compensation system for nuclear damage: as related to the TEPCO Fukushima Daiichi nuclear accident*. (NEA/OECD 2012).

<sup>345</sup> Schwartz (n 340) 39.

<sup>346</sup> Pelzer, ‘The Present State of Research Carried Out by the English-Speaking Section of the Centre for Studies and Research’ (n 17) 269.

## §2. Major Actors of International Norm-Making

There are three organisations who play a major role in setting international standards of nuclear safety: the IAEA, the Nuclear Energy Agency (NEA) of the OECD, and the Euratom. Among them, the IAEA is the only agency given a worldwide mandate by its Statute to ‘establish or adopt, in consultation and, where appropriate, in collaboration with the competent organs of the United Nations and with the specialized agencies concerned, standards of safety for protection of health and minimization of danger to life and property [...]’ (Article III. A.6).<sup>347</sup> But this provision does not provide the IAEA with legal authority to prescribe its safety standards into binding instruments. The IAEA standards are thus primarily advisory, with each State retaining its exclusive powers to regulate nuclear safety and handle disasters. In contrast, the Euratom is vested with legal authority to impose its standards on Member States through the adoption of Regulations, Directives, and Decisions that are all binding in nature. The role of these three organisations is described in the following section.

### A. IAEA

The IAEA was officially established by its Statute in July 1957,<sup>348</sup> thus operationalizing the “Atoms for Peace” proposal made by the U.S. four years earlier. Today, the Agency has 173 Member States and is regarded as the global focal point agency for atomic energy.<sup>349</sup> The IAEA is an autonomous intergovernmental organisation with its own Statute and linked to the UN system by a special agreement (Related Organisation). Its core mandate has two pillars: the promotion of the peaceful use of nuclear energy and the containment of nuclear weapons proliferation (Article II). In addition to these main objectives, the Agency is

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<sup>347</sup> Statute of the International Atomic Energy Agency (adopted on 23 October 1956, entered into force on 29 July 1957) 276 UNTS 3

<sup>348</sup> *ibid*

<sup>349</sup> Source: IAEA website (<https://www.iaea.org/about/governance/list-of-member-states>)

authorised to undertake the following tasks: to promote and facilitate research (Article III.A.1); to foster exchange of technical knowledge and training of experts (Article III.A.3 and 4); and to establish or adopt nuclear safety standards (Article III.A.6). Interestingly, the IAEA has established its world authority not for its first mandate – promotion – but for taming of atomic energy over the years: namely, safeguarding and improving safety.<sup>350</sup>

Both functions of control are strictly conditioned by the Statute: the IAEA safeguards and safety standards are only imposed on Member States, or any other nations, which enter cooperation agreements or technical assistance projects with the Agency.<sup>351</sup> Originally, the founders of the IAEA had envisaged the Agency to play a central role in transferring technical know-how and supplying nuclear materials (or arranging with a Member State to do so on its behalf) to developing countries in a cooperation agreement as its main promotion activity. Through these “Agency projects”, the IAEA was expected to implement the tasks of safeguards and safety controls. But since its creation, the Agency has implemented only a few cooperation projects which involved important power plant construction or transfer of nuclear materials.<sup>352</sup> In practice, the majority of reactor and fuel supply projects have been conducted under bilateral agreements, predominantly involving US entities. Therefore, IAEA’s safety and safeguard controls have in fact been rarely conducted under the Statute requirement.

Nevertheless, its safeguard activities have expanded over the years, not under the Statutory mandate, but in connection with the provisions of the Treaty on the Non-Proliferation

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<sup>350</sup> Pelzer, ‘The Present State of Research Carried Out by the English-Speaking Section of the Centre for Studies and Research’ (n 17).; In the IAEA jargon, “safeguard” is used in relation to the control of weapons’ proliferation, and “safety” is used in the context of regulating civil nuclear activities.

<sup>351</sup> Bernhard G Bechhoefer and Eric Stein, ‘Atoms for Peace: The New International Atomic Energy Agency’ (1956) 55 Michigan Law Review 747.; Under the NPT (Article III), each non-nuclear-weapon State Party is required to accept safeguards implemented by the IAEA in accordance with its Statute and safeguards system ‘with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices’.

<sup>352</sup> David Fischer, ‘History of the International Atomic Energy Agency: The First Forty Years’ (IAEA 1997).

of Nuclear Weapons (NPT) signed in 1970.<sup>353</sup> Meanwhile, its authority for safety controls was further reduced by its executive body, the Board of Governors<sup>354</sup>, which decided in 1976 to cancel mandatory safety inspections conducted on a regular basis for the Agency's project operations and replace it with advisory missions carried out with the prior consent of the concerned State.<sup>355</sup> When the IAEA renounces its own statutory right to control safety for its assisted operations, one may wonder the level of control it could exercise for non-assisted operations.

Notwithstanding, in accordance with Article III. A.6 of the Statute, the IAEA has established a comprehensive body of safety standards concerning civil nuclear activities over the years. Although they are not legally binding on Member States, they have been incorporated into national regulations and legislations of many nuclear countries via regional or other international regulatory instruments and bilateral agreements. As such, they have become de facto international nuclear safety norms.

As the global focal point agency, the IAEA also plays an important role in facilitating the establishment of international conventions on the issues related to atomic energy. To name a few, the IAEA undertook the secretariat function for the 1963 Vienna Convention on Civil Liability for Nuclear Damage<sup>356</sup>, the Convention on Nuclear Safety<sup>357</sup>, the Convention on Early

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<sup>353</sup> Treaty on the Non-Proliferation of Nuclear Weapons (adopted on 1 July 1968, entered into force on 5 March 1970) 729 UNTS 161; Under a provision of the Treaty (Article III 1.), every non-nuclear-weapon State party is required to accept safeguards, negotiated and concluded with the IAEA in accordance with the Statute and the Agency's safeguards system.

<sup>354</sup> The Board of Governors is one of the two policy-making bodies of the IAEA. Permanent members are composed of major nuclear power countries. The other is the annual General Conference of IAEA Member States.

<sup>355</sup> Reinhard H Rainer and Paul C Szasz, 'The Law and Practices of the International Atomic Energy Agency 1970-1980 (Supplement 1 to the 1970 Edition)' (IAEA 1993) Text 410-411; cited by Fischer (n 352).

<sup>356</sup> Vienna Convention on civil liability for nuclear damage (adopted on 21 May 1963, entered into force on 12 November 1977) 1063 UNTS 265.

<sup>357</sup> The Convention on Nuclear Safety (adopted on 20 September 1994, entered into force on 24 October 1996) 1963 UNTS 293 (CNS)

Notification of a Nuclear Accident<sup>358</sup> and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency<sup>359</sup>. These legal instruments will be analysed in the following paragraph.

## B. Euratom

As mentioned earlier, the Euratom was created by the Euratom Treaty of 1957, constituting one of the three organisations constituting the European Communities (ECs) founded after the end of the Second World War.<sup>360</sup> While the other two have gone through significant modifications for the unification process, the Euratom Treaty has not been amended in substance since its inception.<sup>361</sup> Moreover, the Euratom has not merged with the European Union (EU) in 1993 as did the two other EC organisations (ECSC and EEC) when the Maastricht Treaty went into effect. The Euratom thus retains a separate legal personality from the EU, despite its shared membership and institutional structure, and therefore its decision-making process is largely outside of the European Parliament's oversight.<sup>362</sup> The original purpose and the mission of the Euratom were similar to those of the IAEA:<sup>363</sup> to promote the development and research of civil nuclear energy, to establish uniform safety standards, and to safeguard the use of nuclear materials against military purposes<sup>364</sup>. Initially, the ECs envisaged the Euratom to undertake a centralising role to own and control the supply of all fissionable

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<sup>358</sup> The Convention on Early Notification of a Nuclear Accident (adopted 26 September 1986, entered into force 27 October 1986) 1439 UNTS 275

<sup>359</sup> The Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (adopted 26 September 1986, entered into force 27 October 1986) 1457 UNTS 133

<sup>360</sup> The ECs were constituted by the European Coal and Steel Community (ECSC) established by the 1952 Treaty of Paris, the European Economic Community (EEC) established by the 1957 Treaty of Rome and the EAEC (Euratom) by the 1957 Euratom Treaty.

<sup>361</sup> Mervyn O'Driscoll, 'The Origins and Early History of Euratom, 1955-1968' in European Parliament (ed), *The European Parliament and the Euratom Treaty: Past, Present and Future* (European Parliament 2002).

<sup>362</sup> *ibid.*

<sup>363</sup> The core missions of the Commission are listed in Article 2 of the Treaty.

<sup>364</sup> In fact, the provision of the Treaty never mentions the word "military" itself, but it is generally interpreted as such. Article 2 (e) indeed states that the Euratom shall ensure that 'nuclear materials are not diverted to purposes *other than those for which they were intended*' (emphasis added).

materials through the Euratom Supplies Agency and to develop harmonised European reactor designs and fuel cycle technologies through the Joint Nuclear Research Centre. But these original ambitions have failed to materialise due to different national interests at play among the Member States: notably, France’s resistance in conceding supervisory powers to the organisation as it aspired to develop nuclear weapons and its own civil nuclear industry.<sup>365</sup>

Just like the IAEA, the Euratom today plays the most important role, not in promoting, but in conducting “checks and balances” of civil nuclear energy use. Unlike the IAEA, the Euratom is equipped with supranational powers to impose rules on Member States through “regulations”, “directives”, and “decisions”, whereby the Member States are required to adopt them into their national laws, regulations, and administrative provisions.<sup>366</sup> Since half of the countries who possess civil nuclear reactors in the world are the EU Member States, Euratom Directives indeed have a significant impact on international nuclear safety norms.

As for nuclear safety, the Euratom adopted the Nuclear Safety Directive (2009/71/Euratom)<sup>367</sup> in 2009, reflecting the provisions of the 1994 Convention on Nuclear Safety (CNS). The detail of the directive will be examined in the following paragraph.

### **C. NEA/OECD**

The origin of the OECD Nuclear Energy Agency (NEA) is the European Nuclear Energy Agency (ENEA) established in 1958 by the Council of the Organisation for European Economic Co-operation (OEEC), the predecessor of the OECD. The Agency was renamed to

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<sup>365</sup> O’Driscoll (n 361).

<sup>366</sup> EU Regulations must be applied in its entirety across the EU while Directives leave national authorities the choice in terms of form and method for its application. Decisions must be applied in its entirety by those to whom it is addressed (a country or a company). Source: Article 288 of the Treaty on the Functioning of the European Union (TFEU)

<sup>367</sup> Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations OJ L 172/18, amended by 2014/87/Euratom.

the current form in 1972 to reflect its growing membership beyond the European continent. Initially created to foster nuclear technical cooperation among European member countries, the mandate was changed during 1970s to coordinate and harmonise the national nuclear programmes of Member States, especially in the fields of safety, health, and regulation. The NEA publishes numerous reports and non-binding guidelines on regulatory, technical, scientific, economic, and legal aspects of civil nuclear activities. Notably, its publication on nuclear law issues is the most substantial among all the international nuclear organisations. Currently, the NEA has 34 member countries from Europe, America, and Asia, with China and India as Strategic Partners.<sup>368</sup>

However, unlike the IAEA and the Euratom, the NEA does not have its own statute and works within the framework of the OECD. Also, the Agency does not have a regulatory function and its main activities are coordination, harmonisation, knowledge sharing, and policy analysis among member countries with an overall aim to facilitate the “peaceful” use of nuclear energy. The NEA also played a leading role in establishing several international conventions related to nuclear energy. The most prominent one is the 1960 Convention on Third Party Liability in the Field of Nuclear Energy (often referred to as Paris Convention)<sup>369</sup>, which will be examined in the following paragraph.

### **§3. Legal and Normative Framework of Nuclear Safety**

International efforts to regulate nuclear risks were first concentrated on the activities which would affect many countries in case of accidents, which justified the international control

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<sup>368</sup> Current Member countries are Argentina, Australia, Austria, Belgium, Bulgaria, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, Mexico, the Netherlands, Norway, Poland, Portugal, Korea, Romania, Russia, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the UK and the US.

<sup>369</sup> Convention on Third Party Liability in the Field of Nuclear Energy (adopted 29 July 1960, entered into force 1 April 1968) 956 UNTS 251

and supervision.<sup>370</sup> They include the proliferation and tests of nuclear weapons and the transport of radioactive materials. Indeed, an international legal regime for the latter activity was developed much earlier than that of power plants safety. The UN Economic and Social Council (ECOSOC) published its first recommendations, ‘the UN Recommendations on the Transport of Dangerous Goods’, so-called “Orange Book”, as early as 1956. Subsequently, the IAEA complemented such recommendations by publishing its own guideline ‘Regulations for the Safe Transport of Radioactive Material’ in 1961. And these recommendations have been incorporated into various international treaties on the carriage of dangerous goods, such as the 1974 International Convention for the Safety of Life at Sea (SOLAS)<sup>371</sup>, Annex 18 of the 1944 Convention on International Civil Aviation<sup>372</sup>, and the 1957 European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR).<sup>373</sup>

The IAEA recommendations on nuclear reactor safety did not follow the same path. Unlike other comparable international organisations such as the International Civil Aviation Organisation (ICAO) and the International Maritime Organisation (IMO) which have adopted extensive and prescriptive standards on the design, construction, operation, and emergency conducts of aircraft and vessels over the years, the IAEA has insisted on national responsibility, leaving significant discretionary powers to respective States to determine which level of safety was safe enough without effective control mechanism even after the creation of international

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<sup>370</sup> Norbert Pelzer, ‘Safer Nuclear Energy Through a Higher Degree of Internationalisation? International Involvement Versus National Sovereignty’ (2013) 91 Nuclear Law Bulletin 43.

<sup>371</sup> International Convention for the Safety of Life at Sea (adopted 1 November 1974, entered into force 25 May 1980) 1184, 1185 UNTS 2

<sup>372</sup> Convention on International Civil Aviation (adopted 7 December 1944, entered into force 4 April 1947) 1184 UNTS 3 (Chicago Convention); Annex 18 to the Convention deals with the Safe Transport of Dangerous Goods by Air and became effective on 1 January 1983. Radioactive substances are categorized as Class 7 dangerous material.

<sup>373</sup> Agreement concerning the International Carriage of Dangerous Goods by Road (adopted 30 September 1957, entered into force 29 January 1968) UNECE Doc. ECE/TRANS/215 (Vol. I and II) (ADR)



treaties on nuclear safety.<sup>374</sup> Some legal scholars thus described the existing international regime for civil nuclear energy as “a shield rather than a sword”.<sup>375</sup>

As a result, nuclear power plant safety is governed primarily by national legislations, then by international soft-law instruments, and lastly by international agreements, the last two of which were established by the IAEA. Before the Chernobyl accident in 1986, no legally binding international instruments existed with regard to nuclear safety but only a series of guidelines, codes, and recommendations that were all non-binding in nature.

This paragraph attempts to elucidate the international normative structure of nuclear safety, composed of soft law and binding instruments, and analyse their respective strengths and weaknesses.

### **A. Non-Binding Instruments: IAEA Safety Standard Series and ICRP Recommendations**

According to the IAEA, nuclear safety is defined as:

The achievement of proper operating conditions, prevention of accidents and mitigation of accident consequences, resulting in protection of workers, the public and the environment from undue radiation risks.<sup>376</sup>

From this definition, we see that the objective of nuclear safety is to protect site personnel, the public and the environment. Meanwhile, the environment was not mentioned in the original IAEA Statute which defined safety as ‘protection of health and minimization of danger to life

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<sup>374</sup> Kamminga (n 69); Jack Barkenbus and Charles Forsberg, ‘Internationalizing Nuclear Safety: The Pursuit of Collective Responsibility’ (1995) 20 Annual Review of Energy and the Environment 179.

<sup>375</sup> Leigh Hancher and Peter D Cameron, ‘After Chernobyl: Has Anything Really Changed?’ in Peter D Cameron, Leigh Hancher and Wolfgang Kühn (eds), *Nuclear Energy Law After Chernobyl* (Graham & Trotman and International Bar Association 1988) 195.

<sup>376</sup> IAEA, ‘IAEA Safety Glossary: 2018 Edition’ (IAEA 2019) 155.

and property'.<sup>377</sup> Indeed, the protection of the environment is a new concept added later to its objective to reflect the preoccupation of the international community during the 1970s with the rise of the environmental movement.<sup>378</sup> Nevertheless, the above definition has some ambiguities. For example, does protection of “the public” include the properties of the public? Why is the word “undue” inserted before “radiation risk”? To add more confusion, the objective of nuclear safety is also defined in other IAEA publications as:

to protect individuals, society and the environment from harm by establishing and maintaining in nuclear installations effective defences against radiological hazards<sup>379</sup>

Again, there is vagueness with certain terms used in the above definition. Is the protection of “individuals” different from that of “the public”? What does the protection of “society” practically entail? On the other hand, what becomes clear from these definitions is that the “protection” in nuclear safety would mean *the protection from radiation exposure only* and not against other consequences of nuclear disasters. This point will be further elaborated in the analysis below (§4).

As mentioned earlier, the IAEA’s safety guidelines are today regarded as the international reference for nuclear regulation and disaster protection. They were first developed in 1974 when the civil nuclear programme took off and the construction of power reactors surged in the world. So-called Nuclear Safety Standards (NUSS) Programme, the guidelines were composed of five Codes of Practice and 55 Safety Guides which gave detailed guidance on siting, design, commissioning, operation, quality assurance, and regulatory activities. The NUSS Programme was incorporated into a new structure of publications called the IAEA Safety

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<sup>377</sup> Article III A.6 of the IAEA Statute

<sup>378</sup> Fischer (n 352).

<sup>379</sup> IAEA, ‘Basic Safety Principles for Nuclear Power Plants’ (IAEA 1999) 75-INSAG-3 Rev. 1 8.

Series in 1989, which was renamed as the IAEA Safety Standards Series in 1997. The Series are categorised into three groups in a hierarchical order: Safety Fundamentals, Safety Requirements, and Safety Guides. On the top of the hierarchy, Safety Fundamentals enunciate core objectives and principles of nuclear safety and protection, according to which Safety Requirements establish detailed safety requirements that “must be met” by national nuclear regulators to protect people and the environment. And the Guides elaborate further the actions, conditions, or procedures for meeting these requirements. Today, the Series consist of one unified Safety Fundamentals document (SF-1), seven General Safety Requirements (GSR) documents supplemented by six Specific Safety Requirements (SSRs) documents, and Safety Guides documents that treat at least 83 subject matters. A total of 132 documents covers issues ranging from mining, transport, and handling of radioactive materials to radiological protection, operations of power plants, research reactors, fuel cycle and waste disposal facilities, and disaster response.<sup>380</sup>

Meanwhile, these IAEA guidelines are not free from modulation and compromise since they must always be approved by the Board of Governors before publication,<sup>381</sup> which consists of 10 major nuclear powers and 3 others representing the regions in which the major 10 are not located (selected by co-optation, thus quasi-permanent) and 22 elected members.<sup>382</sup>

Despite the use of the term “must be met” in the provisions of Safety Requirements, these IAEA safety standards ultimately create no legal obligation for Member States. This fact is repeatedly emphasised in the Foreword address of Director-General of IAEA in most of the Series documents, which repetitively remind that ‘safety standards are not legally binding on

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<sup>380</sup> IAEA, ‘Long Term Structure of the IAEA Safety Standards and Current Status’ (IAEA 2021).

<sup>381</sup> See IAEA website on Board of Governors at <<https://www.iaea.org/about/governance/board-of-governors>> accessed 25 April 2023

<sup>382</sup> For the composition of the Board of Governors, see Article VI (Board of Governors) of the IAEA Statute.

Member States but may be adopted by them, *at their own discretion*'.<sup>383</sup> As explained earlier, they are binding only on States who enter a cooperation agreement and whose project is financed by IAEA. Nevertheless, some legal experts claim that the Series guidelines are as good as binding documents since many of these norms have already been adopted via different forms by States.<sup>384</sup>

As was the case in the US, the IAEA's guideline on disaster response (off-site) – the protection of people and the environment in nuclear emergencies – was published only in 1981 (following the TMI accident).<sup>385</sup> As for the post-emergency or recovery phase protective actions, the first guideline had to wait until 1989, three years after the Chernobyl accident.<sup>386</sup> Legally binding instruments on emergency response as well as nuclear safety were also established only after the Chernobyl accident.

The main IAEA Series documents specifically addressing disaster response and protection include: the 2015 Preparedness and Response for a Nuclear or Radiological Emergency (GSR Part 7)<sup>387</sup>, the 2007 Arrangements for Preparedness for a Nuclear or Radiological Emergency (GS-G-2.1)<sup>388</sup>, the 2011 Criteria for Use in Preparedness for a Nuclear

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<sup>383</sup> For example, IAEA, 'Application of the Concepts of Exclusion, Exemption and Clearance' (n 277) ii, v; IAEA, 'Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety' (IAEA 2000) General Safety Requirements No. GS-R-1 2. Emphasis added.

<sup>384</sup> Günther Handl, 'The IAEA Nuclear Safety Conventions: An Example of Successful "Treaty Management"?', *Nuclear Law Bulletin No.72* (NEA/OECD 2003); Boustany (n 202). For Boustany, non-binding rules can be transformed, in due course, into general principles of law or international customary law, to which some provisions of these safety standards could be no exception. Especially when these guidelines contain "must be met" minimum standards to ensure national and transnational protection of the environment by preventing the release of detrimental radioactive substances, she contends that 'it is hard to understand how they could be totally bereft of any binding effect' (p.43).

<sup>385</sup> IAEA, 'Planning for Off-Site Response to Radiation Accidents in Nuclear Facilities' (IAEA 1981) Safety Series No. 55.

<sup>386</sup> IAEA, 'Principles and Techniques for Post-Accident Assessment and Recovery in a Contaminated Environment of a Nuclear Facility', (IAEA 1989) Safety Series No.97.

<sup>387</sup> IAEA and others, 'Preparedness and Response for a Nuclear or Radiological Emergency' (IAEA 2015) General Safety Requirements GSR Part 7.

<sup>388</sup> IAEA, 'Arrangements for Preparedness for a Nuclear or Radiological Emergency' (IAEA 2007) Safety Guide GS-G-2.1.

or Radiological Emergency (GSG-2)<sup>389</sup>, the 2018 Arrangements for the Termination of a Nuclear or Radiological Emergency (GSG-11)<sup>390</sup>, and the 2013 Actions to Protect the Public in an Emergency due to Severe Conditions at a Light Water Reactor (EPR-NPP-PPA)<sup>391</sup>.

Also, the ICRP has published a few guidelines which specifically address the nuclear disaster protection measures: the 2009 Application of the Commission's Recommendations for the Protection of People in Emergency Exposure Situations' (Publication 109),<sup>392</sup> the 2009 Application of the Commission's Recommendations to the Protection of People Living in Long-term Contaminated Areas (Publication 111),<sup>393</sup> both of which were replaced by the 2020 Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident (Publication 146).<sup>394</sup>

## **B. Legally Binding Instruments: Liability Conventions, Safety Conventions, and Euratom Directive**

The first conventions dealing with civil nuclear accidents were to do with the issue of compensation – financial liability of operators for nuclear damage – which were established as early as in 1960s under the auspices of the IAEA and the NEA/OECD: the Paris and Vienna Conventions. As shown in the history of the US nuclear safety regulation, the institution of a special liability regime was the prerequisite for the development of the civil nuclear programme because it protected not only the public but also the companies in case of accidents. Without it,

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<sup>389</sup> IAEA and others, 'Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency' (IAEA 2011) General Safety Guide GSG-2.

<sup>390</sup> IAEA and others, 'Arrangements for the Termination of a Nuclear or Radiological Emergency' (IAEA 2018) General Safety Guide GSG-11.

<sup>391</sup> IAEA, 'Actions to Protect the Public in an Emergency Due to Severe Conditions at a Light Water Reactor' (n 72).

<sup>392</sup> ICRP, 'Application of the Commission's Recommendations for the Protection of People in Emergency Exposure Situations. ICRP Publication 109.' (n 207).

<sup>393</sup> ICRP, 'Application of the Commission's Recommendations to the Protection of People Living in Long-Term Contaminated Areas after a Nuclear Accident or a Radiation Emergency. ICRP Publication 111.' (n 18).

<sup>394</sup> ICRP, 'Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.' (n 38).

commercial reactor enterprise would not have been simply possible or commercially viable. As a result, these conventions were drawn up swiftly based on the model of the US' Price-Anderson Act, the world's first nuclear liability law enacted in 1957, for the purpose of facilitating the start-up of nuclear projects around the globe.

Emergency response or disaster management, on the other hand, had not been the priority subject of nuclear regulation for a long time, both domestically and internationally. Preoccupied with the development of the civil nuclear sector, many nuclear power authorities were extremely hesitant to talk about the subject, let alone come up with detailed plans. Some of them downplayed the possibility of accidents so much that it was considered almost impossible that severe accidents would ever occur in their countries.<sup>395</sup> This stance changed only after catalytic events - grave accidents – occurred in major nuclear countries, namely the 1979 TMI accident in the US and, in particular, the 1986 Chernobyl accident in the former Soviet Union.

The Chernobyl accident indeed prompted the creation of the first international legal instruments on accident response and nuclear safety. The safety of nuclear installations has long been a matter of national sensitivity especially during the Cold War where dominant nuclear powers, the US and the USSR, considered civil nuclear installations as part of their national security issues. Also, the internationalisation of power plant safety was not deemed necessary by many countries due to its static structure, having little risk, so was presumed, to cause damage beyond their territories in case of accidents. The Chernobyl accident completely changed this view. Indeed, radioactive plumes released from the accident travelled thousands of miles away affecting the territory of many European countries. This pushed the IAEA to

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<sup>395</sup> This was the case in Japan before the Fukushima accident, which will be examined in depth in the following Title.

come up with binding international obligations on nuclear safety for the first time in nearly 30 years of its existence.

In the aftermath of the Chernobyl accident, four major international agreements on disaster response and nuclear safety were adopted: the first two on emergency response and the other two on nuclear safety. On the regional level, the Euratom followed suit and adopted a legally-binding directive on nuclear safety more than 10 years after these international conventions. Notwithstanding, as the analysis will show below, these instruments did not fundamentally change the ethos of the international nuclear safety regime, the reign of sovereignty and national jurisdiction.

This sub-paragraph will examine four important international instruments on nuclear safety and disaster protection: Paris and Vienna liability conventions (1), Conventions on Nuclear Accidents (2), Conventions on Nuclear Safety (CNS) (3), and Euratom Nuclear Safety Directive (4).

### 1. Paris and Vienna Conventions on Third Party liability

Today, the international nuclear liability regime is composed of two main Conventions, the IAEA's Vienna Convention of 1963<sup>396</sup> and the OECD's Paris Convention of 1960<sup>397</sup>. There are two Protocols to amend the said Conventions respectively: the 1997 Protocol to Amend the Vienna Convention (the 1997 Vienna Protocol, hereafter)<sup>398</sup> and the 2004 Protocol to Amend the Paris Convention (the 2004 Paris Protocol, hereafter)<sup>399</sup>. With two other Conventions, the

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<sup>396</sup> Vienna Convention on civil liability for nuclear damage (adopted on 21 May 1963, entered into force on 12 November 1977) 1063 UNTS 265 (Vienna Convention)

<sup>397</sup> Convention on Third Party Liability in the Field of Nuclear Energy (Paris Convention) (adopted 29 July 1960, entered into force 1 April 1968) 956 UNTS 251 (Paris Convention)

<sup>398</sup> Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage (adopted 12 September 1997 and entered into force 4 October 2003) 2241 UNTS 270

<sup>399</sup> Protocol to Amend the Paris Convention on Third Party Liability in the Field of Nuclear Energy (adopted 12 February 2004, entered into force 1 January 2022), available at [http://www.oecd-nea.org/law/paris\\_convention\\_protocol.pdf](http://www.oecd-nea.org/law/paris_convention_protocol.pdf)

1988 Joint Protocol<sup>400</sup> and the 1997 Convention on Supplementary Compensation (CSC)<sup>401</sup>, they currently form the international nuclear damage liability regime. European countries developed their nuclear liability legislations through ratification to these Conventions. But the international nuclear liability regime remains to be an extremely inadequate and sparsely agreed regime. For example, one fourth of countries with nuclear reactors is not Party to neither the Vienna nor Paris Convention. Although the situation has slightly changed with the 1997 CSC Convention,<sup>402</sup> these non-Signatories include several major nuclear countries such as the United States, Japan, Canada, India, Pakistan, China, and Korea. The number of State Parties to some of these conventions is also very low. For example, the CSC has only 11 Parties and the 1997 Vienna Protocol has only 15 Parties.

The Vienna and Paris Conventions, developed based on the 1957 US Price–Anderson Act, established basic principles of nuclear liability which have since been transposed to national legislation of many nuclear power countries including those who are party to neither convention. These core principles are as follows: strict liability, exclusive liability (legal channelling), compulsory financial security, limited liability in amount, and limited liability in time.<sup>403</sup>

### *Strict liability*

In nuclear damage, liability is imposed on the operator regardless of fault, negligence or intention to harm. The “liability without fault” principle functions for an advantage of victims

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<sup>400</sup> Joint Protocol Relating to the Application of the Vienna Convention on Civil Liability for Nuclear Damage and the Paris Convention on Third Party Liability in the Field of Nuclear Energy (adopted 21 September 1988, entered into force on 27 April 1992) 1672 UNTS 302 (Joint Protocol)

<sup>401</sup> Convention on Supplementary Compensation for Nuclear Damage (adopted 12 September 1997, entered into force 15 April 2015) 36 ILM 1473 (CSC)

<sup>402</sup> Canada, India, Japan, and the US ratified the CSC convention.

<sup>403</sup> Schwartz (n 340); NEA/OECD, ‘Responsabilité et réparation des dommages nucléaires - Une perspective internationale’ (n 338).



as it relieves them the burden of proving negligence or intent of the perpetrator as well as of identifying individuals who caused the accident in order to receive compensations<sup>404</sup>. It is intended to facilitate a swift reparation of damage for claimants. But the strict liability is not the absolute liability as the principle has an exoneration clause for nuclear incidents caused by armed conflicts, hostilities, or natural disasters of an exceptional nature.

#### *Exclusive Liability (Legal Channelling)*

The operator is solely liable for damage and no other entities regardless of who actually caused the accident. All liability is “channelled” through the operator. This allows victims to file a claim rapidly without having to identify individuals or entities who would have committed a fault to cause the accident. But this principle also hampers the victims to fully exercise their right to claim damages from the manufacturer, the supplier, and other companies who could be liable for the accident.

#### *Compulsory Financial Security*

All operators must obtain financial security up to the amount prescribed by the relevant law before entering operation. In most cases, the security is provided by private insurance companies. There are other forms of guarantees such as State or bank provided security, operator pooling system or a combination of them. This ensures that compensation will be swiftly paid to claimants in case of accidents.

#### *Limited Liability in Amount*

Unlike ordinary tort law where there is no limit to the compensation amount payable, the international nuclear liability regime limits the amount of liability to be borne by operators

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<sup>404</sup> Schwartz (n 340).

in case of nuclear damage.<sup>405</sup> The desire of the governments to protect the nuclear industry and the necessity for the operators to obtain insurance coverage resulted in creating a principle which puts a cap on the amount of compensation payable to victims by the operator. Without it, operators would most probably go bankrupt after exhausting financial security to pay up compensation. Many countries thus adopted legislation to enable the government to intervene and provide additional or supplementary compensations to victims when the compensation amount exceeds that of imposed financial security of the operator.

### *Limited Liability in Time*

This is the specific condition imposed by insurance companies. Liability does not usually extend more than ten years from the accident. ‘Neither insurance companies nor nuclear operators can accept the prospect of remaining liable to pay compensation [...] for an indefinite or even an extended period of time after a nuclear accident’.<sup>406</sup> In some cases, States are ready to intervene and respond to claims which are instituted after the time limit.

Among these principles, limited liability in amount and time raises serious questions. Initially limited to 5 million USD, the Vienna Convention today sets the liability limit of the operator at 150 million SDR<sup>407</sup> (equivalent to 150 million euros) through the 1997 Protocol while the Paris Convention increased to 700 million euros by the 2004 Protocol. Nevertheless, the amount, either 150 million or 700 million euros, is completely illusory in view of the actual cost of a major accident, today estimated at hundreds of *billions*. Under the actual liability regime, there is a strong possibility that victims will not be adequately compensated and thus

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<sup>405</sup> Vasquez-Maignan (n 344).

<sup>406</sup> Schwartz (n 340) 41.

<sup>407</sup> The Special Drawing Right (SDR) is the unit of account used in the Paris Convention and is defined by the International Monetary Fund (IMF) based upon a basket of key international currencies (Source: NEA/OECD website). The currency value of the SDR fluctuates daily and valuation basket is reviewed and adjusted every five years. For example, SDR 1 was 1.09 euros on 4 April 2023.

the population is not sufficiently protected against nuclear accidents. This possibility is even admitted by the 1997 Vienna Protocol (Article VIII) which states:<sup>408</sup>

Subject to application of the rule of sub-paragraph (c) of paragraph 1 of Article VI, where in respect of claims brought against the operator the damage to be compensated under this Convention exceeds, or is likely to exceed, the maximum amount made available pursuant to paragraph 1 of Article V, priority in the distribution of the compensation shall be given to claims in respect of loss of life or personal injury.

Moreover, the principle of limited liability in time is inconsistent with the specific nature of nuclear risk – radioactivity – whose ‘damage might not manifest itself until many years after the incident which caused it’.<sup>409</sup> For example, survivors of atomic bombs in Hiroshima and Nagasaki – *hibakusha* – are still fighting for the recognition of their illness at courts 75 years after the bombardment.

According to Sezin Topçu, a historian and sociologist of science, these significant gaps between the liability of the operator and the actual cost of an accident constitute an integral part of the nuclear liability regime, essentially of the entire civil nuclear enterprise, on which the industry depend for its survival in the face of potentially colossal nuclear damage in case of an accident.<sup>410</sup> The regime ultimately represents a State subsidy system for the nuclear industry.<sup>411</sup>

## 2. Conventions on Nuclear Accidents

The first two agreements, the Convention on Early Notification of a Nuclear Accident (the Early Notification Convention, hereafter)<sup>412</sup> and the Convention on Assistance in the Case

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<sup>408</sup> Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage, 29 September 1997, art. 10, available at <https://www.iaea.org/sites/default/files/infcirc566.pdf>

<sup>409</sup> Schwartz (n 340) 39.

<sup>410</sup> Topçu, ‘Organiser l’irresponsabilité? La Gestion (Inter)Nationale Des Dégâts d’un Accident Nucléaire Comme Régime Discursif’ (n 315).

<sup>411</sup> Currie (n 115).

<sup>412</sup> The Convention on Early Notification of a Nuclear Accident (adopted 26 September 1986, entered into force 27 October 1986) 1439 UNTS 275

of a Nuclear Accident or Radiological Emergency (the Assistance Convention, hereafter)<sup>413</sup>, were signed six months following the accident in 1986. The Early Notification Convention was in effect to apply Principle 21 of the 1972 Stockholm Declaration in the nuclear domain,<sup>414</sup> establishing a State obligation ‘to notify, directly or through the International Atomic Energy Agency (hereinafter referred to as the “Agency”), those States which are or may be physically affected as specified in article 1 and the Agency of the nuclear accident, its nature, the time of its occurrence and its exact location *where appropriate*’.<sup>415</sup> Principle 21 of the Declaration namely recognises the responsibility of the States ‘to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction’.<sup>416</sup> The Convention thus adopted one of the core international environmental law principles – “no harm” rule – which source can be traced back to the Trail Smelter arbitration in 1938 and 1941.<sup>417</sup>

However, the Convention contains several legal weaknesses in creating obligations for the States. First, it grants a significant discretion to the accident State to determine whether an incident indeed amounts to the ‘nuclear accident’ defined in Article 1 – having an actual or possible release of radioactive material – and if so, whether the release has a transboundary effect of ‘radiological safety significance for another State’. This ultimately means that unless

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<sup>413</sup> The Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (adopted 26 September 1986, entered into force 27 October 1986) 1457 UNTS 133

<sup>414</sup> This also corresponds to Principle 18 of the 1992 Rio Declaration that was adopted after the Convention, which states ‘[s]tates shall immediately notify other States of any natural disasters or other emergencies that are likely to produce sudden harmful effects on the environment of those States’.

<sup>415</sup> Article 2 (a) of the Early Notification Convention (n 414). Emphasis added.

<sup>416</sup> The principle, though not legally binding, is today recognised as a rule of international customary law. See, for example, Jean-Pierre Beurier, *Droit international de l’environnement* (5e édition, Pedone 2017); Louise de La Fayette, ‘International Environmental Law and the Problem of Nuclear Safety’ (1993) 5 *Journal of Environmental Law* 31.

<sup>417</sup> *Trail Smelter Case (United States v. Canada) (1938 and 1941)* 3 *R.I.A.A.* 1905. The arbitration tribunal famously concluded that ‘no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence’ (p.1965). This arbitration notably became the basis for two fundamental principles of international environmental law: the no-harm and the polluter-pays rules.

the State recognises, or willing to acknowledge, the incident as “accident” as per Article 1, the Convention does not create obligations for the State to notify. In addition, notifying the exact location of the accident is rather optional in the Convention (represented by the term “where appropriate”).<sup>418</sup> As a result, the Convention creates obligations only for States that are already willing and have good intentions to notify an accident anyways.<sup>419</sup> At the time of the Chernobyl accident, the Soviet Union reassured that there was no significant radioactive release from the accident, which would affect other countries. The Convention thus would not have changed that course of events and will not probably prevent such a situation from happening again in the future.<sup>420</sup> Moreover, the scope of application is limited to emergencies at non-military facilities, thus effectively excluding “other” nuclear accidents which would notably involve military facilities (Article 3).<sup>421</sup>

The Assistance Convention contains equally vague legal substances. The Convention provides an important legal basis for mutual assistance in case of nuclear accidents or radiological emergencies. Yet again, the provision and reception of the mutual assistance is left to the discretion of the States Parties. While Article 1 stipulates that ‘States Parties shall cooperate between themselves and with the [IAEA] [...] to facilitate prompt assistance in the event of a nuclear accident or radiological emergency’, Article 2 specifies that States Parties “may” request or grant assistance in the event of a nuclear accident or radiological emergency.

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<sup>418</sup> Article 1 of the Early Notification Convention

<sup>419</sup> Norbert Pelzer, ‘Learning the Hard Way: Did the Lessons Taught by the Chernobyl Nuclear Accident Contribute to Improving Nuclear Law’, *International Nuclear Law in the Post-Chernobyl Period* (OECD/IAEA, 2006); Berthold Moser, ‘The IAEA Conventions on Early Notification of a Nuclear Accident and on Assistance in the Case of a Nuclear Accident or Radiological Emergency’ in NEA/OECD and IAEA (eds), *International Nuclear Law in the Post-Chernobyl Period* (NEA/OECD 2006).

<sup>420</sup> Pelzer, ‘Learning the Hard Way: Did the Lessons Taught by the Chernobyl Nuclear Accident Contribute to Improving Nuclear Law’ (n 419).

<sup>421</sup> Moser (n 419).; Article 3 of the Convention states: ‘[w]ith a view to minimizing the radiological consequences, States Parties may notify in the event of nuclear accidents other than those specified in article 1’.

It signifies that there is no strict legal obligation for the State to either request or render assistance, the situation which we had already had prior to the Convention.<sup>422</sup>

But this legal vagueness, according to a nuclear law expert, constitutes in fact the very strength of the two Conventions. Norbert Pelzer notably argued that the success of the Conventions lied with the number of States who became parties – 127 States in total for the first convention and 122 States for the latter – which indicates that the world now has a globally accepted legal framework on notification and assistance in case of nuclear accidents.<sup>423</sup> Notwithstanding, most legal scholars are rather sceptical as to the effectiveness of the Conventions in changing the status quo and assuring better protection against nuclear disasters.<sup>424</sup> Effectively, none of these Conventions have provisions related to the protection of people in nuclear disasters.

### 3. Conventions on Nuclear Safety (CNS)

The other two conventions were on nuclear safety: one on civil nuclear power plants and the other on spent fuel and radioactive waste management facilities. The Convention on Nuclear Safety (CNS)<sup>425</sup> was signed in 1994, taking eight years from the Chernobyl accident, and the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Joint Convention) was adopted in 1997,<sup>426</sup> eleven years following the accident. These time lags were mainly due to intensive negotiations that had taken

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<sup>422</sup> Pelzer, 'Safer Nuclear Energy Through a Higher Degree of Internationalisation? International Involvement Versus National Sovereignty' (n 370).

<sup>423</sup> Source: IAEA website. The number is as of September 2020.

<sup>424</sup> Peter D Cameron, 'Nuclear Safety After Chernobyl: The Role of International Law' (1988) 1 *Leiden Journal of International Law* 121; Moser (n 419); both articles cited by Pelzer, 'Safer Nuclear Energy Through a Higher Degree of Internationalisation? International Involvement Versus National Sovereignty' (n 370).

<sup>425</sup> The Convention on Nuclear Safety (adopted on 20 September 1994, entered into force on 24 October 1996) 1963 UNTS 293 (CNS)

<sup>426</sup> Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (adopted 5 September 1997, entered into force 18 June 2001) (Joint Convention) 2153 UNTS 303

place among states since major nuclear power countries initially opposed to the idea of legally binding safety instruments.<sup>427</sup> These countries contended that not only it was not possible to find effective common standards because the conception and operation of nuclear reactors differed from one country to another, but also a binding safety instrument would even do more harm causing disturbance to the nationally coherent safety system of respective States.<sup>428</sup> Interestingly, these opposing states were some of major nuclear powers who had already achieved a high-level safety standard and thus would not probably be affected anyway by a binding safety instrument.

While some legal experts qualify the adoption of safety conventions as “an advance” in bringing domestic nuclear safety matters within the ambit of international legal regime and “a milestone” in the nuclear energy law, others considered it to be largely inadequate, “evasive”, “inward-looking, insular character”, and “lowest-common-denominator”.<sup>429</sup> This is because safety obligations stated in the conventions were often enveloped in “weasel words” that condition or limit the application of provisions<sup>430</sup>, such as “as appropriate”, “adequate”, or “reasonably practical”, and the Convention avoids the prescription of any specific technical standards, strict obligations, or sanctions in case of non-compliance, thus in effect safeguarding the sovereign control over nuclear safety. For example, Preamble (iii) of the CNS reaffirms that

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<sup>427</sup> de La Fayette (n 416). According to the author, those nuclear powers included France, the US and the UK.

<sup>428</sup> Some legal experts refute such an argument. Kamminga (n 45) takes an example of international legal regimes established for the safety of civil aviation and maritime safety. Despite the technical varieties that exist in aircrafts and vessels, these regimes effectively impose binding technical standards on their design, construction, operation and manning. Similarly, de la Fayette (n 52) remarks the inconsistency of the attitude toward nuclear safety, compared to the safety of international shipping and the protection of the marine environment, in which the majority of maritime states accept extremely stringent technical regulations and inspections.

<sup>429</sup> Boustany (n 202); Kamminga (n 69); Barkenbus and Forsberg (n 374); de La Fayette (n 416); Peter D Cameron, ‘Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management’ in Nathalie Horbach (ed), *Contemporary Developments in Nuclear Energy Law: Harmonizing Legislation in CEES/NIS* (Kluwer Law International 1999). For example, Boustany qualified the CNS and the Joint Convention as the “art of legal ‘evasion’”. For La Fayette, the convention represents a “regressive stance” which ‘serves to defeat the very purpose of the convention’ (p. 68).

<sup>430</sup> Carlton Stoiber, ‘Inside Nuclear Baseball: Reflections on the Development of the Safety Conventions’ (2018) 100 Nuclear Law Bulletin 61.

‘responsibility for nuclear safety rests with the State having jurisdiction over a nuclear installation’ and the objective of the Convention (Article 1 (1)) is set ‘to achieve and maintain a high level of nuclear safety worldwide through *the enhancement of national measures* and international co-operation’.<sup>431</sup> This emphasis on national jurisdiction is rather odd for an international treaty that is generally created precisely because the subject matter, nuclear safety in this case, is considered in need for international control over national jurisdiction.

Another particularity of the agreements is that they do not contain any technical safety provisions, nor cite or refer specifically to any of the IAEA codes and safety guides.<sup>432</sup> Preamble (viii) affirms this point by stating that the ‘Convention entails a commitment to the application of fundamental safety principles for nuclear installations rather than of detailed safety standards’.<sup>433</sup> As a matter of fact, many environmental conventions are drafted as “framework” conventions to which technical details would be added later as protocols and annexes, as opposed to “comprehensive” conventions in which general obligations and technical annexes are simultaneously negotiated and included in a single treaty.<sup>434</sup> The CNS ended up being neither of them. The approach of framework convention was initially proposed by the Secretariat of IAEA, only to be rejected by a handful of major nuclear powers who were fearful of prescriptive obligations, supranational control, and subsequent costs.<sup>435</sup> Instead, they

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<sup>431</sup> Emphasis added

<sup>432</sup> Boustany (n 202).

<sup>433</sup> According to a legal officer of IAEA who was involved in the making of the Convention, ‘fundamental safety principles for nuclear installations’ refers to, without naming it in the text, the “Safety Fundamentals” of the IAEA Safety Series: IAEA, ‘The Safety of Nuclear Installations’ (IAEA 1993) Safety Series No. 110. It was replaced by IAEA and others, ‘Fundamental Safety Principles’ (IAEA 2006) Safety Fundamentals No. SF-1. See Odette Jankowitsch, ‘The Convention on Nuclear Safety’ (1994) 2 Nuclear Law Bulletin No. 54 (NEA/OECD) 9;

<sup>434</sup> Kamminga (n 69); Barkenbus and Forsberg (n 374); de La Fayette (n 416). For examples of “framework conventions”, Kamminga cited the Vienna Convention for the Protection of the Ozone Layer (adopted 22 March 1985, entered into force 22 September 1988) (1987) 26 ILM 1529 and the UN Framework Convention on Climate Change (adopted on 9 May 1992, entered into force 21 March 1994) (1992) 31 ILM 851.

<sup>435</sup> Jankowitsch (n 433); cited by Kamminga (n 69); Barkenbus and Forsberg (n 374). According to the latter authors, these major nuclear powers notably include the US, France and Japan.



promoted for a concept of “incentive Convention”<sup>436</sup> that would “encourage” all countries to strengthen safety, and a closed-door “peer review” mechanism among State Parties, instead of a third-party or IAEA inspection, as a tool to verify compliance with Convention’s obligations.<sup>437</sup> These propositions were finally embraced and reflected by the final text of the Convention.

While some legal specialists argue that the incentive nature of the Convention in fact facilitates compliance by way of peer pressures, contributing in effect to enhancing safety, others are quite unconvinced.<sup>438</sup> For the sceptics, the Convention offers only limited added values to the existing framework of nuclear safety and falls short of other existing international regimes that regulate risks of technology-environment nexus.<sup>439</sup> By virtue of its “incentive” nature, they argue, the Convention was finally transformed into a “soft law” instrument despite its legally binding power.<sup>440</sup>

Seventeen years after the adoption of the CNS, the world witnessed another major nuclear accident, the Fukushima Daiichi nuclear power station in Japan. Would the accident have been prevented had the Convention been more prescriptive and equipped with stringent safety control mechanisms? The question has no definitive answers, but the thesis explores the question in the case study of the Fukushima accident in the following Title.

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<sup>436</sup> Preamble (vii) of the Convention mentions this term without providing any definition. Handl provides an interesting definition: ‘a convention, not designed to ensure fulfilment of obligations by parties through control and sanction, but based on the parties’ enlightened self-interest in enhanced levels of safety to be developed co-operatively and promoted through regular “peer review” meetings’ (p. 8). See Handl (n 384).

<sup>437</sup> Jankowitsch (n 433).

<sup>438</sup> For optimistic views, see Pelzer, ‘Learning the Hard Way: Did the Lessons Taught by the Chernobyl Nuclear Accident Contribute to Improving Nuclear Law’ (n 419); Handl (n 384); Johan Rautenbach, Wolfram Tonhauser and Anthony Wetherall, ‘Overview of the International Legal Framework Governing the Safe and Peaceful Uses of Nuclear Energy - Some Practical Steps -’ in NEA/OECD and IAEA, *International Nuclear Law in the Post-Chernobyl Period* (NEA/OECD 2006); For sceptical views, Boustany (n 202); Kamminga (n 69); Barkenbus and Forsberg (n 374).

<sup>439</sup> Barkenbus and Forsberg (n 374); Kamminga (n 69).

<sup>440</sup> Boustany (n 202).

#### 4. Euratom Directive on Nuclear Safety

As described earlier, the Euratom is a Europe-based regional nuclear organisation but its members compose half of the world nuclear powers with commercial nuclear reactors, and thus its decisions have a weight in shaping the status of international safety norms. Most importantly, unlike the IAEA, the Euratom standards which come out as directives adopted by the European Commission (Directorate-General Energy), are binding on its Member States. For this reason, it is important to examine what have been established as safety standards and protection norms by Euratom directives.

The Euratom Treaty prescribes the Community (Euratom) to establish uniform safety standards to protect the health of workers and the general public against dangers arising from ionising radiation (Article 2 (b) and Article 30). But it does not make any explicit reference to safety of nuclear installations or emergency preparedness. The question of nuclear safety, as is the case with the IAEA, is largely considered as a matter of national competence of respective Member States.<sup>441</sup> The extent of Euratom competence became a contentious issue when the Community was to accede to the above CNS.<sup>442</sup> The Euratom was of the view that its competence was limited to radiation protection and information sharing on emergency plans (Article 15 and 16 (2) of the Convention) and thus proposed a restrictive application of the CNS provisions. This position was challenged by the European Commission at the European Court of Justice in 2002 which upheld the Commission's view that nuclear safety was part of the Euratom's competence.<sup>443</sup>

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<sup>441</sup> O'Driscoll (n 361).

<sup>442</sup> Athanase Popov, 'Euratom Competence in the Areas of Nuclear Security and Nuclear Safety: An Impossible Parallel?' (2018) 2018/2 Nuclear Law Bulletin No. 101 63.

<sup>443</sup> Case C-29/99, *Commission v Council* [2002] ECR 2002 I-11221. The judgement notably stated that Chapter III (Health and Safety) of the Euratom Treaty can be interpreted as covering the field of nuclear safety and 'it is not appropriate, in order to define the Community's competence, to draw an artificial distinction between the protection of the health of the general public and the safety of sources of ionising radiation' (para 82).

Following the Court judgement, the Euratom adopted a directive concerning nuclear safety for the first time in 2009 whose substance and language largely followed those of the CNS. The Nuclear Safety Directive (2009/71/Euratom)<sup>444</sup> indeed consists of only five pages without technical annexes (in comparison, the Basic Safety Directive on radiation protection has a total of 114 pages), simply affirming national responsibility as the principal foundation of nuclear safety and emphasising ‘national circumstances’ to take into account when establishing safety frameworks. The objectives of the Directive are fixed as to ‘maintain and promote the continuous improvement of nuclear safety’ and to ‘ensure that Member States shall provide for appropriate national arrangements for a high level of nuclear safety’ (Article 1). In terms of compliance verification, it requires the Member States only to conduct self-assessments every 10 years and arrange for an international peer review under the auspices of IAEA (Article 9.3).

Despite being endowed with considerable enforcement powers like no other, the Euratom falls short of establishing clear safety criteria and ensuring the highest level of safety and protection for the population of the Community.

#### **§4. Bottlenecks of International Nuclear Safety Regime**

After having examined the history and make-up of the international nuclear safety regime, this paragraph attempts to lay out its major characteristics, particularly its limits, namely, tension between international control and national sovereignty (A) and dilemma between promotion and control (B).

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<sup>444</sup> Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations OJ L 172/18, amended by 2014/87/Euratom.

## **A. International Control vs. National Sovereignty**

The first obvious characteristic of the nuclear safety regime is the primacy of national jurisdiction and the sensitivity that the issue provokes. As Pelzer lucidly pointed out, this has to do with the basic fact that the civil nuclear energy has its roots in atomic bombs.<sup>445</sup> In fact, civil nuclear programme, due to its sheer scale of political and financial stakes and the sensitivity of its materials for national security, has always been a state affair and often part of the grand national project. In addition, the possession of nuclear technology generally demonstrates the country's mastery in technical and scientific matters, which also contributes to the national image and pride. As such, any international control on the safety aspect of their programme could be interpreted as a stain on such image, an intervention on domestic matters, or worse, an infringement to national sovereignty. Consequently, there has been a constant effort from the part of major nuclear powers to maintain the issue of nuclear safety and disaster response within the realm of domestic affairs, resisting any strict international controls.

Under the current regime, even after the Chernobyl and Fukushima experiences, if an accident occurs, it is entirely up to respective governments to decide how to protect the population from its effects, determining what levels of radioactive contamination are “dangerous enough” or “liveable” and what actions are “protective” enough according to their respective technical and financial capabilities and political will.

## **B. Dilemma of Promotion vs. Regulation: No Third-Party Control**

Another particularity with the regime of nuclear safety is the constant hesitation and reluctance of regulatory authorities to adopt more stringent safety rules or protection standards. In the early phase of civil nuclear sector development, as seen in the case of the US, nuclear

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<sup>445</sup> Pelzer, ‘Learning the Hard Way: Did the Lessons Taught by the Chernobyl Nuclear Accident Contribute to Improving Nuclear Law’ (n 419).

regulatory authorities in charge of safety were also the agencies tasked, first and foremost, to promote the energy. In this context, the agencies were often constrained to make compromises on safety in order to deliver the other objective: rapid growth of civil nuclear activities. For the same reason, they had tendencies to downplay the risks related to power plant operations and the scale of potential accident consequences.<sup>446</sup>

Typically satirised as “letting the fox guard the henhouse”<sup>447</sup>, the dual responsibility of nuclear authorities has gradually been separated in major nuclear power countries when they came under heavy public criticisms following an accident or over a handling of environmental controversy. The US established the Nuclear Regulation Authority (NRC) in 1974, separating in effect its safety regulation function from the AEC, when the issue of environmental pollution from nuclear power installations became a public concern in the context of the first environmental movement in the US. In the UK, the Nuclear Installations Inspectorate was created under the Ministry of Power (at the time) in 1959, taking the regulatory function away from AEA, following the 1957 Windscale accident. In Japan, the dual function of the nuclear authority was not separated until after the Fukushima nuclear accident in 2011. The Nuclear Regulation Authority (NRA) was established in 2012, taking the regulatory function from the Nuclear and Industrial Safety Agency (NISA), a sub-agency of the Ministry of Economy, Trade, and Industry (METI) whose mandate was also to promote the nuclear industry.

The exception to this trend is the IAEA. While its own safety guideline, Safety Requirement (Part 1), advises the separation of regulatory and promotional functions of nuclear authorities to ensure safety,<sup>448</sup> the IAEA retains the two contradictory functions within the same

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<sup>446</sup> Topçu, ‘Organiser l’irresponsabilité? La Gestion (Inter)Nationale Des Dégâts d’un Accident Nucléaire Comme Régime Discursif’ (n 315); Kamminga (n 69).

<sup>447</sup> Walker and Wellock (n 327) 48–49.

<sup>448</sup> IAEA, ‘Governmental, Legal and Regulatory Framework for Safety’ (IAEA 2016) General Safety Requirements GSR Part 1 (Rev.1).

house even today. The same advice was also emitted by the 1987 Brundtland Report of the World Commission on Environment and Development, established by the UN General Assembly in 1983.<sup>449</sup> Indeed, the Report recommended the creation of international regulation body, independent from the IAEA, which would inspect nuclear reactors in the world.<sup>450</sup> Such advice has since been ignored by the IAEA and nuclear countries. But the consequence of this failure is visible today: severe accidents continue to occur and there is no effective international control mechanism to ensure the power plant safety and the protection of citizens against nuclear disaster effects.

Yet, the uncoupling of dual tasks does not always guarantee a genuinely independent regulation of nuclear energy, free from industrial and political pressures.<sup>451</sup> The tell-all book written by the former Chairman of the US Nuclear Regulatory Commission (between 2009-2012) illustrates well how the regulatory authority is overpowered by the industry it was meant to control with the back support from the Congress. After having served as a commissioner for four years and as Chairman for three years at the NRC, Jaczko made a scathing conclusion in his 2019 book: the nuclear power industry endangers our lives and ‘the continued use of nuclear power will lead to catastrophe in this country or somewhere else in the world’.<sup>452</sup> According to this insider’s account, nuclear safety regulation including protection standards for the public in disasters seems to be decided under the significant influence of the nuclear industry. If that is the case in the US, the situation would not be so different in other major nuclear power countries.

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<sup>449</sup> UNGA, ‘Report of the World Commission on Environment and Development: “Our Common Future” (Brundtland Report)’ (UN General Assembly 1987) UN Doc A/42/427 ( 4 August 1987).; The Commission was established in 1983 by the resolution 38/161 of UNGA (A/RES/38/161) with a view to make recommendations on the question of sustainable development. The then UN Secretary-General Javier Pérez de Cuéllar appointed Gro Harlem Brundtland, former Prime Minister of Norway, as Chairperson of the Commission.

<sup>450</sup> *ibid* para 62.

<sup>451</sup> Walker and Wellock (n 327).

<sup>452</sup> Jaczko (n 332) 22.

## **Section 2: Current Protection Norms and their Ambiguities**

After having analysed the history and make-up of the international nuclear safety regime, this section aims to examine the protection norms and principles for nuclear disasters established by the regime. The nuclear disaster protection norms indeed represent one of the rare disaster response systems that exist in the world. As shown earlier in the definition of nuclear safety by the IAEA, the notion of nuclear disaster protection is essentially concentrated on the protection from radiation hazards. It does not contain other regular relief activities such as food distribution, water, sanitation, and hygiene (WASH), protection of vulnerable groups such as separated children, and family reunification, which normally form an essential part of disaster relief operations. As a result, nuclear disaster response is heavily reliant on the radiation protection norms fixed by the ICRP.

This section first tries to elucidate such disaster protection system established by the IAEA and ICRP and then studies national disaster response systems established by major nuclear powers, namely the US and France<sup>453</sup> (§1). The second half of the section examines the peculiarities, ambivalences, and shortcomings of these nuclear protection norms, especially from the perspective of other international disaster protection frameworks established for man-made and natural disasters (§2).

### **§1. Nuclear Disaster Protection Norms**

This paragraph investigates nuclear emergency preparedness and response (EP&R) and post-disaster recovery systems created by international and national nuclear authorities. The basic framework of these systems is generally laid down by international conventions, non-

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<sup>453</sup> These two countries were chosen for this section's analysis because they are the two biggest civil nuclear powers in the world, with 92 commercial reactors in the US and 56 reactors in France. Japan was in third place with 54 reactors before the Fukushima nuclear accident. Japan is intentionally excluded from the analysis since it will be examined in detail in the following Title.

binding instruments (e.g. IAEA Safety Standard Series), national laws and regulations. First, the thesis maps out the international norms – protection measures, principles, and criteria – established by the IAEA and ICRP (A), which will be followed by the study of two national cases, the US and France (B). The analysis of each protection system is divided into two phases: emergency response and post-accident recovery. These studies allow the thesis to obtain a clear understanding on the current status of protection norms established by the nuclear regime.

### **A. International Protection Norms**

As analysed earlier, the IAEA is given an international mandate by its Statute to establish nuclear safety standards and has developed a series of guidelines including those related to the protection of population in nuclear disasters. Its disaster protection standard is in fact largely based on radiation protection standards set by the ICRP. In view of this, the review of international norms will be conducted by navigating through both IAEA and ICRP guidelines on nuclear disaster management (listed in the previous section on ‘Non-Binding Instruments’).

The IAEA manuals divide disaster management into three phases: emergency response, transition, and planned/existing exposure situation.<sup>454</sup> They correspond to the ICRP’s early, intermediate, and long-term phases.<sup>455</sup> According to the IAEA, an emergency is ‘(a) non-routine situation or event that necessitates prompt action, primarily to mitigate a hazard or adverse consequences for human life, health, property or the environment’.<sup>456</sup> The emergency response phase usually lasts from hours to days and weeks depending on the situation. The transition phase is defined as the period ‘once the source has been brought under control’ and where ‘no further significant accidental releases or exposures resulting from the event are

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<sup>454</sup> IAEA and others, ‘Arrangements for the Termination of a Nuclear or Radiological Emergency’ (n 390).

<sup>455</sup> ICRP, ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.’ (n 38).

<sup>456</sup> IAEA and others, ‘Preparedness and Response for a Nuclear or Radiological Emergency’ (n 387) 80.



expected'.<sup>457</sup> According to the IAEA, this phase usually lasts from days to months and a year. The end of the transition phase makes the end of nuclear or radiological emergency and enters the post-accident recovery phase. The third phase, planned or existing exposure situation, is also called 'long term recovery operations' by the IAEA, which would last for an indeterminate period depending on the scale of contamination. To simplify the matter, the analysis of protective actions in this paragraph will be divided into two phases – emergency and recovery – where the “transition” or “intermediate” phase will be integrated into the recovery phase.

## 1. Emergency Response

According to the IAEA guideline, emergency response consists of 'actions to mitigate the consequences of an emergency for human life, health, property and the environment' and 'provides a basis for the resumption of normal social and economic activity'.<sup>458</sup> The latter statement, though, sounds a little odd for emergency response since the nuclear emergency phase normally deals with saving human lives and, in a worst-case scenario, the life of the nation itself. It gives an assumption that 'the resumption of normal social and economic activity' is always possible after a nuclear emergency, disregarding a scenario where radiological contamination would be so severe that no human activity would be feasible for certain or extended areas following a nuclear accident. However, as the below analysis will show, this statement represents the baseline philosophy of nuclear disaster management.

Nuclear disaster management starts with preparedness, just like other disaster management. Nuclear disaster preparedness consists of defining zones at risk – emergency zones – and dose levels or events to trigger specific protective actions – generic criteria – in addition to organisational preparation (i.e., institutional and logistical preparedness). In the

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<sup>457</sup> IAEA and others, 'Arrangements for the Termination of a Nuclear or Radiological Emergency' (n 390) 9.

<sup>458</sup> IAEA and others, 'Preparedness and Response for a Nuclear or Radiological Emergency' (n 387) 82.

event of an emergency, initial protective actions are implemented in accordance with these predetermined zones and generic criteria. In other words, they would not be implemented if the radiological situation does not reach the pre-set criteria or in the areas outside the pre-fixed zones, at least initially.

The purpose of these preparedness measures is to ensure the effective and timely implementation of protective actions in the event of accidents. The basic concepts of emergency zones (a), emergency protective actions (b) and generic criteria (c) are as follows.

#### a. Emergency Zones (PAZ and UPZ)

In nuclear disaster preparation, two emergency zones need to be identified: precautionary action zone (PAZ) and urgent protective action planning zone (UPZ). The residents living in these zones are notified in advance on what to do in case of nuclear emergencies and once an emergency occurs, they will be instructed to take urgent protective actions within one hour from the declaration of a general emergency. The objective is to initiate these protective actions preferably before, if not, shortly after a radiation release from the accident so as to prevent severe deterministic effects. The difference between the two is that the first zone is given priority for certain protective measures, notably evacuation, over the second zone. For example, the IAEA guideline specifies that the UPZ evacuation shall be implemented in such a way as not to disrupt or delay the PAZ evacuation.<sup>459</sup> The zones are determined in terms of distance in a circle from the nuclear plant though a certain flexibility is provided for local landmarks (e.g., roads, administrative boundaries, rivers). In all cases, these zones can be defined beyond national borders when a power plant is situated close to a border.

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<sup>459</sup> IAEA, 'Actions to Protect the Public in an Emergency Due to Severe Conditions at a Light Water Reactor' (n 72) 21.

In addition to emergency zones, the IAEA also recommends identifying areas called “emergency distances” – extended planning distance (EPD) and ingestion and commodities planning distance (ICPD) – where certain protective actions may need to be undertaken depending on the pathways and the amount of its radiation release. The suggested radius for each zone is described in the following table (Table 2).

Table 2: IAEA Emergency Zones<sup>460</sup>

<b>Emergency Zone</b>	<b>Distance in Radius (km)</b>
Precautionary action zone (PAZ)	3-5
Urgent protective action planning zone (UPZ)	15-30
Extended planning distance (EPD)	100
Ingestion and commodities planning distance (ICPD)	300

In the event of an accident, the population living within these zones will be instructed to implement certain protective actions as follows (Table 3).

Table 3: Emergency Protective Actions in IAEA Emergency Zones<sup>461</sup>

<b>Zone</b>	<b>Protective Action</b>
PAZ	Immediate ITB administration <sup>462</sup> , evacuation beyond the UPZ, prevention of ingestion
UPZ	Immediate ITB administration, shelter indoors until evacuation (letting the PAZ evacuation first), prevention of ingestion
EPD	Prevention of ingestion and dose rate monitoring to locate radiation hotspots for potential evacuation or relocation
ICPD	Prevention of ingestion and food monitoring

As seen in the table above, ITB administration and evacuation (or sheltering) is immediate and almost systematic for PAZ and UPZ (1-30 km radius) in the event of major accidents.

<sup>460</sup> ibid 22.; This is for a nuclear power plant which has more than 1000 MW(th).

<sup>461</sup> Source: ibid 21.

<sup>462</sup> Iodine thyroid blocking (ITB) administration means taking stable (non-radioactive) iodine tablets to avoid or reduce the uptake by the thyroid gland of radioactive iodine released from the accident. It will be further explained below in the “Emergency Protective Actions”.

Meanwhile, evacuation is conditional upon the existence of radiation hotspots but still envisaged in EPD (30-100 km radius).

The distinctive feature of nuclear disaster preparedness is that there is no concept of exclusion zone – the area prohibited for habitation. In the field of natural disaster preparedness against flooding, tsunami, and volcano eruption, the so-called “red zone” where the construction of residential houses is forbidden is often adopted as a precautionary measure to mitigate potential disaster effects.<sup>463</sup> As analysed earlier, these exclusion zones had been indeed envisaged by the US regulator (AEC) for reactor facilities during the 1950s in order to protect citizens from potential accident effects. The recommended distance for such a zone was 30 km radius from a power station, which in fact corresponds to the IAEA’s emergency zone (PAZ+UPZ) planning. The AEC later withdrew such safety measures due to strong opposition from the industry. Seventy years later, the situation seems to remain the same: no concept of exclusion zone.

#### b. Emergency Protective Actions

Emergency protective actions are composed of “urgent protection actions” and “early protective actions”.<sup>464</sup> For them to be effective, the first actions need to be implemented within hours to a day from the accident while the latter actions shall be undertaken within days to weeks or within a month. Importantly, urgent protective actions may be implemented as a precautionary measure before the actual release of radioactive materials from a troubled site. These countermeasures include iodine thyroid blocking (ITB), evacuation, sheltering, restriction of the consumption of local foodstuffs, decontamination of individuals, and medical

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<sup>463</sup> Hasegawa and others (n 49).

<sup>464</sup> IAEA and others, ‘Arrangements for the Termination of a Nuclear or Radiological Emergency’ (n 390).

assistance.<sup>465</sup> Early protective actions are described as relocation, long-term restriction of the consumption of foodstuffs, and protection of international trade and commercial interests. A short description of each action is as follows.

### *Iodine thyroid blocking (ITB)*

Taking stable (non-radioactive) iodine tablets would avoid or reduce the uptake by the thyroid gland of radioactive iodine released from the accident. It is a measure designed to protect children from exposure to radioactive iodine, which would increase the risk of developing thyroid cancer. It is said that the younger the person is at the time of exposure, the higher the risk is for such cancer. The effectiveness of the measure depends on its timely administration. The stable iodine needs to be taken before exposure, within 24 hours, or shortly after intake (e.g. if taken 4 hours after exposure, protection will be reduced by half).<sup>466</sup> The principle of the measure is that by taking the tablets of potassium iodide (KI) before the exposure, it prevents the thyroid gland from absorbing radioactive iodine, thus reducing the risk of developing cancer at a later stage.<sup>467</sup> For this reason, the ITB agent needs to be pre-distributed at homes, schools, workplaces, and hospitals in the area surrounding a power plant.

### *Evacuation*

Evacuation is ‘the rapid, temporary removal of people from an offsite area to avoid or reduce short-term radiation exposures’.<sup>468</sup> It is most effective when it is conducted before a

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<sup>465</sup> IAEA, ‘Arrangements for Preparedness for a Nuclear or Radiological Emergency’ (n 388) 32.

<sup>466</sup> WHO, ‘Use of Potassium Iodide for Thyroid Protection during Nuclear or Radiological Emergencies’ (World Health Organization 2011) <<https://www.who.int/publications/m/item/use-of-potassium-iodide-for-thyroid-protection-during-nuclear-or-radiological-emergencies>> accessed 11 June 2021.

<sup>467</sup> Source: WHO Website

<[https://www.who.int/ionizing\\_radiation/pub\\_meet/tech\\_briefings/potassium\\_iodide/en/](https://www.who.int/ionizing_radiation/pub_meet/tech_briefings/potassium_iodide/en/)> accessed on 18 September 2019.

<sup>468</sup> ICRP, ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.’ (n 38) 51.; Curiously, the IAEA guideline does not provide a comprehensive definition for evacuation.

release as a precautionary measure or shortly after a release. Combined with the iodine intake, the IAEA considers that evacuation before a release is the most effective and preferred protective action in the event of an emergency. Furthermore, it affirms that evacuation at speeds greater than walking speed, *even during a radiation release*, is more effective than sheltering in doors to protect individuals from radiation exposures.<sup>469</sup> For the IAEA, evacuation is thus a temporary measure which shall not last more than one week. It should be lifted when the following conditions are met:<sup>470</sup>

- Projected exposure dose does not exceed 100 mSv per year;<sup>471</sup>
- Only limited restrictions are necessary on the consumption of locally produced food or the access to certain areas, and clear instructions are in place on such restrictions;
- Infrastructure and public service are restored;
- Workplaces and public support are organised

If the radiological situation is not controlled within one week, the evacuation measure shall be replaced by temporary or permanent relocation depending on the situation. In contrast, the ICRP does not recommend any specific dose value to lift evacuation orders or to allow people to return, and simply suggests selecting reference levels (i.e. 1-10 mSv/year according to the most recent recommendation) in relation to protective actions, taking into account social and economic factors.

### *Sheltering*

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<sup>469</sup> IAEA, 'Actions to Protect the Public in an Emergency Due to Severe Conditions at a Light Water Reactor' (n 72) 27 (emphasis added).

<sup>470</sup> IAEA and others, 'Arrangements for the Termination of a Nuclear or Radiological Emergency' (n 390).

<sup>471</sup> This dose criterion is inconsistent with the most recent ICRP recommendation (2020) on reference levels for emergency situations (less than 20mSv/year).

Sheltering indoors is a short-term measure which *shall not last more than a day*. Once instructed, people are expected to stay inside a house or building with windows and doors shut. It is devised whenever immediate and safe evacuation is impossible or hazardous (e.g., extreme weather, extremely fragile health conditions). But sheltering, by itself, is not a sufficiently protective measure against radiation exposure and therefore its use shall be limited.<sup>472</sup>

### *Temporary Relocation*

Temporary relocation is defined as ‘the non-urgent removal of people in order to avoid longer term exposure from radioactive material deposited on the ground’ by the IAEA and ‘the movement of people, either already evacuated or coming directly from their homes, to temporary accommodation that can meet all of their basic needs and where living conditions can be properly supported’ by the ICRP.<sup>473</sup> According to the ICRP, the relocation can last weeks, months, or several years depending on the scale of the contamination. The relocation measure shall be terminated on the same condition as the evacuation measure.

### *Decontamination of individuals and medical assistance*

According to the IAEA estimation for the worst scenario accident, fatal injuries due to radiation overexposure could happen to those living within the first 3 to 5 km radius from the site (i.e. within the PAZ). Likewise, non-fatal severe effects to fetus, thyroid and reproductive organs could also occur among those living within the first 10 to 30 km from the power station (i.e., within the UPZ). The residents within Emergency Zones (PAZ or UPZ) can also receive significant exposure from radioactive material deposited on their skin, for whom

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<sup>472</sup> IAEA, ‘Actions to Protect the Public in an Emergency Due to Severe Conditions at a Light Water Reactor’ (n 72) 27.

<sup>473</sup> ICRP, ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.’ (n 38) 53; IAEA, ‘Actions to Protect the Public in an Emergency Due to Severe Conditions at a Light Water Reactor’ (n 72) 28.

decontamination procedures should be conducted as soon as possible (i.e. taking showers and changing their clothing). To prepare for this, the medical response system to screen and treat possibly contaminated patients shall be set up in advance.

### *Restriction of the consumption of foodstuffs*

At a major accident, a massive release of radioactive materials can occur and durably contaminate an extended area which often goes well beyond one's national borders. One of the principal sources for post-emergency exposure comes from ingestion of contaminated food or milk (or water). To avoid or prevent this exposure, the restriction to consume locally produced food, milk, rainwater, animal feed and commodities should be instructed even without a result of laboratory analysis on food contamination. The food monitoring system shall be progressively installed to adjust the restrictions.

### *Protection of international trade and commercial interests*

The IAEA explains that past accidents have caused major adverse economic effects 'in part because steps were not taken immediately to *reassure people*, including national and international customers',<sup>474</sup> that commodities 'from the affected region are being carefully controlled to ensure that they are not contaminated (i.e. do not exceed international criteria for trade)'.<sup>475</sup> This is indeed a very odd "protective action" which is out of line with the IAEA's own objective of protection for emergency response: to avoid or reduce exposure doses of the population. However, this protective action represents the overall ethos of the disaster response system established by the nuclear regime. The ICRP indeed emphasises that an important objective of emergency exposure situation is 'to prepare, to the extent practicable, for the

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<sup>474</sup> IAEA, 'Arrangements for Preparedness for a Nuclear or Radiological Emergency' (n 388) 103. Emphasis added.

<sup>475</sup> IAEA, 'Actions to Protect the Public in an Emergency Due to Severe Conditions at a Light Water Reactor' (n 72) 33; IAEA, 'Arrangements for Preparedness for a Nuclear or Radiological Emergency' (n 388) 103.



resumption of societal and economic activities considered as “normal” in addition to the prevention of ‘severe deterministic health effects<sup>476</sup> as doses could reach high levels’.<sup>477</sup> This seems to suggest, just like the IAEA guideline, that emergency protective actions need to be already designed to facilitate the resumption of social and economic activities while we are still in the situation where ‘the doses could reach high levels’. All these statements in fact point to the ultimate objective of the radiation protection framework as analysed in the previous chapter: the protection of people and the environment to a certain degree so as not to unduly limit nuclear activities.<sup>478</sup>

### c. Criteria (Triggers)

In disaster preparedness, the IAEA advises to preselect dose criteria which would trigger respective protective actions during emergencies. And this should be selected from the dose range between 20 and 100 mSv, the reference level recommended by the ICRP for emergency exposure situations. In addition, these criteria should be determined on the basis of the optimisation process – risk-benefit analysis – so as to clearly indicate ‘whether and when evacuation, shelter, relocation and food restrictions are justified’.<sup>479</sup> Most importantly, the IAEA says, ‘in no case should [protective actions] based on the generic criteria cause more detriment than they avert’.<sup>480</sup> In other words, protective actions in nuclear emergencies have to go through a vetting process of justification and optimisation. The following table illustrates the IAEA’s criteria for respective emergency protective actions (Table 4).

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<sup>476</sup> As explained earlier in the chapter, deterministic effects are adverse tissue reactions such as skin burns and eye lens damage which only occur at high doses (over a certain threshold dose). In contrast, stochastic effects are cancers and genetic effects which occur even at low doses and appear more than ten years after exposure.

<sup>477</sup> ICRP, ‘The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.’ (n 28) 109.

<sup>478</sup> *ibid* 41. Emphasis added.

<sup>479</sup> IAEA, ‘Arrangements for Preparedness for a Nuclear or Radiological Emergency’ (n 388) 32.

<sup>480</sup> IAEA and others, ‘Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency’ (n 389) 8.

As shown in the table, dose criteria are expressed in either projected or received doses. According to the IAEA, urgent protective actions are triggered when exposure dose<sup>481</sup> of an individual is estimated to reach 100 mSv (50 mSv for thyroid) within a week while early protective actions should be implemented when exposure dose within a year is projected to reach 100 mSv. These dose values seem extremely high in view of the latest ICRP publication (2020) which indeed states that ‘the most appropriate reference level during the early and intermediate phases may be lower than 20 mSv’.<sup>482</sup>

Table 4: IAEA Dose Criteria for Emergency Protective Actions<sup>483</sup>

<b>Projected/Received Dose<sup>484</sup></b>	<b>Recommended Protective Actions</b>
Projected dose of 100 mSv in the first 7 days (Whole Body)	Sheltering, evacuation, decontamination of individuals, restriction of consumption of foodstuffs, public reassurance
Projected dose of 50 mSv in the first 7 days (Thyroid)	Iodine thyroid blocking
Projected dose of 100 mSv in a year (Whole Body)	Temporary relocation, decontamination, replacement of foodstuffs, public reassurance
Received dose of 100 mSv in a month	Medical screening, follow-up, and counselling

According to radiation protection norms, doses higher than 100 mSv would significantly increase the likelihood of deterministic effects and cancer risks. Thus, taking protective actions at such dose criteria, says the IAEA, can protect the population from such

<sup>481</sup> It means effective dose from both external and internal exposures.

<sup>482</sup> ICRP, ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.’ (n 38) 49 (para 122).

<sup>483</sup> Source: IAEA and others, ‘Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency’ (n 389) 11.

<sup>484</sup> As explained in the previous chapter, equivalent dose is a calculated absorbed dose to an organ or a skin and effective dose is a calculated absorbed dose to a whole body.

risks. But these justifications in fact spark more questions. For example, does a plant operator know how much radiation release would occur in the following seven days during a nuclear emergency? Why do life-saving protective actions have to be justified or conditioned on dose levels? When both the IAEA and the ICRP adopt the public exposure dose limit at 1 mSv/year and the LNT model for low dose radiation risk, how can they justify the public exposure until 100 mSv in emergencies? Does setting dose criteria ensure the protection of residents in emergencies? The fundamental question which arises from these dose criteria is: what is the justification for setting generic criteria to implement life-saving protective actions in nuclear emergencies? To give an analogy, it would be like telling the residents living in the coastal area not to evacuate following a big earthquake until the meteorological agency projects the level of tsunami risk higher than the prefixed criteria.

## 2. Recovery Protection

The post-accident recovery phase begins when a radiation release comes to a halt and is put under control. According to the IAEA terms, it is the phase of ‘transition’ and ‘long-term recovery operations’ or ‘existing exposure situation’. In terms of dose levels, emergency ends when a residual dose<sup>485</sup> approaches on the order of 20 mSv/year. A reference dose for the recovery phase, ‘existing exposure situation’ in the IAEA/ICRP term, should be in the range of 1-20 mSv/year. According to the most recent recommendation of ICRP, such reference level should be set in the lower half of that range (i.e. 1-10 mSv/year).<sup>486</sup>

According to the IAEA, protection strategies for the recovery phase need to be adjusted so as to incorporate changing radiological situations and, more importantly, various non-

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<sup>485</sup> A residual dose is the effective dose from all pathways, external and internal exposures, which is ‘expected to be incurred after protective actions have been terminated (or after a decision has been taken not to take protective actions)’. (IAEA, GSR Part 7, p. 93).

<sup>486</sup> ICRP, ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.’ (n 38).

radiological factors such as social, economic, and political interests.<sup>487</sup> To do this, the guideline strongly advises the application of justification and optimisation, the famous principles of radiological protection. It explains that at the dose range less than 100 mSv, these non-radiological factors often outweigh the radiation protection considerations in determining protective actions. For a protection action to be justified, it has to bring overall benefit to individuals and the society as a whole after balancing out potential detriments and costs. Here it is important to understand what are considered by the IAEA as “detriments and costs” of protective actions. This would help clarify what is at stake in the protection framework of the nuclear regime.

The IAEA identifies these “detriments and costs” of protective actions as, *inter alia*:<sup>488</sup>

1) possible reduced life expectancy owing to stress associated with resettlement, 2) costs associated with the loss of essential infrastructure, 3) loss of productivity of industrial facilities, 4) compensation payments arising from protective actions, 5) loss of cultural or historical sites and heritage, and 6) the costs associated with the management of radioactive waste generated. As it becomes clear from the list, most of them concern economic and industrial interests of central and local governments rather than the health and wellbeing of affected individuals. Secondly, these “costs” are mainly born by one particular protective action: long-term relocation or resettlement. Indeed, the first claim – shortened life expectancy due to resettlement – seems to be rather a speculative statement and an odd conception of detriment. The guideline in effect does not provide any statistical data to back up such a claim. Moreover, this is the only time the term “resettlement” appears in the entire guideline, which is neither defined nor listed as a protective action. From this analysis, it becomes clear that the IAEA considers relocation

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<sup>487</sup> IAEA and others, ‘Arrangements for the Termination of a Nuclear or Radiological Emergency’ (n 390).

<sup>488</sup> *ibid* 37.

and resettlement of residents as the least preferable, or to-be-avoided, options in order to protect social and economic interests for the society as a whole.

Another particularity of the recovery protection strategy is the emphasis placed on “self-help actions” of the public. The IAEA guideline recommends that self-help actions should be an integral part of each protective action, especially following a major accident with a substantial radiation release.<sup>489</sup> The most recent ICRP recommendation also relies on it as the key protective action for the long-term phase, together with decontamination measures.<sup>490</sup> The most cited example of such self-help actions is the citizens’ acquisition of “a practical radiological protection culture”<sup>491</sup>. In this scheme, residents living in or returned to the contaminated area are “empowered” by radiological protection training in which they obtain knowledge and skills in measuring and monitoring contamination in foodstuff and the environment so as to reduce radiation exposure dose by themselves in their daily lives.<sup>492</sup> It was implemented after both the Chernobyl and Fukushima accidents and produced mixed results.<sup>493</sup>

While it is useful and reassuring for some who remain or return home in contaminated areas, it also represents an extremely constraining and heavy-loaded exercise for others since they have to watch out for every food consumption and every move they make on a daily basis. Furthermore, under the banner of “empowerment”, it in reality hides a sort of individualisation of risks where the responsibility to protect citizens is relegated to the citizens themselves where

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<sup>489</sup> *ibid* 33.

<sup>490</sup> ICRP, ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.’ (n 38).

<sup>491</sup> Practical radiological protection culture is defined by ICRP as ‘the knowledge and skills enabling citizens to make well-informed choices and behave wisely in situations involving potential or actual exposures to ionizing radiation’. (ICRP Publication 146, p. 130)

<sup>492</sup> ICRP, ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.’ (n 38).

<sup>493</sup> Topçu, ‘Catastrophes nucléaires et « normalisation » des zones contaminées : Enjeux politiques, économiques, sanitaires, démocratiques et éthiques.’ (n 319); Fassert and Hasegawa (n 42).

risk management becomes the responsibility of each affected individual, not of the authorities.<sup>494</sup>

These long-time protective actions defined by the IAEA and the ICRP are as follows: long-term relocation, long-term food monitoring and restrictions, decontamination of areas, medical follow-up, and delineation of areas.<sup>495</sup>

### *(Permanent) Relocation*

In the IAEA manual, relocation is primarily considered as a temporary measure which shall be lifted on the same condition as evacuation. While it offers detailed guidance on the modality of lifting the relocation measure, it does not provide a clear definition or guidance on permanent relocation or resettlement. In fact, the term “resettlement” does not appear in any of its guidelines. It is the same with the ICRP guidelines although the term “permanent relocation” briefly appears in one of the publications. Furthermore, the ICRP Publication 111 (2009) contends that ‘worldwide experience following nuclear and non-nuclear accidents shows that neither nations nor individuals are very willing to leave affected areas’ despite contamination, adding that ‘countries generally cannot afford to lose a part of their territory, most inhabitants generally prefer to stay in their homes rather than to be relocated (voluntarily or not) to non-contaminated areas’.<sup>496</sup> These statements were made without any supporting data or literature to demonstrate their validity.

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<sup>494</sup> Topçu, ‘Catastrophes nucléaires et « normalisation » des zones contaminées : Enjeux politiques, économiques, sanitaires, démocratiques et éthiques.’ (n 319); Christine Fassert, ‘Living in/with Contaminated Territories: An STS Perspective’ (2017) 8(1) *Technoscienza (Italian Journal of Science & Technology Studies)* 117; Fassert and Hasegawa (n 42).

<sup>495</sup> IAEA, ‘Arrangements for Preparedness for a Nuclear or Radiological Emergency’ (n 388); ICRP, ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.’ (n 38).

<sup>496</sup> ICRP, ‘Application of the Commission’s Recommendations to the Protection of People Living in Long-Term Contaminated Areas after a Nuclear Accident or a Radiation Emergency. ICRP Publication 111.’ (n 18) 26, 30.

In the IAEA guideline, the issue of permanent relocation is treated in connection with “delineation of areas” where human habitation is unwarranted due to a high level of radiological contamination. In this situation, the IAEA says that there is a need to ‘remove people permanently from the area and forbidden its use’.<sup>497</sup> But besides this statement, there is no guidance at all as to the implementation of permanent relocation. This absence of migratory options in the nuclear protection regime will be further analysed in the following paragraph.

### *Long-term food restrictions and monitoring*

Even after the emergency phase, locally grown food and drinking water shall be regularly checked for contamination. According to the IAEA protection standard, exposure dose from ingestion shall be less than 10 mSv for the transition phase and less than 1 mSv for the recovery phase. International food safety standards were also developed by the FAO/WHO Codex Alimentarius Commission<sup>498</sup> which recommends a dose criterion of 1 mSv per year from food ingestion or a maximum of 10% of diet consisting of contaminated food.<sup>499</sup> However, the ICRP also suggests a possibility of setting higher dose levels for such restriction in order to preserve local production deeply rooted in traditions, essential to the economy of the entire community.<sup>500</sup> It notably cites the example of a native population, Sami, in Norway who continued with reindeer meat consumption affected by the Chernobyl fallout.

### *Remediation or Decontamination of areas*

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<sup>497</sup> ICRP, ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.’ (n 38) 61.

<sup>498</sup> The Codex Alimentarius Commission was established jointly by the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) in 1961 with a view to set up world food safety standards. Its standards on radionuclide contamination follow the recommendation made by the ICRP.

<sup>499</sup> Codex Alimentarius Commission, ‘General Standard for Contaminants and Toxins in Foods and Feeds’ (FAO/WHO 2009) CODEX STAN 193-1995.

<sup>500</sup> ICRP, ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.’ (n 38).

Remediation is an action to remove the contamination itself (decontamination) or to alter the exposure pathways. After a large-scale accident, remedial actions are recommended so as to ‘enable the progressive lifting of protection actions such as evacuation and relocation’.<sup>501</sup> A reference level to implement such remediation is an annual effective dose of 10 mSv from all sources including the natural background radiation.<sup>502</sup> At less than that dose level, remedial actions are regarded as unjustified.

### *Medical follow-up*

The long-term medical follow-up should be set up for individuals who received certain doses for the purpose of detecting and treating potential illnesses (e.g. radiation induced cancers) early. However, this protective action is established only for those who received a dose of 100 mSv and higher *in a month*.<sup>503</sup> This means that those who were exposed to radiation dose less than 100 mSv within a month would not be monitored.

### *Delineation of areas and access control*

The IAEA and the ICRP advise to delineate areas identified as unsuitable for inhabitation and resumption of social economic activities due to high levels of radiation, and to install a mechanism to control access to such areas. For this decision, both organisations emphasise the importance of taking non-radiological factors into account such as economic and social repercussions as well as social acceptance and administrative boundaries.

### *Return of residents*

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<sup>501</sup> IAEA and others, ‘Arrangements for the Termination of a Nuclear or Radiological Emergency’ (n 390) 51.

<sup>502</sup> IAEA, ‘Remediation Process for Areas Affected by Past Activities and Accidents’ (IAEA 2007) Safety Guide WS-G-3.1.

<sup>503</sup> IAEA and others, ‘Preparedness and Response for a Nuclear or Radiological Emergency’ (n 387) 65.



Neither the IAEA nor the ICRP recommend any specific radiological criteria to allow people to return to contaminated territories. For such a decision, the IAEA simply suggests taking into account not only the radiological situation but also the restoration of infrastructure, public service, employment, radioprotection training, informed consent, etc.<sup>504</sup> The 2020 ICRP publication goes a step further urging the authorities to engage in an extensive consultation with stakeholders and clearly stating that ‘individuals have a basic right to decide about their future’.<sup>505</sup> It also recommends that all individual decisions should be respected and supported by the authorities, including relocation for those who either do not want or are not permitted to move back to their homes.

## **B. National Protection Norms of Major Nuclear Powers**

As shown above, nuclear safety and disaster response norms are largely left to individual states to determine and establish. To map out the current state of protection norms, the thesis explores emergency protection measures established by major nuclear powers, namely the US and France.

### **1. The US**

As studied above, the US is the first and biggest nuclear power in the world both in terms of military and civil uses. Currently it has 92 commercial nuclear reactors in operation which supply about 20% of domestic electricity use and account for 30% of worldwide nuclear electricity generation. The country was also the first nation to develop safety and protection standards for civil nuclear installations. However, its nuclear emergency response plan was not established until after the TMI accident in 1979. It took the US nuclear authority nearly 20 years

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<sup>504</sup> IAEA and others, ‘Arrangements for the Termination of a Nuclear or Radiological Emergency’ (n 390) 52.

<sup>505</sup> ICRP, ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.’ (n 38) 61.

to publish such guidelines after the first commercial reactor went into operation in the US. Since then, the preparation of on-site emergency plans became a statutory requirement for the operators.

In the US, State and local authorities are responsible for establishing and implementing off-site emergency plans to protect the public in the event of accidents.<sup>506</sup> These off-site plans are supervised at the federal level by the Federal Emergency Management Agency (FEMA). The Nuclear Regulatory Commission (NRC), on the other hand, is responsible for overseeing on-site emergency plans of power plants prepared and implemented by operators. Therefore, the NRC cannot directly order protective actions for the public during emergencies.<sup>507</sup>

To guide State and local officials, FEMA requested the Environmental Protection Agency (EPA), responsible for establishing radiation protection standards at the federal level,<sup>508</sup> to compile comprehensive guidelines for public protective actions in the event of nuclear emergencies. The Protective Action Guide (PAG) Manual of the EPA, first published in 1992 (updated in 2017), indeed consolidates guidelines issued by various federal agencies and provides dose criteria that would trigger various protection measures during emergency and recovery phases.<sup>509</sup>

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<sup>506</sup> The administrative structure of the US is composed of the federal government, state government, and local government. Local government include counties and municipalities (towns and cities). Source: The White House (<https://www.whitehouse.gov/about-the-white-house/our-government/state-local-government/>)

<sup>507</sup> NRC website (<https://www.nrc.gov/about-nrc/emerg-preparedness/about-emerg-preparedness/federal-state-local.html>), consulted on 13 July 2021.

<sup>508</sup> As explained in the previous chapter, the function of the Federal Radiation Council (FRC) was integrated into the EPA when the latter was created in 1970 as part of the administrative reorganisation.

<sup>509</sup> EPA, 'PAG Manual: Protective Action Guides and Planning Guidance for Radiological Incidents' (2017) EPA-400/R-17/001.

#### a. Emergency Response

Just like in the IAEA guidelines, the US emergency preparedness and response is composed of emergency zones, protective actions and dose criteria.

##### *Emergency Zones*

Under NRC regulations, plant operators and State and local authorities are required to establish on-site and off-site emergency preparedness plans, respectively, before any new reactor operation licence is issued. In the plans, two Emergency Planning Zones (EPZ) should be defined:<sup>510</sup> a plume exposure EPZ within a 10 mile (16.1 km) radius of the plant and an ingestion exposure EPZ within a 50 mile (80.5 km) radius. Both zones shall be defined by State and local authorities considering local topography (e.g. rivers, roads, railway tracks) as well as political boundaries (e.g. State, county, municipality borders).

Within an EPZ, an area should be pre-designated for immediate precautionary actions in case of a severe accident, which will be implemented prior to a release or the availability of information concerning such a release from the plant. This in fact corresponds to the PAZ of the IAEA (3-5 km radius) but the EPA guideline does not provide a specific distance for this zone. In case of lesser severe accidents, the area for the immediate protective actions will be specified at the time of the accident, depending on the circumstance. These protective actions are evacuation and/or shelter with an option of iodine thyroid blocking (ITB) administration.

As for the ingestion exposure EPZ (within 80.5 km radius), the restriction and monitoring of drinking water and foods such as milk, fresh vegetables or aquatic foodstuffs are envisaged as early and/or long-term actions. In the IAEA protection norms, this ingestion monitoring zone (ICPD) is extended until a 300 km radius from the power plant. As such, in

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<sup>510</sup> *ibid.*

terms of emergency zones, the US preparedness plans are less precautionary compared to the international norm.

*Protective Actions and Dose Criteria*

The PAG Manual lays down three guiding principles to determine exposure levels for protective actions as follows: 1) avoid acute (deterministic) effects; 2) reduce the risk of delayed (stochastic) effects; and 3) ‘[b]alance protection with other important factors and ensure that actions result in more benefit than harm’.<sup>511</sup> They are basically the same principles established by the IAEA and the ICRP, notably risk-benefit balancing and justification principles.

In the US model, protective actions are divided according to three phases – early, intermediate and late phases – which roughly corresponds to the IAEA’s three phases (emergency response, transition and long-term). The early phase is described as the beginning of a radiological incident, lasting roughly hours to days, in which immediate decisions for protective actions are to be taken, even precautionary ones if need be. The principal measures during this phase consist of sheltering-in-place and evacuation. Taking stable iodine is also recommended as a supplementary measure in cases where a significant release of radioactive iodine is projected. The dose criteria for these protective actions are shown in the table below (Table 5).

Table 5: The US Dose Criteria for Early Protective Actions

<b>Actions</b>	<b>Dose Criteria</b>
Shelter or Evacuation	Projected dose of 10-50 mSv over four days
Intake of Iodine Thyroid Blocking (ITB)	Projected child thyroid dose of 50 mSv

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<sup>511</sup> *ibid* 3.

The US dose standards for shelter and evacuation are triggered at a projected effective dose (whole body) of 10-50 mSv over four days, much lower dose level than that of the IAEA recommendation (100 mSv over 7 days). The iodine tablet intake is fixed at a projected child thyroid dose of 50 mSv which is again about the half of IAEA's recommended dose level (adult thyroid dose of 50 mSv which corresponds to child thyroid dose of 100 mSv as children are more sensitive)<sup>512</sup>.

According to the Manual, evacuation is the most effective protective action (“100%”) against radiation exposure when it is implemented before the arrival of the plume. But if the rapid evacuation is not possible due to severe weather conditions, health conditions, or uncertainty about contamination levels along evacuation routes, sheltering-in-place might be the best option when it is followed by informed evacuation. After making the comparative analysis, the US guidelines finally assert that sheltering-in-place should be preferred to evacuation whenever it provides equal or greater protection while also recognising that ‘selection of evacuation or sheltering-in-place is far from an exact science’ and the effectiveness of shelter-in-place ranges from zero to almost 100%.<sup>513</sup> This position is somewhat different from the IAEA advice. The IAEA in fact recommends rather the opposite, emphasising that evacuation provides a more effective protection to individuals than sheltering, even if it is implemented during a radiation release.

## b. Recovery Protection

In the intermediate (recovery) phase, relocation and decontamination are recommended as principal protective actions against external exposure. Another recommended action is food

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<sup>512</sup> *ibid* 15.

<sup>513</sup> *ibid* 17.

and drinking water control. Other than that, the Manual does not provide any concrete or detailed plan for the recovery from nuclear accidents.

### *Relocation or Decontamination*

While the Manual introduces relocation as the most effective protection measure against radiation exposure, it conditions its use by stating that relocation is ‘highly disruptive and therefore only implemented when the dose is sufficiently high to warrant it’.<sup>514</sup> Such dose is then fixed at over 20 mSv/year in the first year and 5 mSv/year in any subsequent year. Moreover, it emphasises that relocation shall be decided on a case-by-case basis and strongly advises to consider decontaminating and remediating the contaminated area first to see if relocation could be avoided. Especially when a large or densely populated area is contaminated (e.g. a release in a large city), protective actions including relocation become costly or impracticable. In this case, the Manual simply advises the authorities to make judgements on the priorities of protection, which could mean that the people living in large cities would be less protected than those living in the less populated areas in case of a severe accident. Also, the Manual makes no reference to or guidance on permanent relocation apart from describing that relocation could last months, let alone how to rebuild the community at the place of resettlement.

When the projected dose in the area is less than 20 mSv during the first year or less than 5 mSv/year in the following year, decontamination is the recommended action and the return of residents is envisaged. But when it comes to the reference dose level for residents’ return, the Manual avoids providing specific values. It simply advises that reoccupancy shall be allowed under radiation levels “acceptable to the community” and for that, stakeholder consultation shall be organised.<sup>515</sup> But if one reads the text carefully, it states that ‘community

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<sup>514</sup> *ibid* 41.

<sup>515</sup> *ibid* 9.

members will *influence* decisions such as if and when to allow people to return home to contaminated areas'.<sup>516</sup> This means that the final decision will probably be in the hands of the authorities.

Another protective action, food ingestion control, is recommended when the projected whole body dose is equivalent to and over 5 mSv/year. As for drinking water, the reference dose is set at 5 mSv projected dose for one year for the general population and 1 mSv projected dose for one year for the most sensitive populations (e.g. infants, children, pregnant women). These criteria are within the range recommended by the IAEA (10 mSv/year for the transition phase and 1 mSv/year for the recovery phase). The dose criteria for protective actions in intermediate and late phases are in the following table (Table 6).

Table 6: The US Dose Criteria for Recovery Protective Actions<sup>517</sup>

<b>Actions</b>	<b>Dose Criteria</b>
Relocation	20 mSv projected first year 5 mSv per year projects in subsequent years
Decontamination	Less than 20 mSv first year
Food interdiction	5 mSv projected for one year (whole body) 50 mSv projected for one year (organ or tissue)
Drinking water restriction	5 mSv projected for one year (adults) 1 mSv projected for one year (pregnant women, children)

In the intermediate phase protection, the US system is much more protective than the international norms established by the IAEA, especially on the criteria for relocation. While the IAEA sets the dose criteria at less than 100 mSv in the first year and none for the subsequent years, the US Manual establishes at 20 mSv for the first year and 5 mSv for one year for subsequent years. Notwithstanding, as a whole, the US nuclear disaster response system

<sup>516</sup> *ibid* 10. Emphasis added.

<sup>517</sup> Source: *ibid* 42 (Table 4–1).

contains only a few protective actions for the population and is far from comprehensive. As for the late (long term) phase, it lists only remediation clean-up, reoccupancy and waste management as protective actions without any reference to the reconstruction of resettled communities.

## 2. France

France is the second largest civil nuclear country in the world with 56 reactors in operation. After the Second World War, the country followed the US, the UK, and the USSR to become a military and civil nuclear power during the 1960s. After the first oil shock, France shifted its energy policy to almost all nuclear during the 1970s. The nuclear share in electricity production amounts to 70% today, the highest in the world.

Unlike the US, the French nuclear sector is under strong state control. The Electricité de France (EDF) is the only commercial operator in the country, whose majority share is owned by the French state. As such, the nuclear emergency response system is also extremely centralised.

In France, protection of the population in the event of nuclear accidents is first under the responsibility of the Prefect (*préfet* in French), the state representative in a department or a region. S/he makes decisions and implements initial public protective actions in consultation with the *Autorité de sûreté nucléaire* (ASN ; Nuclear Safety Authority in English)<sup>518</sup> and the IRSN. Once the state-level crisis management team, Inter-ministerial Crisis Cell (CIC),<sup>519</sup> is organised, the policymaking will be transferred to the CIC. The emergency guideline is

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<sup>518</sup> The nuclear regulatory authority in charge of nuclear safety and radiation protection for the civil nuclear energy sector in France with the technical support provided by the IRSN. It plays a key role in overseeing on-site emergency response and advising the government or the Prefect on protection measures for the public.

<sup>519</sup> The original term in French: *La Cellule Interministérielle de Crise*



established by the Secretariat-General for National Defence and Security (SGDSN)<sup>520</sup>, an inter-ministerial organ under the Prime Minister. The most recent one is ‘National Response Plan: Major Nuclear or Radiological Accidents’ published in February 2014.<sup>521</sup> The Plan is supplemented by off-site response guides separately issued by the Ministry of Interior, namely ‘*Déclinaison du plan national de réponse à un accident nucléaire ou radiologique majeur*’ (2014) and ‘*Plans particuliers d’intervention : centres nucléaires de production d’électricité d’EDF*’ (2017).<sup>522</sup>

In the French doctrine, disaster response is divided between emergency phase (a few hours to a few days) which consists of the “threat” and “radioactive release in the environment (“release”, hereafter)” periods, and post-accident phase which is composed of the “transition” and “long term” periods (a few weeks, months to years). The emergency phase terminates when the radiation release ceases, and the stricken facility is brought back to a controlled state.

#### a. Emergency Response

According to the Plan, the objectives of emergency disaster response are: 1) to protect the general public against radiation exposure; 2) to provide medical assistance to those exposed to radiation; 3) to strive for economic and social continuity by clean-up and adaptation; and 4) to ensure European and international relations by early notification. Among them, the third objective seems a little odd as the Plan is designed for the emergency phase of major nuclear accidents. As the Plan itself admits, such accidents can cause radiation contamination which

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<sup>520</sup> The original term in French: *Le secrétariat général de la défense et de la sécurité nationale*. It was created in 2009, succeeding the function of *le secrétariat général de la défense nationale* (SGDN).

<sup>521</sup> SGDSN, ‘National Response Plan: Major Nuclear or Radiological Accidents’ (SGDSN/The French Republic 2014) Number 200/SGDSN/PSE/PSN-February 2014.

<sup>522</sup> Ministère de l’Intérieur, ‘*Déclinaison Du Plan National de Réponse à Un Accident Nucléaire Ou Radiologique Majeur*’ (French Ministry of Interior 2014); Ministère de l’Intérieur, ‘*Plans Particuliers d’intervention : Centres Nucléaires de Production d’électricité d’EDF*’ (French Ministry of Interior 2017) Tome 2 de la déclinaison du plan national de réponse à un accident nucléaire ou radiologique majeur.

can ‘last for several decades and, in some cases, can result in an area being closed off permanently to the public’.<sup>523</sup>

Like the US system and the IAEA model, the French emergency response system establishes emergency zones, protective actions and their triggering dose criteria.

### *Emergency Zones*

To prepare for a nuclear accident, the Prefect of concerned departments establishes an off-site emergency plan (PPI in French)<sup>524</sup> for each nuclear power station as part of the department-level civil security emergency response organisation (ORSEC in French)<sup>525</sup>. Initially designed for an area of 10 km radius from a nuclear station, the PPI was extended to 20 km radius in 2019. As a result, iodine tablets are distributed to individual homes, offices, and schools situated within the 20 km radius of all 19 nuclear power plants in France. Moreover, awareness raising activities as to what to do in case of accidents and disaster drills are conducted within the PPI. This off-site plan has three emergency zones: 2 km, 5 km, and 20 km radius zones from respective power stations. Initial protective actions are implemented within these zones. Compared to the emergency zones established in the US (16 km and 80 km radius) and the IAEA regulations (15-30 km radius), the French zoning is much smaller and thus less precautionary.

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<sup>523</sup> SGDSN (n 521) 4.

<sup>524</sup> *Plan Particulier d'Intervention* (PPI) is prepared by the Prefect for the sites with potential risk for the population such as nuclear facilities, chemical factories categorised as “Seveso” under the EU directives, underground gas installations, large dam, etc. It is part of the departmental emergency management plan (ORSEC) and implemented in accordance with décret n°2005-1158 du 13 septembre 2005 relatif aux plans particuliers d'intervention concernant certains ouvrages ou installations fixes et pris en application de l'article 15 de la loi n° 2004-811 du 13 août 2004 relative à la modernisation de la sécurité civile.

<sup>525</sup> *Organisation de la Réponse de Sécurité Civile* (ORSEC) is emergency management plan for natural and major industrial disasters that is prepared by the Prefect at departmental level pursuant to la loi n° 2004-811 du 13 août 2004 de modernisation de la sécurité civile.

In the first period of the emergency phase (“reflex”), sheltering indoors can be instructed for the 2 km radius zone by the operator before any intervention from the authorities. In the following “immediate” period, if a several and enduring release is projected, the Prefect would order evacuation of the residents who are living within the 5 km radius from the facility. Evacuees will be hosted at reception centres (schools, municipality event halls, etc) which should be located at least 30 km away from the power plant in trouble. After these measures are taken, emergency response enters the “concertation” period where the Prefect will decide whether to extend or lift protective actions within or beyond the PPI in consultation with nuclear expert organisations, namely the ASN, the IRSN, and the operator. The decision will depend on the amount of release, the direction of radioactive plume, the extent of contamination, local conditions, etc.

### *Protective Actions and Dose Criteria*

The key emergency protective measures are shelter-in-place, evacuation, and stable-iodine prophylaxis. The ASN issued a regulation fixing the dose criteria for these protective actions (see Table 7 below).<sup>526</sup> Shelter-indoors is undertaken when a projected whole body effective dose exceeds 10 mSv. Sheltering is a short-term measure, which should not last more than half-day. Evacuation is chosen as an action if such a dose exceeds 50 mSv and stable-iodine intake is instructed when the dose to the thyroid is projected to exceed 50 mSv. The French dose criterion for evacuation is higher than the one set by the American authorities (10-50 mSv within four days) but lower than those fixed by the IAEA (100 mSv in 7 days). But the French criterion does not have any time frame attached to the dose value, which would possibly

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<sup>526</sup> Décision n° 2009-DC-0153 du 18 août 2009 de l’Autorité de sûreté nucléaire relative aux niveaux d’intervention en situation d’urgence radiologique

provide more flexibility for the Prefect and the regulators to determine whether to implement protective actions and the timing of such implementation.

Table 7: French Dose Criteria for Emergency Protective Actions

Actions	Dose Criteria
Shelter-in-place	Projected dose of 10 mSv
Evacuation	Projected dose of 50 mSv
Intake of stable iodine	Projected thyroid dose of 50 mSv

Once the authorities obtain information on the situation of radiological contamination on the ground, they may evacuate the population from more areas, even outside the PPI, ban the access to certain areas most contaminated, and prohibit the consumption and distribution of foodstuffs produced locally. But overall, the French emergency plan is even more elusive and sketchy than the US plan or the IAEA standards with very few fixed dose values (only for evacuation, sheltering, and stable iodine).

#### b. Recovery Protection

As for the recovery phase protection, the ASN established the Steering Committee for the Management of the Post-Accident Phase of a Nuclear Accident (CODIRPA)<sup>527</sup> in 2005 to come up with a national strategy for long-term post-accident management. It published its first report ‘Policy Elements for Post-Accident Management in the Event of Nuclear Accident’ in 2012.<sup>528</sup> The report was complemented by, *inter alia*, ‘Recommendations for Post-Accident

<sup>527</sup> *Comité directeur pour la gestion post-accidentelle d’un accident nucléaire* in French.

<sup>528</sup> Autorité de sûreté nucléaire (ASN), ‘Policy Elements for Post-Accident Management In the Event of Nuclear Accident’ (French Nuclear Safety Authority 2012).

Management of an Accident’ and ‘Post-Accident Management of an Accident: The New Zoning’, both of which were published in 2022.<sup>529</sup>

According to the strategy, the objectives of the post-accident phase are described as: 1) to protect the population from radiation hazards; 2) to provide support to the population, victims of the accident’s consequences; and 3) to reclaim the territories concerned on an economic, cultural, and social level.<sup>530</sup> Again, the third objective sounds quite odd as a disaster protection measure and in stark contrast with the other two that are focused on the protection of people. The use of the word “reclaim” also alludes to a post-war situation where certain territories are lost to the adversary. It is not clear, from this objective, whether this reclaiming of the “concerned” territories will be done for the benefit of the population or for the integrity of the state. Interestingly, such an objective does not exist either in the US or the international model of post-accident recovery policy. Also, in the French guide, the term “resilience” is frequently used against the accident consequences, namely “resilience of the concerned territories”, “resilience of (affected) persons”, and “resilience and national unity”, which do not exist in either the US or the international guidelines.<sup>531</sup> This tone of the guideline, distinctive from the others, strongly indicates that for France, the survival of the nation, or national integrity, would be at stake after a major nuclear disaster. And that survival would depend on how to recover from such a disaster.

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<sup>529</sup> CODIRPA, ‘Recommandations Pour La Gestion Post-Accidentelle d’un Accident Nucléaire’ (Comité directeur pour la gestion post-accidentelle d’un accident nucléaire/French Advisory Committee for Post-Accident Management of a Nuclear Accident 2022); CODIRPA, ‘La Gestion Post-Accidentelle d’un Accident Nucléaire : Les Nouveaux Zonages’ (Comité directeur pour la gestion post-accidentelle d’un accident nucléaire/French Advisory Committee for Post-Accident Management of a Nuclear Accident 2022). Translation in English by R. Hasegawa

<sup>530</sup> CODIRPA, ‘Recommandations Pour La Gestion Post-Accidentelle d’un Accident Nucléaire’ (n 529) 14.

<sup>531</sup> CODIRPA, ‘Recommandations Pour La Gestion Post-Accidentelle d’un Accident Nucléaire’ (n 529).

The policy paper also defines three core principles of recovery-phase management as preparedness, justification, optimisation and transparency & stakeholder involvement.

### *Protection Zones, Protection Actions, and Criteria*

In the French doctrine, the first protective action to undertake following the end of the emergency phase is to define post-accident zones according to the contamination levels of the affected territory. There are three zones as follows: relocation zone (la zone d'un éloignement), food interdiction zone (la zone d'interdiction de consommation), and food monitoring zone (la zone de contrôle avant commercialisation).<sup>532</sup>

Relocation zone is defined by the dose criterion of 20 mSv within one year from the termination of the emergency phase. This 20 mSv reference dose in nuclear emergencies was even codified in the Public Health Code of France (*le code de la santé publique*) in 2018.<sup>533</sup> The French dose criterion is thus quite similar to the one fixed by the US regulator. Yet, the French model is less precautionary than the US model since the latter also established the relocation reference dose for the subsequent years, which is four times lower (5 mSv/year). From the perspective of radioprotection norms, 20 mSv for one year represents the dose limit for nuclear workers and 20 times the public dose limit. This plan essentially applies the rule established for nuclear workers, those who indirectly 'benefit from the exposure situation',<sup>534</sup> to members of the public including vulnerable populations such as infants, children and pregnant women, those more sensitive to radiation effects. As the Fukushima case will show

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<sup>532</sup> *ibid.*

<sup>533</sup> Article R 1333-93 du code de la santé publique, modifié par Décret no 2018-434 du 4 juin 2018 ; The modified text (original in French) is as follows : « Le niveau de référence d'exposition d'une personne à des substances radioactives résultant d'une situation d'urgence radiologique est fixé à 20 mSv en dose efficace au cours de l'année qui suit la fin de la situation d'urgence radiologique ».

<sup>534</sup> ICRP, 'The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.' (n 28) 97.

below, this dose policy would inevitably lead to a situation where many residents are obliged to stay and live in the contaminated territories where they do not necessarily feel safe.

The second and third zone – food interdiction and food monitoring – are then delineated in the areas contaminated by radiation but the dose level does not exceed 20 mSv (whole body) or 50 mSv (thyroid) in the first year. However, the guideline does not provide any specific dose values to define the respective zones. It simply states that the demarcation of these zones must be done flexibly and adapted to various interests at stake. Once designated, the consumption of local produce is banned in the food interdiction zone. In the food monitoring zone, agricultural products will be checked before being put on the market. Such food control will be conducted using the European norms for the maximum permitted levels of radioactive contamination of food and feed established by the Euratom Regulation (2016/52).<sup>535</sup>

At the end of the emergency phase, public reception and information centres (CAI)<sup>536</sup> will be created in the contaminated areas. It serves as a local focal-point desk to receive necessary information (e.g. about the accident, radiological situation, radiation effects on health, etc), radiation protection advice, administrative support to receive social assistance and claim compensation, and support to organise relocation. The census among the affected population will be also conducted under the coordination of the Prefect with two objectives. First, it helps identify those who wish to resettle elsewhere so as to facilitate the operations of relocation and compensations. Second, it also assesses and registers individual exposure doses during the emergency phase for the purpose of medical and epidemiological follow-ups.

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<sup>535</sup> Council Regulation (Euratom) 2016/52 of 15 January 2016 laying down maximum permitted levels of radioactive contamination of food and feed following a nuclear accident or any other case of radiological emergency, and repealing Regulation (Euratom) No 3954/87 and Commission Regulations (Euratom) No 944/89 and (Euratom) No 770/90 [2016] OJ L13/2.

<sup>536</sup> *Centre d'accueil et d'information du public* in French.

Other than these actions, the rest of post-accident measures mainly comprise radiation protection measures for those who remain in the contaminated territories, maintaining economic activities in the contaminated territories, and clean-up activities and waste management. The French guide is particularly focused on maintaining the economic activities in the affected areas. Identifying employment as one of the determining factors for an individual's decision to stay in or leave the contaminated territories, it details ways to facilitate economic activities and create new employment opportunities.

Through the analysis of these protective actions and principles, the French disaster response system tends to place precedence on keeping the population in the contaminated territories with radiation protection measures rather than relocating them to avoid radiation exposure altogether. As shown in the core objectives of disaster response, it is the balancing act between the protection of the population and reclaiming the contaminated territories for state integrity. This stance represents in fact the core principle of the international nuclear safety and radiation protection regime.

## **§2. Ambivalence of Nuclear Disaster Protection Norms**

From the above analysis on legal, institutional, and normative frameworks, this paragraph attempts to describe major ambiguities and shortcomings of nuclear disaster protection norms. This will be done in part by cross-examining these norms against those established by other international disaster protection regimes founded on humanitarian and human rights laws. The identified shortcomings are as follows: poor long-term recovery strategy (A), inequitable protective actions (B), conditional protection (C), and the absence of human-rights approach (D).



## A. Inadequate Long-Term and Non-Radiological Protection Strategies

The first observation that one makes from the nuclear protection framework is a paucity of long-term strategies. Compared to comprehensive and clear guidance established for emergency protective actions, those after the transition phase are very thin on substance and ambiguous as strategy. As mentioned earlier, the principal characteristic of nuclear disasters is the radiological contamination which, once spread in the environment, is difficult to remove and remains hazardous over a long period of time. It is thus rather puzzling to find that the nuclear disaster protection does not contain a robust set of long-term strategies. Indeed, the IAEA has not yet published any specific guidelines on post-accident long-term protection of population except the ones on the remediation (decontamination) process.<sup>537</sup> The ICRP, on the other hand, published a guideline dedicated to the protection of people living in long-term contaminated areas after a nuclear emergency but it only deals with those who returned or stayed in the contaminated areas. It is the same situation with national nuclear disaster plans. The European Commission's study which reviewed off-site disaster response plans of all EU countries in 2012 also found that there was 'a general lack of strategies and arrangements for longer term protective measures and for the return to normality following an emergency'.<sup>538</sup> This insufficiency of long-term protection strategy represents a significant shortcoming in the nuclear disaster response model and indicates either an uneasiness or an incompetency of the nuclear regulatory regime to deal with the issue of recovery from nuclear disasters.

Indeed, protective actions and norms established by the IAEA are constituted almost entirely of radiation protection measures. The content of the IAEA and ICRP guidelines on the

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<sup>537</sup> IAEA, 'Remediation Process for Areas Affected by Past Activities and Accidents' (n 502).

<sup>538</sup> Directorate-General for Energy, ENCO and UJV, *Review of Current Off-Site Nuclear Emergency Preparedness and Response Arrangements in EU Member States and Neighbouring Countries: Final Report* (European Commission 2014) x.

protection of people during nuclear accidents is therefore almost identical. This suggests that the current protection regime is deficient in the expertise related to protecting victims from disaster effects. Such expertise includes camp management, shelter, food distribution, logistics, protection of vulnerable groups, education, water, sanitation and hygiene (WASH), health, emergency telecommunications, separated families, prevention of violence (including gender-based violence), and access to goods and services, all of which are indispensable for protecting and assisting people in disasters in respect of their rights, dignity, and legitimate interests. They are all basic components of the humanitarian disaster relief and protection system established by the UN and international humanitarian agencies.

The 2020 ICRP guideline on the protection of people in a large nuclear accident (Publication 146) mentions, for the first time, the importance of “respecting the dignity of people” in disaster management.<sup>539</sup> It further explains that ‘(a)ll individual decisions about whether to remain in or leave an affected area, or to return home or not, including those of voluntary evacuees, should be respected as a matter of dignity, and supported by the authorities’.<sup>540</sup> Notwithstanding, actual measures recommended in the guideline are all oriented toward those who decide to stay in or return to contaminated territories and almost none of them are targeting those who choose to resettle elsewhere or not to return to affected territories. Furthermore, those long-term measures are simply radiation protection measures, relying heavily on the self-help initiatives of the citizens themselves. As for non-radiological recovery measures, the ICRP simply urges the authorities to conduct ‘dedicated research programmes’ to address the rehabilitation challenges.<sup>541</sup> The guideline never cites or refers to any of the existing literature or normative frameworks in the field of disaster relief and

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<sup>539</sup> ICRP, ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.’ (n 38) 19.

<sup>540</sup> *ibid* 61.

<sup>541</sup> *ibid* 73.

humanitarian operations which exclusively deal with assisting and protecting population in man-made and natural disasters.<sup>542</sup> The long-term recovery strategy of the nuclear regime roughly stops at the decontamination of affected areas, the installation of food and health monitoring systems, and the “empowerment” of people with self-help radiological protection actions so that they can reduce daily radiation exposure doses by themselves.

## **B. “Live with Radiation” over Relocation/Resettlement**

The second distinctive feature of the nuclear protection regime is its clear precedence placed on helping people to “live with radiation” – staying in and returning to contaminated territories – over relocating or resettling people elsewhere in a way to avert radiation exposure. As mentioned earlier, most protection measures are designed for persons who stay in or return to contaminated areas. For those who relocate permanently, there is little to no guidance as to how to protect and assist them. Indeed, the term “relocation” is mainly used in the context of *temporary* relocation in both the IAEA and ICRP guidelines. While long term relocation (i.e., resettlement) is also mentioned as a possibility, protective measures associated with such relocation are poorly elaborated.

Meanwhile, resettlement is regarded as a core protection strategy in the aftermath of disasters by the humanitarian assistance and forced migration framework.<sup>543</sup> It forms one of so-called “durable solutions”, composed of voluntary repatriation and resettlement, which would help the displaced persons achieve a situation where they no longer have any protection needs related to their displacement and can enjoy their rights without discrimination due to their

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<sup>542</sup> To cite a few examples, UNCHR, ‘Report of the Representative of the Secretary-General, Mr. Francis M. Deng, Submitted Pursuant to Commission Resolution 1997/39 Addendum: Guiding Principles on Internal Displacement’ (n 88); IASC, ‘IASC Framework on Durable Solutions for Internally Displaced Persons’ (n 90); IASC, ‘IASC Operational Guidelines on the Protection of Persons in Situations of Natural Disasters’ (Inter-Agency Standing Committee/The Brookings-Bern Project on Internal Displacement 2011); UNDP, ‘National Post-Disaster Recovery Planning and Coordination’ (UNDP 2016) A Guidance Note.

<sup>543</sup> IASC, ‘IASC Framework on Durable Solutions for Internally Displaced Persons’ (n 90).

displacement. The most important element of durable solutions is that affected individuals make their own informed and voluntary decisions on what durable solution to pursue according to their needs.<sup>544</sup> Moreover, there should be no hierarchy between the two durable solutions, and under no circumstances should displaced persons ‘be encouraged or compelled to return or relocate to areas where their life, safety, liberty or health would be at risk’.<sup>545</sup>

In the nuclear protection regime, this non-hierarchical principle between these two durable solutions – return or resettlement – is lacking. The overall recovery strategy clearly favours the option of return, or remaining *in situ*, for the affected population after a nuclear disaster. The recommendations are essentially focused on decontamination, radiation protection measures, and the restoration of economic activities in the contaminated territories so as to facilitate the return or the remaining of the population. This priority can also be glimpsed from the dose criteria or reference levels set for the protective actions of evacuation and relocation: 10-50 times higher than the public dose limit in the case of the US and France, and 100 times higher in the guideline of the IAEA.

But why is the nuclear regime hesitant or hostile to permanent relocation, one of the major protection measures applied regularly for persons displaced by disasters and development projects? According to Topçu, Fassert and Hasegawa, it is because the priority of the nuclear post-accident doctrine is placed on the “normalisation” and “reconquest” of contaminated territories.<sup>546</sup> Topçu argues that such normalisation is crucial for the state to regain the credibility among the public (especially if the state wants to continue with the nuclear programme despite the accident), diminish assistance and compensation payments, and

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<sup>544</sup> *ibid.*

<sup>545</sup> *ibid* 12; UNHRC, ‘Report of the Representative of the Secretary-General on the Human Rights of Internally Displaced Persons, Walter Kälin, Addendum: Framework on Durable Solutions for Internally Displaced Persons’ (Human Rights Council 2010) UN Doc A/HRC/13/21/Add.4 (9 February 2010) para 21(f).

<sup>546</sup> Topçu, ‘Catastrophes nucléaires et « normalisation » des zones contaminées : Enjeux politiques, économiques, sanitaires, démocratiques et éthiques.’ (n 319); Fassert (n 494); Fassert and Hasegawa (n 42).

safeguard the future of the nuclear industry.<sup>547</sup> As such, the existence of condemned lands or permanent relocation of the population makes an irreversible and grave consequence of the accident “too visible” in the eyes of the public so as to be avoided.<sup>548</sup>

### **C. Conditional Protection: Justification and Optimisation Principles**

The third specificity of the regime is the conditionality of its protective actions. In the nuclear disaster response model, people are not protected unless the situation meets certain criteria. Typically, evacuation and relocation are conditioned on projected dose values. This inevitably leads to the phenomenon called “voluntary evacuation” or “voluntary relocation” of affected persons.<sup>549</sup> Also called “shadow evacuation”, the IAEA defines it as ‘unofficial spontaneous evacuation undertaken by members of the public who are located outside the area where evacuations are officially recommended’.<sup>550</sup> In the guideline, it is portrayed as a nuisance ‘causing a delay in an evacuation of the PAZ’.<sup>551</sup> The ICRP’s text is more nuanced, recommending the authorities to ‘consider the negative and positive aspects of such self-initiated evacuation of people’.<sup>552</sup> But overall, the phenomenon is ignored at best and criticised at worst by these guidelines. Yet, “voluntary” evacuation is a regular phenomenon which occurs in any disaster and catastrophic situations. People flee when they feel their lives are at risk. For example, in the event of armed conflicts and natural disasters, people flee without the government’s evacuation orders. In fact, “voluntary” evacuees constituted at least one third of

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<sup>547</sup> Topçu, ‘Catastrophes nucléaires et « normalisation » des zones contaminées : Enjeux politiques, économiques, sanitaires, démocratiques et éthiques.’ (n 319) 7.

<sup>548</sup> Topçu, ‘Catastrophes nucléaires et « normalisation » des zones contaminées : Enjeux politiques, économiques, sanitaires, démocratiques et éthiques.’ (n 319).

<sup>549</sup> The term “voluntary evacuation” appears only once in the entire text of the ICRP Publication 146 (2020) ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident’.

<sup>550</sup> IAEA, ‘Actions to Protect the Public in an Emergency Due to Severe Conditions at a Light Water Reactor’ (n 72) 27.

<sup>551</sup> *ibid.*

<sup>552</sup> ICRP, ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.’ (n 38) 51.

all officially counted evacuees in the aftermath of the Fukushima accident.<sup>553</sup> As it will be shown in the case study below (Part I-Title II), these “voluntary” evacuees are not fully recognised as legitimate victims of the accident by the Japanese authorities and are thus provided with little assistance and compensation.

In addition to dose-based criteria, the IAEA and the ICRP add another set of criteria for the implementation of protective actions on the basis of justification and optimisation principles. The IAEA provides a long list of non-radiological factors deemed important for consideration in choosing and implementing protective actions. The list goes from economic, social, and ethical aspects to available resources, waste management, and geographical and administrative aspects. Some curious examples include ‘direct cost associated with the implementation of emergency response actions’, ‘compensation issues’, ‘interruption in international trade’, ‘disrupted living conditions’<sup>554</sup>, ‘reduction in life expectancy due to resettlement’, ‘issues associated with public trust and credibility of authorities’, ‘costs of management of waste generated’, and ‘availability of financial and material resources’.<sup>555</sup> From the list, it becomes clear that they essentially represent the needs and interests of the state instead of those of the affected population. Ultimately, the justification and optimisation process provide a great flexibility and discretionary powers to national authorities to decide whether or not to implement protective actions after considering their political and economic interests and constraints. Under the framework, the protection of health and lives of citizens are directly put in balance against political and economic interests of the state.

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<sup>553</sup> Hasegawa, ‘Disaster Evacuation from Japan’s 2011 Tsunami Disaster and the Fukushima Nuclear Accident’ (n 42).

<sup>554</sup> One can assume that life has already been disrupted by the accident.

<sup>555</sup> IAEA and others, ‘Arrangements for the Termination of a Nuclear or Radiological Emergency’ (n 390) 182–185.

Such relativity in providing disaster relief and protection is quite distinct from the regular international disaster response model established by the UN and international humanitarian community. Under the humanitarian relief framework, the protection is not relative but universal, aimed at ‘obtaining full respect for the rights of the individual’ in accordance with human rights, refugee and international humanitarian law, preventing and/or alleviating immediate effects of disasters, and ‘restoring dignified conditions of life through reparation, restitution and rehabilitation’.<sup>556</sup> The contrast between the rights-based framework and the nuclear framework is also stark in who decides what is the best protective action for each individual: in the former, an affected person decides according to his/her needs and legitimate interests while in the latter, it is the state or nuclear regulatory authorities who decide on behalf of individuals and the society what is beneficial for them and the society as a whole. This difference is further elaborated in the following.

#### **D. Absence of Rights-Based Approach**

As Michel Prieur asserts, nuclear emergency response plans generally lack the notion of human rights despite the fact that many nuclear countries are States Parties to international human rights treaties and the European Convention on Human Rights (ECHR).<sup>557</sup> Despite the derogatory clauses prescribed for “public emergencies” in some of human rights treaties, Prieur contends that human rights principles shall be generally applied in all circumstances including large-scale disasters and emergencies.<sup>558</sup>

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<sup>556</sup> OCHA, ‘Glossary of Humanitarian Terms in Relation to the Protection of Civilians in Armed Conflict’ (UN Office for the Coordination of Humanitarian Affairs 2004) 25.

<sup>557</sup> Prieur (n 255).; Convention for the Protection of Human Rights and Fundamental Freedoms (adopted 4 November 1950, entered into force 3 September 1953) 213 UNTS 221 (European Convention on Human Rights - ECHR)

<sup>558</sup> As explained the footnote above, Article 4 of the International Covenant on Civil and Political Rights (ICCPR) stipulates, ‘in time of public emergency which threatens the life of the nation [...], the States Parties to the present Covenant may take measures derogating from their obligations under the present Covenant to the extent strictly

In fact, the nuclear regime's disregard for human rights is not limited to the disaster response system but inherent in the very legal system which created the civil nuclear enterprise in the first place: nuclear law.<sup>559</sup> For Luis Rodriguez-Rivera, the regime's core principle – the balancing of risks and benefits – could ultimately constitute 'a complete violation of recognised human rights where decisions made or acquiesced to by states create grievous threats to present and future generations of its people, as well as the environment'.<sup>560</sup> Under the nuclear regime where state political and economic interests are given equal or considerable weight in decision-making, individual rights are constantly at risk of a modulation and compromise. The conflict between the nuclear regime and the rights-based regime in protecting persons in nuclear disasters will be further elaborated in the next Part (Part Two -Title I).

## Conclusion of Chapter 2

According to Charles Perrow, nuclear power plants are typically made of high-risk technologies whose system, due to its interactive complexity, 'makes accidents in them inevitable, even "normal"', no matter how effective safety devices are.<sup>561</sup> The former Chairman of the U.S. Nuclear Regulatory Commission affirmed his argument stating that 'reactor design is inherently unsafe' and that nuclear plant accidents will always happen.<sup>562</sup> Despite this, the nuclear disaster protection system was not established until the 1980s in many nuclear power countries and the IAEA, only in the aftermath of major accidents.

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required by the exigencies of the situation'. Article 15 (Derogation in time of emergency) of the ECHR provides a similar derogatory right to States Parties. However, certain rights (e.g. right to life) are excluded from these derogatory clauses. Also, the clauses fix a high bar for derogation: public emergency has to be at the level "*which threatens the life of the nation*".

<sup>559</sup> Rodriguez-Rivera, 'The Human Right to Environment and the Peaceful Use of Nuclear Energy' (n 103).

<sup>560</sup> *ibid* 181.

<sup>561</sup> Charles Perrow, *Normal Accidents: Living with High Risk Technologies* (Updated Edition, Princeton University Press 1999) 3–4.

<sup>562</sup> Jaczko (n 332) 20.



The US story on the development of atomic energy, first for military and later for “peaceful” purposes, tells a lot about how the nuclear safety regime is organised today. The safety regime was ultimately established by those who wanted to develop civil nuclear enterprise and thus inevitably marred by political compromises and adaptations. Due to the energy’s historical link to military use, the proximity with the state and its elites, and the stake for the globalised multibillion-dollar nuclear industry, nuclear regulation and disaster response are always under the sway of political, economic, national defence, and industrial interests. The nuclear law was essentially born to accommodate and maintain this *modus operandi*, which not only facilitated the launch of the civil nuclear programme but also became the foundation of the nuclear safety regime.

As a result, the nuclear disaster response and recovery plan is fundamentally flawed and inadequate to protect the population in the event of nuclear accidents, just like the radiation protection framework analysed in the previous chapter. It provides only limited protection to citizens, restricted by various dose and non-radiological criteria, which would inevitably leave many of the affected on their own to survive. Moreover, the majority of protective actions envisaged in the nuclear disaster management is composed of radiological protection measures, designed to enable or encourage people to stay or return home in the contaminated territories, rather than relocating them elsewhere to prevent radiation exposure.

In this context, the current international system of control setup by the IAEA is toothless or even complicit, leaving the matter largely to the sphere of national jurisdiction. The next part of the thesis (Part Two) will explore international law principles which potentially challenges and limits such national behaviours and the principles of the nuclear safety regime.



## Conclusion of Title I

Ulrich Beck once identified radioactivity as the quintessential risk of today's society. By evading all human perceptive abilities, radioactivity only exists through scientific (or non-scientific) knowledge and interpretation, which could be magnified or minimised within the knowledge, thus 'open to social definition and construction'.<sup>563</sup> The concepts such as "socially acceptable" or "permissible" dose, "reference level", and "as low as reasonably achievable" are typical of these social definitions and constructions. According to Yasuo Nakagawa, a historian of science and technology specialised radiation protection, today's nuclear and radiation safety norms are indeed socially constructed standards, professing to be scientific, which ultimately serve as a political tool to back up the State nuclear project.<sup>564</sup> The analysis of this Title tends to corroborate such a claim. It is the system which protects people to a certain degree and at the same time imposes radiation exposure to people for the safeguard of nuclear activities. It operates under the primacy of the mass over the individual, especially ignoring the vulnerability of certain individuals. Under the current system, the protection of individual rights is often compromised in the face of political, economic, and industrial considerations of the state authorities.

However, state actions are also subject to the limitations imposed by international law as well as the principle of the Rule of Law.<sup>565</sup> The main function of the latter principle is indeed to put a limitation on the state power by holding those in power accountable to the same laws as citizens. According to Olivier Beaud, a legal specialist in constitutional law, it represents 'the translation in legal terms of the idea of the ethical primacy of the individual vis-à-vis authority',

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<sup>563</sup> Ulrich Beck, *Risk Society: Towards a New Modernity* (1992 English translation, SAGE Publications 1986) 23.

<sup>564</sup> Nakagawa (n 78).

<sup>565</sup> Boustany (n 202).

protecting citizens from the arbitrary or an abuse of state power.<sup>566</sup> The problem is that all matters related to nuclear energy, such as nuclear disaster response and nuclear damage liability, are often codified in a special regime in many countries, sometimes separated from the ordinary code or common law. This implies that the nuclear regime may escape the limitations exercised through the Rule of Law.

On the other hand, the analysis of this Title found that the principles of the nuclear regime in fact come into conflict with those of international laws. This legal friction with other branches of international law will be thoroughly examined in the next part (Part Two).

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<sup>566</sup> Olivier Beaud, 'Ouverture: L'honneur Perdu de l'État?' (1992) 15 *Droits* 3, 7–8; cited and translated by Boustany (n 202).

## **Title II: Case Study of the Fukushima Nuclear Accident**

After studying the nuclear safety and radiation protection norms established by international nuclear institutions, this Title conducts an in-depth case study to investigate how these international norms were actually applied in a real accident and how effective they were in protecting the accident victims.

The Fukushima Daiichi Nuclear Power Plant accident occurred on 11 March 2011 in Japan. Classified as a Level 7 accident by the IAEA, the same maximum level attributed to the 1986 Chernobyl accident, it was a world major nuclear accident which resulted in three reactor core meltdowns, three hydrogen explosions and a massive radiation release into the environment. It triggered large-scale human displacement, extensive environmental contamination, significant health impacts, incalculable social and economic damage, and long-term disruption of the lives of so many citizens, which after 10 years is far from over.

The case of the Fukushima accident presents an illustrative example of how citizens are realistically protected against nuclear accidents in a major nuclear country which aligns its nuclear and radiation regulation with the international norms and is party to international conventions related to nuclear safety. To conduct a thorough examination of such a case, this Title is divided into two parts: the analysis of emergency response (Chapter 1) and post-accident protection (Chapter 2). Before the probe into the Fukushima emergency response, the thesis also conducts a brief study on the Japanese nuclear regulation system, especially the nuclear disaster preparedness and response plan established prior to the accident. The analysis of the Fukushima post-accident protection system will focus on “the Fukushima status”, the normative status of victims defined by the post-accident policies and the compensation scheme established

by the government. This chapter conducts a thorough investigation into the consequences of the established status on the affected population.

The Fukushima status ultimately reveals the government's position as to who should be recognised as "legitimate" victims as well as what damage should be recognised as "legitimate" nuclear damage. In other words, it sheds light on what the authorities are unwilling to accept, or try to exclude, specific categories of victims and damage. The analysis of this Japanese example is crucial to this doctoral research as it establishes an important precedent for the management of future accidents and influences the international norms of nuclear disaster response and protection, representing the new norms.

## Chapter 1: The Japanese Nuclear Regulation System and Emergency Response

At the time of the Fukushima nuclear accident, Japan was ranked as the third-largest civil nuclear power in the world with 54 commercial reactors in operation with a total production capacity of about 50,000 MW, generating about 30% of the country's electricity. This fact is rather curious for a country that had experienced the tragedy of two atomic bombings in Hiroshima and Nagasaki. In post-war Japan, nuclear energy programme was the symbol of economic and technological development and the strategy of nuclear deterrence,<sup>567</sup> thus vigorously promoted by the Japanese government as part of the grand state project.

This chapter first traces the history of the Japanese nuclear programme and the development of the nuclear regulation system composed of nuclear safety (disaster preparedness), radiation protection, and nuclear liability, which formed the basis for the nuclear disaster protection system prior to the Fukushima Daiichi accident (Section I). This background analysis is crucial to understand the Fukushima disaster management undertaken by the Japanese authorities, especially its specificities and failings to protect its citizens from disaster effects.

The following section then probes into the actual implementation of the emergency response plan in the Fukushima accident, focusing as to what went wrong vis-à-vis the pre-existing EP&R plan (Section II). This probe feeds into the next chapter's analysis on the Fukushima protection status and the reality check as to how the population is today protected in general by their governments in actual nuclear disasters.

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<sup>567</sup> Suzuki (n 3). Suzuki is a former Vice Chairman of the Japan Atomic Energy Commission. In this book, he states that the Japanese nuclear policy is linked to its national defence strategy of retaining the capability to produce nuclear weapons.

## **Section 1: Institutional and Legal System Before the Accident**

According to the IAEA, ‘the protection of people and the environment in countries with nuclear installations relies on the existence of a solid regulatory framework’ consisting of relevant legislation, regulations and guidance, which is overseen by an independent and effective regulation body.<sup>568</sup> This section examines how such a regulatory framework had been created in Japan before the event of the Fukushima nuclear accident.

The section first traces the history of the Japanese civil nuclear programme and the development of its regulatory system, presenting some of the major events which had shaped them as well as the constraints which had hindered its development (§1). This is followed by an in-depth examination of Japanese nuclear regulation regime, divided into radiation emergency preparedness and response (EP&R) (§2), radiological protection (§3), and nuclear damage liability (§4), all of which became the basis for the actual emergency and recovery protective actions implemented in the Fukushima accident. The study particularly tries to identify special characteristics or irregularities of the Japanese pre-accident regulatory system in relation to international norms, which will later manifest themselves in managing the actual emergency.

### **§1: History of Japanese Nuclear Legislation and Institutions**

Japan launched its civil nuclear energy programme in 1954, three months after the Eisenhower’s Atoms for Peace speech at the UN, when a group of conservative party members pushed through a bill at the National Diet to create the first budget for nuclear energy research and development. Twelve years later, the first commercial nuclear reactor went into operation at the Tokai power station in 1966, equipped with a Magnox reactor constructed by a British

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<sup>568</sup> Source: IAEA website on “nuclear installations”, found at <<https://www.iaea.org/topics/nuclear-installations>> consulted 25 January 2023.



firm, General Electric Company. This was the same model of reactors installed at Calder Hall Nuclear Power Station in Windscale (currently called Sellafield) in 1956, the British first “commercial” nuclear reactor, at which a severe accident classified as Level 5 by the IAEA occurred in 1957.

The choice of a British reactor instead of an American one to launch the civil nuclear programme in Japan in fact reveals the real motive of the Japanese government behind the introduction of “peaceful” nuclear energy in the country which had experienced the tragedy of Hiroshima and Nagasaki. According to Tetsuo Arima’s work based on the US and UK governments’ declassified files, the successive Prime Ministers after the World War II as well as the first Chairman of the Japanese Atomic Energy Commission<sup>569</sup> were very keen to equip Japan with a capability to produce and possess plutonium for national security purposes: a possibility to develop atomic bombs in case of future needs.<sup>570</sup> Arima then shows how the choice of the first nuclear reactor was closely linked to this strategy, selecting the British constructor whose government was more flexible with the idea of Japan retaining the plutonium after fuel processing than Americans who were more cautious. Indeed, the Magnox reactors were originally designed to serve two purposes: first, to produce plutonium for nuclear weapons programmes, and second, to produce electricity.<sup>571</sup>

One year after the first nuclear budget was approved at the Diet, the Atomic Energy Basic Act (the Basic Act, hereafter)<sup>572</sup> was enacted, the legal foundation of the Japanese nuclear energy programme which set general principles of its research, development, and use, clearly

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<sup>569</sup> The Prime Ministers cited in the book were Nobusuke Kishi (1957-1960) and Eisaku Sato (1964-72) and the first Chairman of the Japanese AEC was Matsutaro Shoriki.

<sup>570</sup> Tetsuo Arima, 原発と原爆「日・米・英」核武装の暗闘 (*Nuclear Energy and Atomic Bomb: Japan-US-UK Secret Feud of Nuclear Armament*) (Bunshun-shinsho 2012).

<sup>571</sup> SE Jensen and E Nonbol, ‘Description of the Magnox Type of Gas Cooled Reactor (MAGNOX)’ (Nordic Nuclear Safety Research (NKS) 1999).

<sup>572</sup> No. 186 of 19 December 1955, as amended. An unofficial translation of 原子力基本法 by the Japanese Law Translation (<https://www.japaneselawtranslation.go.jp>), the site managed by the Japanese Ministry of Justice.

announcing its overall aim as solely “peaceful”. Based on the Basic Act, other important legislations have been enacted to form the base of the nuclear legal framework in Japan. They include: the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors (Reactor Regulation Act)<sup>573</sup>, which regulates licensing, siting, construction and operation of nuclear facilities; the Act on the Prevention of Radiation Hazards due to Radioisotopes, etc (Radiation Protection Act)<sup>574</sup>, which governs the handling and use of radioactive materials and radiation-generating equipment in order to protect members of the public from radiation hazards; the Act on Special Measures Concerning Nuclear Emergency Preparedness (Nuclear Emergency Act)<sup>575</sup>, which prescribes main countermeasures to prevent and mitigate nuclear accidents; and the Act on Compensation for Nuclear Damage (Compensation Act)<sup>576</sup>, which establishes the basic system of compensation in case of nuclear accidents.<sup>577</sup> These laws are supplemented by relevant Cabinet Orders, Ministerial Ordinances, and Ministerial Public Notices respectively, which specify the implementation modalities and precisions of respective Acts.<sup>578</sup>

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<sup>573</sup> No. 166 of 10 June 1957, as amended. An unofficial translation of 核原料物質、核燃料物質及び原子炉の規制に関する法律 by the Japanese Ministry of Justice (in the Japanese Law Translation site).

<sup>574</sup> No. 167 of 10 June 1957, as amended. An unofficial translation of 放射性同位元素等による放射線障害の防止に関する法律 by the Japanese Ministry of Justice (in the Japanese Law Translation site).

<sup>575</sup> No. 156 of 17 December 1999, as amended. An unofficial translation of 原子力災害対策特別措置法 by the Japanese Ministry of Justice (in the Japanese Law Translation site).

<sup>576</sup> No. 147 of 17 June 1961, as amended. An unofficial translation of 原子力損害の賠償に関する法律 by the Japanese Ministry of Justice (in the Japanese Law Translation site).

<sup>577</sup> NEA/OECD, ‘Regulatory and Institutional Framework in Japan against the Background of Fukushima’ (2011) 2011/1 Nuclear Law Bulletin No. 87 (NEA) 120; Government of Japan, ‘Report of Japanese Government to the IAEA Ministerial Conference on Nuclear Safety - The Accident at TEPCO’s Fukushima Nuclear Power Stations -’ (Nuclear Emergency Response Headquarters 2011) <[https://japan.kantei.go.jp/kan/topics/201106/iaea\\_houkokusho\\_e.html](https://japan.kantei.go.jp/kan/topics/201106/iaea_houkokusho_e.html)> accessed 4 June 2019; Government of Japan, ‘Convention on Nuclear Safety: National Report of Japan for the Fifth Review Meeting’ (2010) <<http://www.nsr.go.jp/data/000110059.pdf>> accessed 29 May 2019.

<sup>578</sup> The Japanese legal system is based on civil law system and its source is organised in the following hierarchical order: Constitution (憲法), international treaties and agreements (条約), Codes (民法) and Laws/Acts (法律), Cabinet Orders (政令), Ministerial Ordinances (省令) and Ministerial Public Notices (告示). Cabinet Orders are established by the Cabinet while Ministerial Ordinances and Public Notices are prescribed by relevant ministries. Ministerial Public Notices are, strictly speaking, not legally-binding and do not have the same enforcement power as Orders and Ordinances.

The Basic Act also established the Japan Atomic Energy Commission (JAEC, hereafter) within the Prime Minister's Office (the predecessor of today's Cabinet Office) in 1956, which was in charge of nuclear policies, research, development, and regulation.<sup>579</sup> In the same year, the Science and Technology Agency (STA) was also created within the Prime Minister's Office to undertake the role of secretariat for the JAEC and implement the policies set by the JAEC. The JAEC and STA thus became the principal motors which led the development of nuclear energy in Japan. The first chairman of the JAEC and the first Director-General of the STA was Matsutaro Shoriki, a media mogul turned politician, later known as Japanese "father of nuclear energy"<sup>580</sup>, who played a key role in introducing and establishing the civil nuclear programme in Japan.

The first nuclear accident occurred at a nuclear-powered merchant ship *Mutsu* in 1974.<sup>581</sup> Following the accident, the Basic Act was revised in 1978 to create the Nuclear Safety Commission (NSC) within the Prime Minister's Office, separating the function of safety regulation policymaking from the JAEC, in order to reinforce nuclear safety. At the same time, it appointed the Ministry of International Trade and Industry (MITI; the predecessor of today's Ministry of Economy, Trade and Industry (METI)) to oversee the regulation for commercial

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<sup>579</sup> Article 5 (1) (2) of the Act; The Japanese institutional history for the development of nuclear energy is analysed in depth by Hitoshi Yoshioka, *原子力の社会史—その日本的展開 (新版) (Social History of Nuclear Energy: Its Japanese-Style Development (New Edition))* (Asahi Shimbun Publications 2011).

<sup>580</sup> According to Tetsuya Arima, a media history professor, Shoriki was also a close collaborator of CIA, the American intelligence agency, for influencing the opinion of the Japanese public in favour of nuclear energy. Tetsuo Arima, *原発・正力・CIA—機密文書で読む昭和裏面史 (Nuclear Energy-Shoriki-CIA: Behind-the-Scene History of Showa Era Read Through Classified Documents)* (Tokyo, Shinchosha 2008).

<sup>581</sup> *Mutsu* is Japan's first (and the last) nuclear powered commercial cargo ship built in 1974. At its first experimental voyage which took place in September 1974, a radiation leakage occurred when a crew brought the reactor to reach 1.4% of full capacity. Though the leak was small, media coverage of the incident triggered fear among local harbour communities and led to their refusal for the ship to return to the port. As a result, *Mutsu* was obliged to stay out in the sea for about one month before the government negotiated a settlement with the local community. After the accident, *Mutsu* was never operated as a commercial cargo and was decommissioned in 1993. See Atsuo Kishimoto, 'Public Attitudes and Institutional Changes in Japan Following Nuclear Accidents' in Edward J Balleisen and others (eds), *Policy Shock: Recalibrating Risk and Regulation after Oil Spills, Nuclear Accidents, and Financial Crises* (Cambridge University Press 2017) 305.

reactors while the STA remained the regulatory body for research reactors. Despite this reform, Japan has experienced a series of nuclear accidents in late 1990s, namely the 1995 Monju Fast Breeder Reactor accident,<sup>582</sup> the 1997 Tokai PCN (*Donen*) reprocessing plant accident,<sup>583</sup> and the 1999 Tokai JCO accident,<sup>584</sup> which facilities were all under the STA's supervision. As a result, the structural overhaul was conducted by the 2001 Central Government Reform<sup>585</sup>, which transferred the primal decision-making authority on nuclear energy from the JAEC and the NSC of the Cabinet Office to the Ministry of Economy, Trade and Industry (METI). The role of both Commissions became more advisory than executive bodies, formulating policy orientations and guidelines. The STA which had lost public confidence was dismantled and absorbed into the Ministry of Education, Culture, Sports, Science and Technology (MEXT).

Since the 2001 Reform, the METI was not only responsible for regulating all commercial reactors through licensing, construction approvals and inspections, but also for

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<sup>582</sup> The Monju Fast Breeder Reactor is one of the two experimental Fast Breeder Reactors that Japan began to invest and develop during the 1980s. It was operated by the Power Reactor and Nuclear Fuel Development Corporation (PNC), Donen in short in Japanese. Fast Breeder Reactors were developed with an aim to utilize the plutonium produced as spent fuel from regular fission reactors so as to achieve a sustainable energy source. Only one year after reaching criticality, the Monju reactor caused a sodium leak which led to a fire at the facility in 1995. It is reported that there was very little release of radioactivity from the accident (classified as INES Level 1 accident) but what made the accident notoriously famous was that the PNC tried to hide and falsified information on the accident, which was revealed by the investigation team organised by the host city and the prefecture. Source: Yoshioka (n 579).

<sup>583</sup> The Tokai reprocessing plant for spent fuel operated by Donen (PNC) caused a fire and an explosion in 1997. Some workers were exposed to radiation and the accident was classified as INES Level 3. Donen tried again to falsify information on the accident and triggered a public outcry. But in the end, instead of being dismantled, the Corporation was simply integrated into Japan Atomic Energy Agency (JAEA) in 2005. *ibid*.

<sup>584</sup> The criticality accident occurred at JOC's nuclear fuel processing plant located in Tokai-mura (Tokai village), which is situated 130 km northeast of Tokyo on the coastal line, on 30 September 1999 after its employees mishandled a solution of enriched uranium in the laboratory. It resulted in exposing three workers to lethal doses of radiation, of whom two lost their lives, and hundreds of other workers, municipal officials, firefighters and residents to various doses up to 48 mSv. An evacuation order was issued for residents who lived within 350 m radius from the facility and shelter indoors was instructed for those who lived within 10 km radius. JCO (formerly Japan Nuclear Fuel Conversion Corporation) was a subsidiary company of Sumitomo Metal Mining Corporation. The accident was classified as INES Level 4 accident by IAEA.

<sup>585</sup> The so-called Central Government Reform (中央省庁再編 in Japanese) was implemented in 2001 with an enactment of the Basic Act on Central Government Reform (Act No.103 of 1998) which aimed to streamline administrative functions, whereby reducing the vertical division, and to reinforce the work of the Cabinet. As a result, the number of ministries and government agencies was reduced from 22 to 12 by merger and restructuring.

setting the national nuclear policy.<sup>586</sup> To execute this expanded role, the METI created two agencies under its supervision: the Agency for Natural Resources and Energy (ANRE) for policymaking and the Nuclear and Industry Safety Agency (NISA) for regulation. The ANRE fixes the country's nuclear energy policy through the publication of the Basic Plan for Energy, in line with the policy guideline, the Framework for Nuclear Energy, published by the JAEC. The NISA, structurally placed under the ANRE (METI), sets regulation policies in consultation with the NSC of the Cabinet Office and conducts safety inspections with a technical support from Japan Nuclear Energy Safety Organization (JNES), the agency established under the NISA in 2003. As such, the NISA was responsible for the safety regulation of all 54 commercial reactors in Japan, operated by 10 different electricity companies, before the Fukushima accident.<sup>587</sup>

After the METI, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) which had absorbed the STA still played an important role in the Japanese nuclear energy programme. Though many of the STA's executive functions over nuclear energy were transferred to the METI at the 2001 Reform, the MEXT was still in charge of nuclear research and development, safety regulation of research reactor facilities, radiation protection, and nuclear third-party liability policies. As for radiation regulation, the Radiation Council established under the MEXT played a key role in formulating national policies by reflecting international standards fixed by the ICRP.<sup>588</sup> The MEXT also supervises the National Institute

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<sup>586</sup> NERHQ, 'Report of Japanese Government to the IAEA Ministerial Conference on Nuclear Safety - The Accident at TEPCO's Fukushima Nuclear Power Stations -' (n 577) II-4.

<sup>587</sup> Government of Japan, 'Convention on Nuclear Safety: National Report of Japan for the Fifth Review Meeting' (2010) Report submitted to the IAEA 5th Review Meeting of the Contracting Parties held on 4-14 April 2011, Vienna, Austria.

<sup>588</sup> The original Radiation Council was first established in 1958 as a specialised entity within the Prime Minister's Office and administered by Science and Technology Agency until 2001. Since the Central Reform of 2001, the new Radiation Council was created under MEXT. After the Fukushima accident, the Council was placed under the newly established Nuclear Regulation Authority in 2012.

of Radiological Sciences (NIRS)<sup>589</sup>, the public research institute of reference on radiology and radiation effects, and co-supervises the Japan Atomic Energy Agency (JAEA)<sup>590</sup> with the METI, the major nuclear research and development agency.

The structure of nuclear energy governance before the 2011 Fukushima accident is illustrated in the following figure (Figure 3). What becomes clear from this structure is the classic fundamental flaw of nuclear governance: the ministry in charge of the development of the nuclear energy programme and the promotion of the nuclear industry was simultaneously in charge of their regulation. This flaw was repeatedly pointed out as one of the elements having contributed to the arrival of the Fukushima accident by the parliamentary commission report, the National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission (NAIIC).<sup>591</sup>

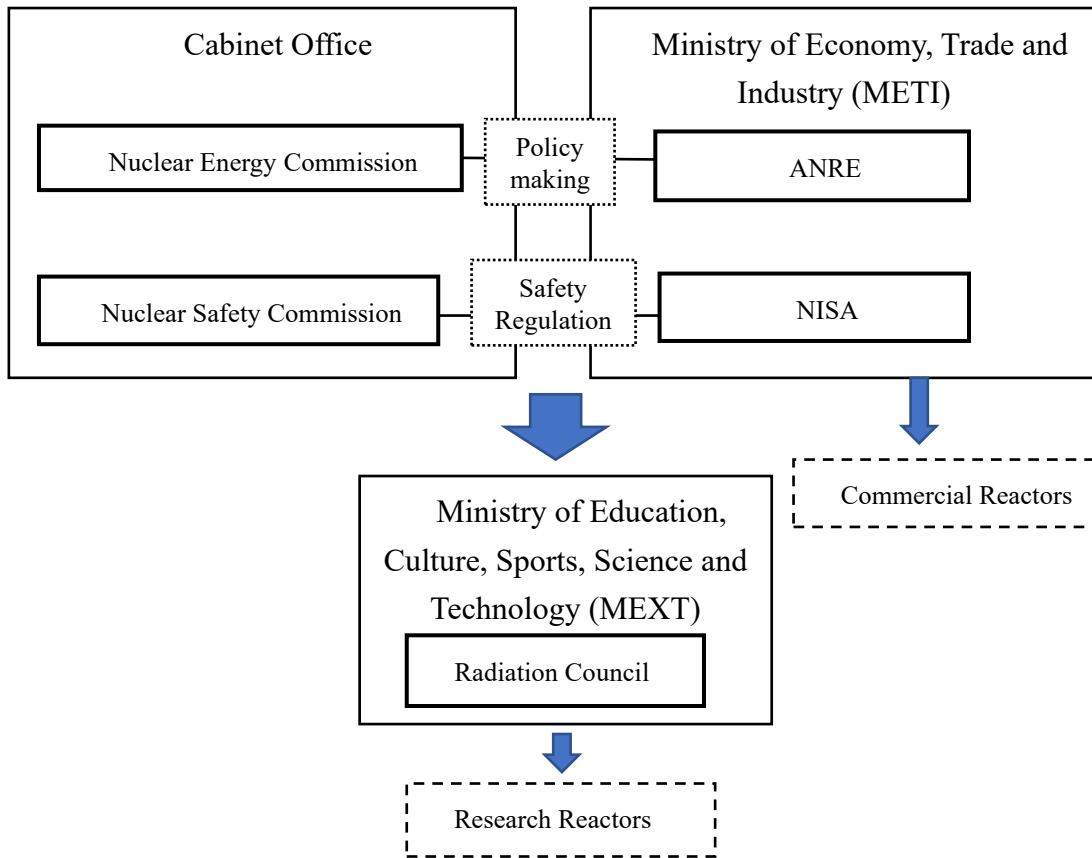
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<sup>589</sup> Originally established in 1957, the NIRS is the public radiation research institute of reference in Japan. After the Fukushima accident, it was renamed as the National Institutes for Quantum Science and Technology (QST) in April 2016, taking over certain operations of the Japan Atomic Energy Agency (JAEA) in addition to the tasks of the NIRS.

<sup>590</sup> The JAEA was established in 2005 as the public nuclear energy research and development agency.

<sup>591</sup> NAIIC (n 20) 47 (Chapter 5).

Figure 3: The Japanese Nuclear Governance Structure Before the Fukushima Accident



## §2: Emergency Preparedness and Response (EP&R) Plan

In Japan, the legal framework to prevent and manage nuclear disasters was slow to develop, lagging behind other major nuclear countries. As suggested by some history scholars, nuclear regulatory changes are often “crisis-driven” where significant revisions are only made as a retrospective reaction to specific events rather than in a proactive manner.<sup>592</sup> The first of such events was the Three Mile Island (TMI) accident that occurred in the US in 1979. The NSC published its first Regulatory Guide on Emergency Preparedness for Nuclear Facilities

<sup>592</sup> Edward J Balleisen and others, ‘Introduction’ in Edward J Balleisen and others (eds), *Policy Shock: Recalibrating Risk and Regulation after Oil Spills, Nuclear Accidents and Financial Crises* (Cambridge University Press 2017).

(Nuclear Emergency Guide, hereafter) in 1980,<sup>593</sup> based on the scenario of the TMI accident. But the real game-changer event for the Japanese safety regulation was the Tokai JCO criticality accident that occurred in 1999<sup>594</sup>. In the aftermath, the Japanese Diet passed the first legislation which specifically deals with nuclear accident management, bringing about some concrete changes to the institutional and legal framework of nuclear safety.

The Act on Special Measures Concerning Nuclear Emergency Preparedness (Nuclear Emergency Act)<sup>595</sup> was adopted in 1999, which was essentially a complementary law to the Basic Act on Disaster Management (Disaster Basic Act, hereafter)<sup>596</sup> which defines institutional roles in disaster prevention and management in case of disasters in general including natural and human-made disasters. The provisions of the Nuclear Emergency Act were further specified by a Cabinet Order,<sup>597</sup> a Ministerial Ordinance,<sup>598</sup> and several guidelines, notably the Nuclear Emergency Guide compiled by the NSC in 1980. While other guidelines essentially dealt with the institutional and technical arrangement of emergency preparedness and response, the NSC's Guide gave specific advice on off-site protection measures and the dose criteria for the protection of citizens in the event of nuclear disasters.

This paragraph describes the Japanese nuclear emergency preparedness and response plan established by the above Nuclear Emergency Act and related regulations and guidelines before the Fukushima accident in the following, which will be divided into the institutional

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<sup>593</sup> NSC, ‘原子力施設等の防災対策について (Regulatory Guide: Emergency Preparedness for Nuclear Facilities)’ (Nuclear Safety Commission 1980) as amended; Translation of the Guide title by Government of Japan (n 587).

<sup>594</sup> See the footnote above (p. 218)

<sup>595</sup> No. 156 of 17 December 1999, as amended.

<sup>596</sup> Act No. 223 of 15 November 1961, revised June 1997. Unofficial translation of 災害対策基本法 by the Japanese Ministry of Justice (in the Japanese Law Translation site).

<sup>597</sup> Cabinet Order No. 195 of 5 April 2000 for the Act on Special Measures Concerning Nuclear Emergency Preparedness

<sup>598</sup> Prime Minister's Office, MITI, and Ministry of Transport Ministerial Ordinance No. 2 of 5 April 2000 for Act on Special Measures Concerning Nuclear Emergency Preparedness



arrangement (A), evacuation zones (B), and protective actions (C). For the analysis of evacuation zones and protective actions, the thesis largely refers to the NSC's Nuclear Emergency Guide since it is almost the only guideline which defined both preparedness measures (pre-accident) and protective actions (post-disaster) for the population in case of accidents.

### **A. Institutional Arrangement**

The “nuclear emergency” is declared by the Prime Minister when an event meets certain pre-set criteria. They are the loss of all AC power, the failure of reactor scram, the loss of reactor coolant, the detection of radiation dose of 500 micro Sv/hour or more for more than 10 minutes at one point near the site boundary or at two points at the same time, and so on.<sup>599</sup> The Nuclear Emergency Act prescribes that in the event of a nuclear emergency, the Prime Minister shall establish and head the Nuclear Emergency Response Headquarters (NERHQ) in the Cabinet Office and create the Local NERHQ at Off-Site Centre.<sup>600</sup> The Local NERHQ is headed by the Senior Vice Minister of METI. The Off-Site Centre is a facility constructed within 20 km radius from every nuclear facility, which serves as the local focal-point for emergency response measures, one of key preparedness measures prescribed under the Act (Art.12). In an emergency, the NERHQ and the Local NERHQ are the central command unit, deciding, organising and implementing countermeasures. The NISA (METI) establishes the Emergency Response Centre (ERC) which also plays a crucial role in undertaking the secretariat for the NERHQ, collecting information from the operator at the accident site, and providing analysis,

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<sup>599</sup> Article 15 of the Nuclear Emergency Act, specified by Cabinet Order No. 195 (2000). For more details, see Government of Japan (n 587) 108.

<sup>600</sup> Article 12, 16, 17 of the Nuclear Emergency Act, cited above.

expertise, and logistics to the NERHQ. The NSC of the Cabinet Office is also tasked to provide expertise to the NERHQ.

The institutional arrangement of the Japanese nuclear emergency response designed by the Act and its complementary regulations is thus the tripartite system composed of the NERHQ headed by the Prime Minister, the ERC managed by NISA, and the Local NERHQ based at Off-Site Centre, illustrated below (Figure 4).

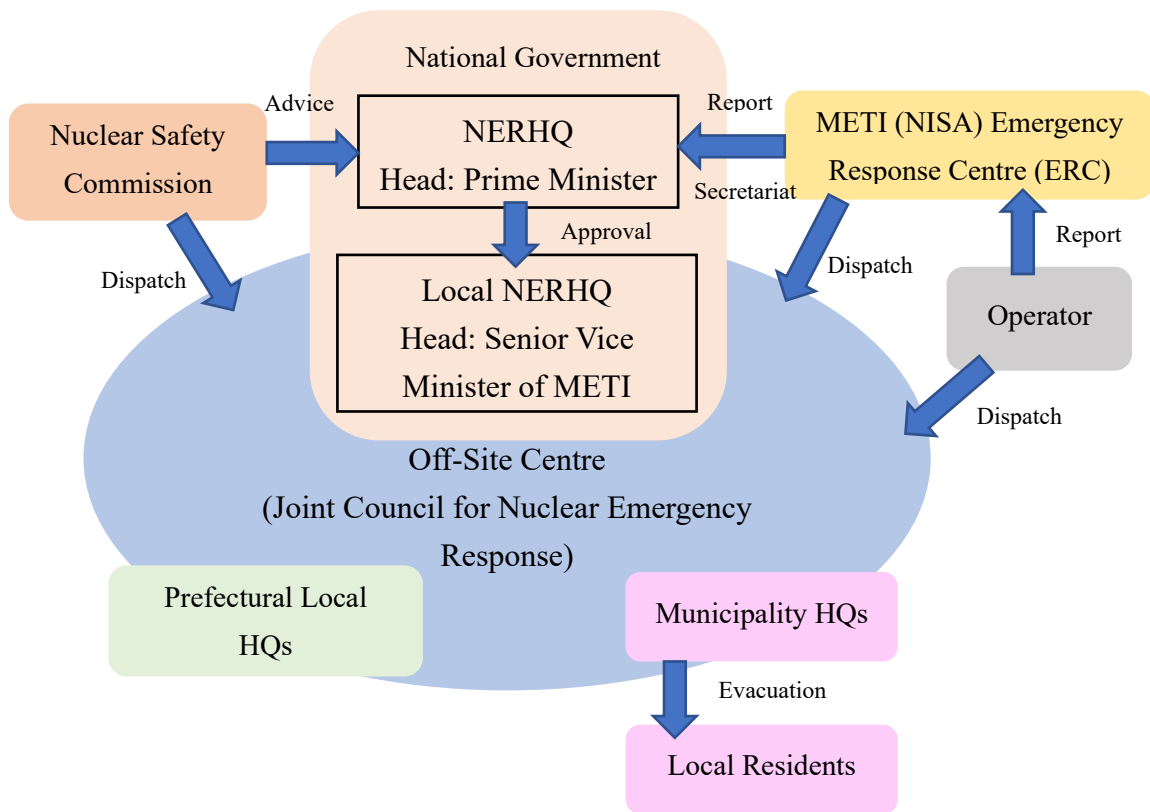
One of the particularities of the Japanese nuclear emergency plan is a significant power delegated to the mayors of concerned municipalities in deciding and implementing emergency protective actions. For example, the Nuclear Emergency Act authorises the municipal mayors, in addition to the Prime Minister (the head of the NERHQ), to issue evacuation orders for their residents as well as to establish restricted zones to which entry will be controlled and limited.<sup>601</sup> In comparison, the French nuclear emergency plan, examined earlier, is much more centralised where all the decisions on emergency measures are undertaken by the Prefect, the state representative in the department, or the Inter-ministerial Crisis Cell (CIC) headed by the Prime Minister installed in the capital.

But in the event of the Fukushima Daiichi nuclear emergency, very little of this institutional arrangement actually functioned. The next section will examine in detail what went wrong and how the planned system did not function in the actual disaster.

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<sup>601</sup> Article 28-2 of the 1999 Nuclear Emergency Act, cited above.

Figure 4: The Japanese Institutional Arrangement for Nuclear Emergency Response<sup>602</sup>



## B. Emergency Zones

The core preparedness measures prescribed by the Nuclear Emergency Act before the Fukushima accident comprised the creation of Emergency Planning Zone (EPZ), evacuation drills, and awareness raising activities in the vicinity of nuclear facilities. The EPZ is defined within the 8–10 km radius from all nuclear power and research reactor facilities whose capacity exceeds 50 MW, in which the residents are informed on radiation risk and trained on emergency evacuation. However, the actual implementation of EPZ preparedness measures had a huge gap with what had been prescribed in the NSC’s Guide. From field interviews with the affected population in Fukushima, Hasegawa showed that evacuation drills had been conducted in a

<sup>602</sup> The image was created by the author of this thesis based on the figure made by Government of Japan (n 587) 110.

minimal fashion and residents were neither well informed nor trained on emergency operations.<sup>603</sup>

During an interview, a municipal worker of Futaba town which hosts the Fukushima Daiichi station, admitted that the participation rate of the drills was very low, a maximum of 30 persons at a time, mainly elderly, who were available during the day. Moreover, evacuation drills were in reality conducted only within the 1-3 km radius from nuclear stations, not the 8-10 km radius area as prescribed in the Guide.<sup>604</sup> One of the rare residents who participated in the drill described that the exercise was organised in a very festive manner and lacked seriousness. During the drill, participants were asked to gather at a local school yard where lunch was served, and they stayed outside eating and chatting ‘as if radiation release were never expected from a nuclear accident’.<sup>605</sup> The reason behind these “light-weight” drill exercises can be found in the very peculiar way the EPZ was justified by the NSC’s Guide. It indeed explains that the concept of EPZ was designed with an extreme precaution, ‘assuming (accident) situations that are technically impossible to occur’.<sup>606</sup> The manual further asserts that in case of an accident, protective actions would most probably be implemented only ‘at one area within the EPZ’ and there should thus be no need to prepare and implement protective actions in the areas outside the EPZ.<sup>607</sup> So, when the Fukushima accident occurred in 2011, the concerned municipalities and residents were mostly at a loss as to what to do and simply had to improvise everything as they could (the following section will examine this point more in detail).

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<sup>603</sup> Hasegawa, ‘Disaster Evacuation from Japan’s 2011 Tsunami Disaster and the Fukushima Nuclear Accident’ (n 42).

<sup>604</sup> NSC, ‘原子力施設等の防災対策について (Regulatory Guide: Emergency Preparedness for Nuclear Facilities)’ (n 593) 107 (Appendix 13).

<sup>605</sup> Hasegawa, ‘Disaster Evacuation from Japan’s 2011 Tsunami Disaster and the Fukushima Nuclear Accident’ (n 42) 26.

<sup>606</sup> NSC, ‘原子力施設等の防災対策について (Regulatory Guide: Emergency Preparedness for Nuclear Facilities)’ (n 593) 14. Translation from Japanese by R. Hasegawa.

<sup>607</sup> *ibid.* Author’s translation.

The particularity of the Japanese EP&R plan established before the Fukushima accident is found in this prevalent notion that *a severe accident could never occur in Japan*. Since the introduction of civil nuclear energy in the 1950s, the idea of “absolute safety” of Japanese nuclear reactors had been nurtured by nuclear energy proponents in the government, the industry, and the academia.<sup>608</sup> Initially invented to convince rural communities to accept the installation of nuclear power stations, the idea has continuously been promoted to garner the support of the general public for nuclear energy. In the face of the Japanese public’s hostility toward atomic energy, an aversion related to the experience of Hiroshima and Nagasaki, the government and the industry had deliberately downplayed the risk of nuclear accidents for a long time.<sup>609</sup> As time passed, nuclear regulators and plant operators themselves started to genuinely believe that an accident was impossible in Japan. In the end, the myth went as far as to block the implementation of safety enforcement measures, defying in effect common-sense logic. Under the “accident-free” myth, nuclear emergency preparedness itself had become, in the eyes of regulators and operators, “contradictory” to that principle and thus had to be watered down.

One such examples is the NSC Working Group discussion on the adoption of a new IAEA preparedness concept, the Precautionary Action Zone (PAZ), which took place in 2006.<sup>610</sup> As analysed in the previous chapter, the concept of PAZ was first introduced by the IAEA in 2002,<sup>611</sup> where the 3-5km radius from the facility should be reserved for precautionary protective actions, notably an evacuation ‘*before* a release of radioactive material occurs or

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<sup>608</sup> Rebuild Japan Initiative Foundation (n 134); Yoichi Funabashi and Kay Kitazawa, ‘Fukushima in Review: A Complex Disaster, a Disastrous Response’ (2012) 68 (2) Bulletin of the Atomic Scientists 9. The Independent Investigation Commission is a private sector initiative of Rebuild Japan Initiative Foundation established by a former editor-in-chief of Asahi Shimbun, Yoichi Funabashi. It is one of the three comprehensive investigation reports published on the Fukushima accident (the other two were commissioned by the Cabinet and National Diet).

<sup>609</sup> Funabashi and Kitazawa (n 608).

<sup>610</sup> Cabinet Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company, ‘Final Report’ (n 134).

<sup>611</sup> IAEA, ‘Preparedness and Response for a Nuclear or Radiological Emergency’ (n 72).

shortly after a release of radioactive material begins’ in order to protect the public from radiation exposure in the event of a nuclear emergency.<sup>612</sup> During the discussion, the regulator, NISA, strongly opposed the idea of adopting PAZ into the Japanese preparedness plan by explaining that ‘in Japan it was extremely unlikely that a serious accident leading to a release of large amount of radioactive materials would occur’ and thus there was no need to plan such an evacuation.<sup>613</sup> Also, if the concept of PAZ is introduced in Japan, the local communities and residents around a nuclear power plant ‘would be forced to consider relocation of their residence’ in case of an accident, which would foster a perception that the current EPZ is insufficient and ‘may arouse the feeling of insecurity about nuclear safety among the people in Japan’.<sup>614</sup> As a result, the concept of PAZ was not integrated in the Japanese preparedness plan. Only after the Fukushima accident, the concept of PAZ (5 km radius) and UPZ (30 km radius) was incorporated in the Japanese EP&R plan.

The same distorted logic intervened in the organisation of some disaster drills. For example, the Niigata Prefecture, a host of another TEPCO nuclear power plant, Kashiwazaki-Kariwa, planned to conduct an emergency drill based on an earthquake scenario in 2010. But such a drill was finally cancelled under the instruction of NISA who feared that the drill would cause ‘unnecessary anxiety and misunderstanding’ among the local residents.<sup>615</sup> The “absolute safety” myth finally paralyzed the nuclear regulator from making a sound judgement and even prevented it from putting reasonable safety measures in place.<sup>616</sup>

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<sup>612</sup> *ibid* 22. (emphasis added)

<sup>613</sup> Cabinet Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company, ‘Final Report’ (n 134) 392–393.

<sup>614</sup> *ibid* 393.

<sup>615</sup> Funabashi and Kitazawa (n 608) 14.

<sup>616</sup> Rebuild Japan Initiative Foundation (n 134) 324. Author’s translation.

## C. Protective Actions and Dose Criteria

According to the NSC's Guide, emergency protective actions consist of shelter-in-doors, evacuation (or shelter in concrete building), iodine intake, food consumption restriction, and restricted zone. The dose criteria to trigger these actions is illustrated in the table below (Table 8). This sub-paragraph focuses its analysis on two key protective actions: shelter-in-doors or evacuation (1) and iodine intake (2).

### 1. Shelter-in-Place or Evacuation (or Shelter in Concrete Building)

In the Japanese EP&R plan, shelter-in-doors is clearly the preferred protective action before evacuation. The Guide explains that sheltering should be prioritised over evacuation since the latter measure 'has higher risk of causing panic and confusion among the local residents' especially when the estimated radiation release is not significant.<sup>617</sup> It only recommends evacuation when there is ample time before radiation release or a long-time release is predicted or evacuation is the only means to avoid significant exposure.

As for the dose criteria, shelter-in-doors is recommended when a predicted effective dose of an individual from *external* radiation reaches between 10 and 50 mSv. But in case of neutron or gamma radiation release (e.g., caesium and iodine), shelter in concrete building or evacuation is advised in the same dose range. At an effective dose over 50 mSv from external exposure, shelter in concrete building or evacuation is systematically prescribed.

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<sup>617</sup> NSC, '原子力施設等の防災対策について (Regulatory Guide: Emergency Preparedness for Nuclear Facilities)' (n 593) 22.

Table 8: Japanese Dose Criteria Before the Fukushima Accident<sup>618</sup>

Effective Dose by External Exposure (mSv)	Equivalent Dose <sup>619</sup> from Internal Exposure (mSv)*	Protective Actions
10 to 50	100 to 500	- Shelter inside homes - <b>In case of neutron or gamma ray emission</b> , shelter in concrete building or evacuate following the instruction
50 or more	500 or more	- Shelter in concrete building or evacuate following the instruction.
	100 (child thyroid equivalent dose)	- iodine intake

\* : Equivalent dose to child thyroid by radioactive iodine, to bone surface and lung by uranium, or to bone surface and lung by plutonium

However, the Guide lacked certain precisions on the modality of these protective measures. First, there is no specific advice as to how to select the value between 10-50 mSv. On this point, the Guide provides the following explanation:

For the dose value concerning evacuation and shelter measures, (the Guide) decided to provide a certain range. The motive behind it is that protective actions should not be decided solely based on dose levels but rather determined by taking into account the feasibility of the measures, the associated risks, *the scale of population affected by the measures*, and the degree of expected dose reduction by the measures, etc. As such, the implementation of these protection measures requires flexibility.<sup>620</sup>

<sup>618</sup> ibid 22 (2010 revised version) ; For English translation, the author referred to NERHQ, ‘Report of Japanese Government to the IAEA Ministerial Conference on Nuclear Safety - The Accident at TEPCO’s Fukushima Nuclear Power Stations -’ (n 577) (Attachment for Chapter II).

<sup>619</sup> Equivalent dose is the term used by ICRP to signify the dose absorbed by a tissue or an organ of the human body which is calculated by adding weighting factors of different types of radiations (neutrons, alpha ray, gamma ray...etc). It is also known as “biological dose” and expressed in the unit of sievert (S).

<sup>620</sup> NSC, ‘原子力施設等の防災対策について (Regulatory Guide: Emergency Preparedness for Nuclear Facilities)’ (n 593) 26. (emphasis added); Translation from Japanese by R. Hasegawa



The statement is clearly made in line with the justification and optimisation principles of the international nuclear and radiation regulation regime, balancing the protection of persons against economic and social costs associated with the measures. These dose criteria also correspond to those fixed by the peers, notably the US and France, as analysed earlier. But the difference is that the NSC's dose criteria only account for external (or internal) exposure dose while the dose criteria fixed by the US and France and recommended by the ICRP and IAEA account for both external and international exposure doses.

Secondly, the Japanese norms lack the notion of time frame in general. The dose criteria do not specify the time in which such dose level will be reached. For example, will evacuation be instructed when the exposure dose of an individual is estimated to reach 10-50 mSv for the first day, in a week, within a month or a year? Moreover, the maximum duration of shelter-in-place is not indicated in the Guide, unlike the French plan which limits such measure to half-day.

Thirdly, the Guide does not provide any specific instruction on evacuation plans. In fact, for evacuation to be effective, the local authorities need to prepare an evacuation plan detailing the logistics, routes, place of accommodation, identification of vulnerable persons, and medical arrangements as they do for natural disaster preparedness in Japan. But such a plan had not been prepared for nuclear emergencies.<sup>621</sup> This is most probably linked to the fact that nuclear regulatory authorities were extremely uneasy and reluctant to evoke evacuation or relocation as a preparedness measure to the local communities and residents, fearing to stir their doubt in the safety of nuclear reactor facilities.

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<sup>621</sup> None of the municipalities that this author has interviewed, Futaba and Naraha (towns which host Fukushima Daiichi and Fukushima Daini NPP respectively), had a nuclear disaster evacuation plan for the residents before the accident.

Finally, the Japanese EP&R plan does not suggest any follow-up measures after the emergency phase. The only guideline which touched upon the termination of the emergency phase was the NSC's Basic Concept on Technical Advice related to the Termination of Nuclear Emergency, adopted in October 2005.<sup>622</sup> Despite being far from precise or comprehensive, the Basic Concept notably suggests, *inter alia*, referring to the "public dose limit" in deciding to discontinue emergency protective measures in post-emergencies. Nevertheless, the document does not suggest any recovery or long-term measures for the population, let alone "relocation". As a matter of fact, there were no guidelines dealing with the recovery or long-term phase of a nuclear accident in Japan before the Fukushima accident. The nuclear disaster management plan was thus basically designed to deal only with non-severe accidents where radiation release is small or lasts only for a short period of time.<sup>623</sup>

## 2. Iodine Intake

The intake of Iodine Thyroid Blocking (ITB, hereafter) is another core emergency protective action. The Guide targets the residents under 40 years old and prescribes it when the equivalent dose of infantile thyroid gland exposure to iodine exceeds 100 mSv. This basically follows the advice of IAEA regarding emergency iodine intake although the World Health Organisation (WHO) sets a separate intervention level for children under 18 years old and pregnant women at 10 mSv.<sup>624</sup>

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<sup>622</sup> NSC, '原子力緊急事態解除宣言等に対する技術的助言に関する基本的考え方について(Basic Views on the Technical Advice Related to the Declaration of the End of Nuclear Emergency)' (Nuclear Safety Commission 2004) published 27 August 2004.

<sup>623</sup> Cabinet Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company, 'Interim Report' (n 134) 312–313.

<sup>624</sup> IAEA, 'Actions to Protect the Public in an Emergency Due to Severe Conditions at a Light Water Reactor' (n 72); WHO, 'Guidelines for Iodine Prophylaxis Following Nuclear Accidents' (World Health Organization 1999) WHO/SDE/PHE/99.6.

The modality of implementation, however, raises a serious question of practicability. The decision to administer iodine tablets for residents will first be decided by the Local NERHQ at Off-Site Centre. But this decision has to be approved by the NERHQ in Tokyo. Once the NERHQ gives a green light, the local NERHQ will convey the information to the Prefectural Governor who will finally instruct the ITB intake to the concerned municipalities and the residents.<sup>625</sup> As the thesis will show in the following section, the ITB intake was not finally implemented for the residents following the Fukushima accident mainly due to the communication breakdown among these different actors despite the green light given by the NERHQ.

In summary, major protection measures envisaged in case of nuclear accidents prior to the TEPCO accident were: 1) sheltering or evacuation when the external exposure dose exceeds 10-50 mSv (in case of gamma ray emission such as caesium); 2) these measures shall be lifted, among others, by referring to public dose limit fixed in the relevant legislation; 3) iodine tablets shall be administered to the population under 40 years old when the equivalent dose to infantile thyroid gland is expected to exceed 100 mSv.

### **§3: Radiological Protection Regime**

The principal law to regulate radiation risk in Japan is the Act on the Prevention of Radiation Hazards due to Radioisotopes, etc (Radiation Protection Act).<sup>626</sup> The regulation on the use of radioactive materials or radiation generating equipment is implemented under the responsibility of the MEXT. As for the policymaking, the Radiation Council<sup>627</sup> placed under

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<sup>625</sup> Cabinet Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company, 'Interim Report' (n 134) 358.

<sup>626</sup> No. 167 of 10 June 1957, as amended.

<sup>627</sup> The Council was established by 放射線障害防止の技術的基準に関する法律 (the Act on Technical Standards for Prevention of Radiation Hazard) in 1958 (No 162 of 21 May 1958, as amended), initially within the Prime Minister's Office, and then placed under the MEXT by the Central Administration Reform in 2001.

MEXT played the key role in setting radiation standards, especially determining whether or not to adopt new ICRP recommendations into the Japanese regulation. According to Masashi Shirabe who made a historic analysis on the scope and the timing of such incorporation, the Japanese radiation regulator took on average 10 years before adopting any new norms fixed by the ICRP.<sup>628</sup>

At the time of the Fukushima accident in 2011, the Japanese radiation protection norms were only updated until the ICRP Publication 60 (1990). Indeed, there was at least a 20-year lag between the then ICRP norms and the Japanese norms on radiological protection at the time of the accident. For example, the intervention levels (reference levels) advised in the NSC emergency guideline correspond to those recommended by the ICRP Publication 40 (1984), representing the 27-year gap in norms. More recent and major ICRP recommendations such as Publication 103 (2007) which introduced three types of exposure situations and the concept of reference dose and Publication 109 and 111 (2009) which dealt with emergency and long-term protective actions and norms after nuclear disasters had not yet been reflected in the Japanese policy.

This paragraph attempts to find out the cause of these lags and the shortcomings of Japanese radiation regulations by examining the development of radiological research and expertise in Japan (A). Secondly, it presents a cartography of the Japanese radiation protection standards that existed before the accident, especially around the concepts of dose limit and Radiation Controlled Area (RCA).

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<sup>628</sup> Masashi Shirabe, 'ICRP 勧告における放射線防護基準の変遷と我が国の対応 (The Evolution of ICRP Recommendations on Radiation Protection Norms and the Response of the Japanese Government)' (2016) 86 (12) Kagaku 1264.

## A. Japanese Radiation Research and Experts

The protection lag in the Japanese radiation standard can be partially explained by the history of radiation research and the profiles of major radiation experts in Japan. According to the study conducted by Susumu Shimazono, a leading scholar in sociology of religion in Japan, the radiation research in Japan had long been oriented toward proving the *safety* of low-dose radiation under the national policy of nuclear energy promotion.<sup>629</sup> The Japanese government has long encouraged and financed the radiation research which aimed at proving the harmlessness or even the benefit (e.g. hormesis theory) of low-dose radiation and thus refuting the Linear Non-Threshold (LNT) model<sup>630</sup> adapted by ICRP. The experts working on these research projects were frequently called in by the government to provide advice in numerous policymaking councils and working group sessions on radiation protection standards. Most of these experts belong to public research institutes such as National Institute of Radiological Sciences (NIRS) and Radiation Effects Research Foundation (RERF), and a private research institute of electric power companies, Central Research Institute of Electric Power Industry (CRIEPI).

For example, Kazuo Sakai, a senior researcher at CRIEPI during 1999-2006, who specialised in hormesis research and was an advocate for relaxing ICRP standards, became the Head of Radiological Protection Research Centre at NIRS in 2006. Since the Fukushima accident, he has been appointed as a member of at least seven policy-making platforms on radiation risk management such as Nuclear Safety Commission (NSC), Cabinet Secretariat Working Group on Risk Management of Low-Dose Radiation, and the Radiation Council of

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<sup>629</sup> Susumu Shimazono, つくられた放射線「安全」論—科学が道を踏みはずすとき (*The Fabricated Theory of Radiation 'Safety': When Science Steps Out of Line*) (Kawade-Shobou-Shinsha 2013).

<sup>630</sup> The LNT model assumes that biological damage, cancer risk in particular, caused by radiation exposure is proportional to the exposure dose even under the threshold of 100 mSv.

the MEXT.<sup>631</sup> He is also a member of ICRP (Committee 1: Radiation Effects). As a result, his proponent standpoint for low-dose harmlessness and the antagonistic position toward ICRP recommendations – too strict in his eyes - has played an important role in shaping the Japanese regulation related to radiological protection and the post-Fukushima radiation policies.

The institute which has the most authority on radiation research in Japan is NIRS. Established in 1957 under the STA (later absorbed to the MEXT) as Japan's only national institute dedicated to radiological research, the NIRS is regularly invited to advise government councils and frequently referred to in government communications on radiation risk. Some researchers even argue that the NIRS was originally created to control the information on radiation effects and orient radiation research in line with nuclear energy promotion undertaken by the STA.<sup>632</sup> The president of the institute, Yoshiharu Yonekura (2006-2016), also famously held the opinion casting a doubt on the validity of the LNT model. Having served as Chair of UNSCEAR between 2016-17, he was one of the most frequently invited experts in various government policymaking committees on post-Fukushima radiation risk management.

Another institute of authority on radiation research in Japan is the Radiation Effects Research Foundation (RERF) based in Hiroshima. RERF is a unique institute of US-Japan cooperation, founded in 1975, to investigate radiation effects among the survivors of Hiroshima and Nagasaki atomic bombs. As explained in the previous Title's analysis, the RERF replaced the Atomic Bomb Casualty Commission (ABCC), which had been established in 1947 by the American National Academy of Sciences (NAS) with funding from the U.S. Atomic Energy Commission.

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<sup>631</sup> Shimazono (n 629).

<sup>632</sup> *ibid* 172.

The origin of ABCC goes back to the US Armed Forces Joint Commission for the Investigation of the Effects of the Atomic Bomb in Japan, whose essential aim was to study the effects of atomic bombs on the victims in Hiroshima and Nagasaki. The Commission began its mission in September 1945 (one month after the bombings) and continued until December 1946. In an effort to avoid the controversy (after all, it is the investigation conducted by the country who dropped the bombs to study the effects on its victims without providing any medical help), the Commission's work was conducted in cooperation with a Japanese medical team and renamed as "Japan-U.S. Joint Commission".<sup>633</sup> Notwithstanding, the reports from the investigation mission was kept by the U.S. government until 1951 and all the medical data including files, organs from autopsy, tissue samples and photographs had been sent and kept at the Armed Forces Institute of Pathology in Washington D.C. until 1960s when the U.S. government finally decided to return them to Japan.<sup>634</sup> For these reasons, the succeeding organisation, the ABCC, often came under criticism and was regarded with much suspicion by atomic bomb survivors during its 30 years of operation (1947-1974).

With the creation of RERF, the institute has become a Japanese entity under the Japanese civil law and co-financed by the Japanese and American governments while its research objective remains unchanged. The presidents of RERF, notably Shigenobu Nagataki (during 1997-2001) and Ohtsura Niwa (since 2015 until today), were also among the most frequently invited experts for various government policymaking committees after the Fukushima disaster. In addition to NIRS and RERF experts, medical doctors from Hiroshima and Nagasaki Universities also played an influential role in the post-Fukushima policymaking.

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<sup>633</sup> Nakagawa (n 78).

<sup>634</sup> Takahashi, 封印されたヒロシマ・ナガサキ：米核実験と民間防衛計画 (*The Classified Hiroshima and Nagasaki: The US Atomic Bomb Tests and the Civilian Defense Plan*) (n 152); Soichi Iijima, '原爆と日本の医学 (Atomic Bomb and Japanese Medicine)' (2001) 1 (2) *Journal of the Research Society for 15 Years War and Japanese Medicine*.

As such, radiation experts who have influenced the Japanese radiation policy have always been those who tended to disregard low-dose risks – threshold or hormesis theorists<sup>635</sup> – and belong to public or interest-group-associated radiation institutions. They are not only promoted as government advisors but also often appointed as international experts to the UNSCEAR and ICRP, thus influencing not only domestic but international norms on radiation risk. As shown with the US case, the experts who take different or cautious stances toward low-dose risk have thus been mostly excluded from government committees and policymaking platforms on radiation regulation.

## **B. The System of Dose Restriction: Dose Limit and Radiation Controlled Area (RCA)**

The Japanese radiation regulation system has two important dose restriction concepts to protect its nationals: dose limit (1) and radiation controlled area (RCA, hereafter) (2). The pre-Fukushima radiation protection norms are thus analysed through these two concepts.

### **1. Dose Limit**

As introduced above, the Japanese legal system of radiological protection is structured on the basis of the Radiation Protection Act. The regime is first and foremost designed to deal with the protection of workers, and not of the public,<sup>636</sup> as shown by the history of the international radiation regulation regime earlier. Radiation protection of workers is regulated by the Ministry of Health, Labour and Welfare (MHLW) Ordinance on Prevention of Ionizing Radiation Hazards (Radiological Protection Ordinance)<sup>637</sup> relative to the Industrial Safety and

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<sup>635</sup> “Threshold theorists” are the scientists who take a view that exposure to low doses (under 100 mSv/year) has little to no health effects. “Hormesis theorists” are those who assert that low dose exposure has beneficial effects on health.

<sup>636</sup> Shirabe (n 628).

<sup>637</sup> Ministry of Labour Ordinance No. 41 of 30 September 1972, as amended.



Health Act<sup>638</sup> in addition to the MEXT ordinance and public notices. There are other ministerial ordinances which define dose limits according to the branch of activities. To name a few, the Ordinance on Enforcement of Medical Care Act issued by MHLW specifies protection dose standard for medical workers.<sup>639</sup> In the transport sector, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) issues an ordinance relative to transports of radioactive substances.

According to these ordinances, the dose limit of workers is set as 100 mSv per five years (20 mSv/year on average) but should not exceed 50 mSv per year. This is in conformity with the ICRP norms. The Japanese regulation also fixed some specific norms for female and pregnant workers. For female workers (non-pregnant), exposure dose should not exceed 5 mSv per three months (20 mSv/year) and for pregnant female workers, such dose should not exceed 1 mSv for internal exposure for the duration of pregnancy.

Radiation protection of the public, on the other hand, was not regulated by a specific ministerial ordinance or public notice but indirectly dealt with by the METI and the MEXT public notices concerning nuclear reactor operations relative to the Nuclear Reactor Act. In fact, the term “public dose limit” does not appear in these public notices but it can be interpreted as such from a certain provision.<sup>640</sup> For example, both METI and MEXT Public Notices on Dose Limits (Article 3.1(1)) stipulate that operators shall ensure that effective dose level at the Peripheral Monitoring Area (PMA)<sup>641</sup> of the reactor facilities and *beyond* does not exceed 1

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<sup>638</sup> No 57 of 8 June 1972, as amended.

<sup>639</sup> Ministry of Health and Welfare Ordinance No 50 of 5 November 1948 relative to the Medical Care Act (No 205 of 30 July 1948).

<sup>640</sup> Shirabe (n 628); Kyo Kageura, ‘安全の語りをめぐる (Around the Discourse on Safety)’ in Masaki Ichinose and others (eds), *低線量被爆のモラル (The Moral of Low-Dose Exposure)* (Kawade-Shobou-Shinsha 2012).

<sup>641</sup> Unofficial translation of 周辺管理区域 made by the Japanese government in Government of Japan (n 587).

mSv per year.<sup>642</sup> This “beyond” in fact means areas where people live. The PMA is defined as ‘areas periphery to Radiation Controlled Area<sup>643</sup>, anywhere beyond which radiation dose is not expected to exceed the dose limit established by the Minister of METI (or MEXT)’.<sup>644</sup> The same Public Notices also provide that ‘the dose limit could be set as 5 mSv per year (in the PMA and beyond) if the Minister of METI (or MEXT) so approves’ under a special circumstance (Article 3.2). The MEXT Public Notice on Quantity of Radioisotopes relative to the Radiation Protection Act also provides that effective dose in the area beyond the boundary of offices and facilities which handle radioisotopes shall not exceed 1 mSv per year.<sup>645</sup> All these regulatory documents further specify that this dose limit of 1 mSv/year comprise both external and internal exposures.

However, it is important to note here that the public dose limit is prescribed only in ministerial *public notices* which are not, strictly speaking, legally binding documents under the Japanese law, while the dose limit for workers are prescribed in ministerial *ordinances* that have legal enforcement powers. Furthermore, under the Japanese regulatory system, the responsibility to ensure the dose limit for the public lies exclusively with the operators, not the state. Notwithstanding, the public dose limit of 1 mSv/year had been established as a normative

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<sup>642</sup> METI Public Notice on Dose Limit on the Basis of Ordinance for Commercial Power Reactors (No 187 of 21 March 2001); An unofficial translation of 実用発電用原子炉の設置、運転等に関する規則の規定に基づく線量限度等を定める告示 by R. Hasegawa; Science and Technology Agency Public Notice on Dose Limit on the Basis of Ordinance for Reactors at the Stage of Research and Development (No 20 of 26 July 1988), amended as MEXT Ordinance No 163 of 30 November 2005.; An official translation of 試験研究の用に供する原子炉等の設置、運転等に関する規則等の規定に基づき、線量限度等を定める告示 by R. Hasegawa

<sup>643</sup> Radiation Controlled Area is defined in the METI Ministerial Ordinance same ordinances (n 78) as ‘places such as reactor compartment, spent fuel storage facility, radioactive waste disposal site, etc.’ where the dose could exceed the limits established by the Minister of METI (or MEXT) (Article 1.2(4) and Article 2.2 (4) respectively).

<sup>644</sup> METI Ordinance for Commercial Nuclear Power Reactors concerning the Installation, Operation, etc. (Article 1.2 (6)). An unofficial translation of 実用発電用原子炉の設置、運転等に関する規則 by NERHQ, ‘Report of Japanese Government to the IAEA Ministerial Conference on Nuclear Safety - The Accident at TEPCO’s Fukushima Nuclear Power Stations -’ (n 577). Prime Minister’s Office Ordinance for Reactors at the Stage of Research and Development (Article 2.2 (6)). An unofficial translation of 試験研究の用に供する原子炉等の設置、運転等に関する規則 by *ibid*; The citation of provisions was translated by R. Hasegawa

<sup>645</sup> Science and Technology Agency Public Notice No 5 of 2000, amended as MEXT Public Notice No 59 of 28 March 2012. An unofficial translation of 放射線を放出する同位元素の数量等を定める件 by R. Hasegawa

principle in the Japanese nuclear regulation system at the time of the Fukushima TEPCO accident.<sup>646</sup>

Interestingly, the Japanese radiation regulation also introduced the concept of “dose target” for the public in addition to the dose limit. The NSC issued the Regulatory Guide for the Annual Dose Target for the Public in the Vicinity of Light Water Nuclear Power Reactor Facilities<sup>647</sup> in 1975, fixing the dose target which nuclear reactor operators shall respect to protect the public from their regular activities as 50 micro Sv per year (0.05 mSv per year), much lower than the public dose limit (1 mSv/year). According to the NSC, the concept of dose target was created in an effort to keep the public exposure dose ‘as low as reasonably achievable’ and thus does not replace in any way the dose limit established in the regulation.

However, these dose limits including dose target do not apply in case of nuclear emergencies in line with the recommendation of the ICRP. Instead, different dose limits (or reference levels) are set in these situations. For example, dose limit for workers involved in emergency work was fixed as 100 mSv by the public notices of relevant ministries.<sup>648</sup> In contrast, there were no ministerial ordinances or public notices which established the dose limit (or reference level) for the public in nuclear emergencies except the NSC guideline which suggested a sort of dose reference, not the dose limit, of 10-50 mSv (from external exposure only) to activate protection measures for residents in case of disasters. Following the Fukushima accident, a medical professor and the Head of Isotope Science Centre at the University of Tokyo, Tatsuhiko Kodama, specifically criticised this concept of dose limit at the hearing of the House of Representatives:

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<sup>646</sup> Kageura (n 640) 150; Also, the government report submitted to the IAEA conference lists the public dose limit as 1 mSv/year. See Government of Japan (n 587) 100.

<sup>647</sup> *ibid*

<sup>648</sup> The METI and MEXT Public Notice on Dose Limit (cited above)

A few minutes ago, a Diet member from Fukushima Prefecture asked how we could ensure safety (after the accident). I think that *it is no good, when it comes to the matter of safety, we simply change the standard as a crisis happens*. Residents would not feel reassured unless (the government) presents the plan as to when (the dose would) be reduced to the standard (dose limit), if not within this year, then during next year or the year after next.<sup>649</sup>

The following section will examine in detail what level of dose limit was applied for the public in the actual disaster.

## 2. Radiation Controlled Area (RCA)

The other important concept of radiation restriction in Japan is the Radiation Controlled Area (RCA). The concept was drawn from the 1990 Recommendation of the ICRP (Publication 60), which was incorporated into the Japanese radiation legislation upon the decision of the Radiation Council in 2001. The concept is regulated by ministerial ordinances and notifications related to the Reactor Regulation Act, Radiation Protection Act, and Industrial Safety and Health Act. According to these regulations, the area where effective dose of a person (worker) from external and internal exposures may exceed 1.3 mSv per three months (divided from public dose limit fixed for a special circumstance: 5 mSv per year) or a surface density of radioactivity may exceed 4 Bq/cm<sup>2</sup> (40,000 Bq/m<sup>2</sup>) except alpha rays should be designated as RCA.<sup>650</sup>

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<sup>649</sup> The excerpt was cited in Kageura (n 640) 152. Emphasis added. The translation from Japanese by R. Hasegawa. Prof Kodama was invited to speak as an expert referent at the Health and Labour Committee meeting of the House of Representatives on 28 July 2011. His testimony at the committee became quite well known via social media as he literally scolded politicians at the committee for not doing enough to protect children in Fukushima prefecture. Since the accident, he has been engaged in providing technical assistance and advice to the affected communities. The transcript of his testimony in English is available at <<https://apjff.org/2011/9/32/Kodama-Tatsuhiko/3587/article.html>>, consulted on 2 July 2019

<sup>650</sup> MHLW Ordinance on Prevention of Ionizing Radiation Hazards (Ministry of Labour No 41 of 1972) (Article 3), METI Public Notice on Dose Limits (No 187 of 2001) (Article 2), MEXT Public Notice on Dose Limits (No 20 of 1988) (Article 2), MEXT Public Notice on Establishing Values of Radioisotope (No 5 of 2000) (Article 4)

Once an area is designated as such, it triggers certain obligations on the part of operators and specific regulations to be performed by the authorities to control risk. In the RCA, the entry is strictly prohibited to all persons except designated workers who shall carry dosimeters all times to monitor his/her exposure dose and go through medical check-ups every six months. The conduct of these workers in the RCA is also restricted, where eating, drinking or smoking is strictly forbidden. In other words, an area detected or suspected to have the dose level above the RCA criteria (5 mSv/year or 40,000 Bq/m<sup>2</sup>) is considered at risk or “contaminated”, which requires specific actions and supervision. By the same token, an area found or suspected to have radiation doses below the criteria is considered *de facto* harmless in legal terms. Examples of RCAs cited by relevant ordinances include reactor compartment, spent fuel storage facility, radioactive waste disposal site, radiation equipment room such as x-ray devices room, work rooms for handling radioactive materials, and inside mines of nuclear source materials.

Though the concept was established for the purpose of workers’ protection, it attracted much attention following the Fukushima accident since the post-accident dose limit (reference level) for the public was fixed higher than the RCA criteria. Legal expert groups such as the Japan Federation of Bar Associations (JFBA) and other lawyers’ associations frequently referred to this RCA regulation to criticise the chosen reference level for the residents affected by the Fukushima disaster and advocate for change. This will be further explored in the following Chapter.

The list of core dose norms fixed by the Japanese legislation is shown in the table below (Table 9).

Table 9: Dose Limits in Japanese Radiation Regulation

Object	Dose Limit (or Criteria)*	Remarks
The Public	- 1 mSv/year (under a special circumstance, 5 mSv/year)	In emergency situations, the dose range of 10 to 50 mSv to trigger shelter or evacuation
Workers	- 100 mSv per five years (not exceed 50 mSv/year) - 5 mSv per three months for women	For pregnant workers, 1 mSv effective dose from internal exposure
Workers (Nuclear Emergencies)	- 100 mSv	
Radiation Controlled Area	- 1.3 mSv/three months (or 5 mSv/year) (for effective dose) - 4 Bq/cm <sup>2</sup> (40,000 Bq/m <sup>2</sup> ) (for surface density)	For alpha radiation, dose criterion is 0.4 Bq/cm <sup>2</sup>

\*Total effective dose from external and internal exposure

#### §4: Nuclear Third-Party Liability Regime<sup>651</sup>

Japan enacted two liability laws to cover nuclear damages in 1961: the Act on Compensation for Nuclear Damage (Compensation Act)<sup>652</sup> and the Act on Contract for Indemnification of Nuclear Damage Compensation (Indemnity Agreements Act).<sup>653</sup> Japan is not a party to any of the international liability conventions mentioned earlier but developed its own national liability legislation at the same period as the conventions, whose provisions align in large part with those of the conventions. As is the case with other nuclear power countries, the regime is created separately from the ordinary tort law under Civil Code. For example, in

<sup>651</sup> The “third party” in the nuclear damage liability regime generally means ‘anyone other than the nuclear operator itself and other than a supplier of goods, services or technology for use in connection with a nuclear installation. A third party may be inside or outside of the nuclear installation and as such the term includes employees of the operator of the nuclear installation at which an accident occurs’. The definition is from Schwartz (n 340) 39 (footnote 3).

<sup>652</sup> Act No. 147 of 17 June 1961, as amended.

<sup>653</sup> Act No. 148 of 1961, as amended. Translation of 原子力損害賠償補償契約に関する法律 by Japanese Law Translation (<https://www.japaneselawtranslation.go.jp>)

many lawsuits filed against TEPCO and the State after the Fukushima accident, the plaintiffs claimed compensation for damage not only based on the provision Article 3(1) of the Nuclear Damage Compensation Act but also Article 709 of Civil Code (the section on tort).<sup>654</sup> But the latter claim has been rejected so far by the courts on the ground that provisions of the Compensation Act were more adequate than the Civil Code to cover the extent of damage caused by the nuclear disaster.<sup>655</sup>

The main principles of the Japanese nuclear liability regime are as follows: strict and exclusive liability of the operator, unlimited liability in amount, limited liability in time, obligatory security deposit, government backup in liability payment, and establishment of Dispute Reconciliation Committee in case of disputes. As in international conventions, the Compensation Act provides that the operator of a nuclear installation is strictly and exclusively liable for the damage incurred from the accident (Article 3.1 & 4.1). Operator's liability would only be exonerated if the damage is caused by a natural cataclysm of exceptional nature or social riot (Article 3.1).

While the advantages of these provisions for the protection of victims, such as speedy damage reparation and relief, are often emphasised by some jurists, others point out certain downsides for victims. First, the "liability without fault" principle impedes actions to elucidate the nature and scope of negligence or intent, and gauge the magnitude of liability of the perpetrator, which would usually play a role in determining the compensation amount and scope

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<sup>654</sup> Art 709 Chpt V (Torts) of the Civil Code stipulates that '(a) person who has intentionally or negligently infringed any right of others, or legally protected interest of others, shall be liable to compensate any damages resulting in consequence'. It is a non-official translation made available on the site, Japanese Law Translation, managed by the Japanese Ministry of Justice: <<http://www.japaneselawtranslation.go.jp/law/detail/?id=2057&vm=&re=>>, consulted on 28 June 2019.

<sup>655</sup> Eri Osaka, '東電の責任 (The Liability of TEPCO)' in Takehisa Awaji and others (eds), *原発事故被害回復の法と政策 (Laws and Policies for Nuclear Accident Damage Reparation)* (Nihon Hyoron Sha 2018).

in an ordinary tort case.<sup>656</sup> Secondly, exclusive liability of the operator exonerates the liability of suppliers who may have delivered defective products. If suppliers were to be held accountable for nuclear damage, they would probably put insurance on their products and services, which would inevitably increase their prices and subsequently increase the overall cost of nuclear reactor operation, making it even more difficult to insure the activity as a whole.<sup>657</sup> In fact, the principle of exclusive liability of the operator was also designed to protect the supplier as well as to make the civil nuclear activity insurable and thus viable. In Japan, this principle was said to be incorporated into the Compensation Act under a specific circumstance where TEPCO started to negotiate a commercial agreement with American General Electric Company (GE) on the construction of its first reactor at the Fukushima Daiichi Nuclear Power Station.<sup>658</sup> This provision was in fact created mostly to satisfy the demand of GE as a supplier at the time when Japan was eager to import the reactor technology from the United States who had the dominant position over the technology and knowhow of building nuclear reactors.

Yet, the Japanese regime has certain particularities compared to the international regime or those of many nuclear countries. One of them is the principle of unlimited liability in amount. Japanese law prescribes that nuclear liability is unlimited in terms of amount payable for compensation. There are only a few nuclear countries who adopt such a principle in the world (e.g., Germany and Switzerland).<sup>659</sup> However, this provision is in fact modulated by the

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<sup>656</sup> Takehisa Awaji and Ryoichi Yoshimura, ‘福島原発事故被害の現在と被害回復の課題 (The Current State of Fukushima Nuclear Accident Damage and the Issues for Damage Recovery)’ in Takehisa Awaji and others (eds), *原発事故被害回復の法と政策 (Laws and Policies for Nuclear Accident Damage Repairation)* (Nihon Hyoron Sha 2018).

<sup>657</sup> Pelzer, ‘The Present State of Research Carried Out by the English-Speaking Section of the Centre for Studies and Research’ (n 17) 277.

<sup>658</sup> Haruichiro Koyanagi, *原子力損害賠償制度の成立と展開 (The Creation and Evolution of Nuclear Damage Liability Scheme)* (Nihon Hyoron Sha 2015) 110; Eri Osaka, ‘原賠法改正問題 (The Issues Related to the Reform of the Nuclear Compensation Act)’ in Takehisa Awaji and others (eds), *原発事故被害回復の法と政策 (Laws and Policies for Nuclear Accident Damage Repairation)* (Nihon Hyoron Sha 2018) 239.

<sup>659</sup> Vasquez-Maignan (n 344).



following Article 16.1 which stipulates that the government, with an approval from the National Diet, shall provide aid to the operator if compensation amount exceeds the financial security prepared by the operator and ‘when the government deems it necessary in order to attain the objectives of this Act’.<sup>660</sup> It means that the operator remains liable for compensation payment to victims, even if the amount exceeds its security amount, but the government will provide financial assistance to the operator to cover such payment.<sup>661</sup> In reality, the Japanese system is quite close to other liability systems which limit the amount of liability for operators. The difference is that the Japanese regime provides more systematic state assistance to the operator in case of exceeding the security amount and such aid is unlimited in amount.

In Japan, the obligatory financial security is fixed as 120 billion Yen (one billion euros equivalent) for a reactor facility with output capacity of more than 10,000 Kw<sup>662</sup> (Article 6 & 7.1 of the Nuclear Compensation Act), which is higher than the financial security prescribed by the international liability regime.<sup>663</sup> In order to secure such funds, nuclear operators are obliged either to contract a private insurance and sign an indemnity agreement with the government which complements the insurance coverage, or to offer a deposit of money or security of such amount to the Legal Affairs Bureau with the approval from the MEXT. The Indemnity Agreement Act defines the content of such indemnity agreement signed between operators and the government. The agreement notably allows nuclear operators to protect themselves against risks which are not covered by the private insurance market, such as nuclear damage arising

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<sup>660</sup> For the latter condition, no specific criteria are provided in the Act. The purpose of the Act is ‘to protect persons suffering from nuclear damage and to contribute to the sound development of the nuclear industry’ (Article 1).

<sup>661</sup> NEA/OECD, ‘Regulatory and Institutional Framework in Japan against the Background of Fukushima’ (n 577).

<sup>662</sup> Financial security amount is applied per station not per reactor as in other countries. All commercial nuclear power stations in Japan are in this category.

<sup>663</sup> The maximum security is set at 700 million euros by the 2004 Paris Protocol (Article 7(a)). See Protocol to Amend the Paris Convention on Third Party Liability in the Field of Nuclear Energy (adopted 12 February 2004, entered into force 1 January 2022), available at [http://www.oecd-nea.org/law/paris\\_convention\\_protocol.pdf](http://www.oecd-nea.org/law/paris_convention_protocol.pdf)

through earthquakes, tsunami, volcanic eruptions, normal operations, and claims filed more than 10 years after an accident.<sup>664</sup>

Liability is limited in time in the Japanese regime as in international conventions. On this point, tort law provision from Civil Code (Article 724) is applied in the nuclear damage liability. The right to claim damages expires when a claimant does not bring action within 3 years from the date when he/she acquired knowledge of the damage and of the person liable (“discovery rule”). The right will also be extinguished when 20 years have passed from the time of the tortious act. After the TEPCO accident, considering the magnitude and the nature of damage, the National Diet passed the Act on Special Cases for Extinctive Prescription on Nuclear Damage<sup>665</sup> in 2013 to extend the time limit for claiming damage incurred by the 2011 Fukushima accident. According to the new law, a claim can be instituted within 10 years (instead of 3 years) from the date when he/she took knowledge of the damage, and within 20 years from the *inception* of damage (instead of the date of the accident).

Another original aspect of the Japanese nuclear liability regime is a provision to establish the Dispute Reconciliation Committee for Nuclear Damage Compensation (Reconciliation Committee) under the MEXT (Article 18 of the Compensation Act). According to Article 18.2, the Committee is missioned to execute the following tasks: 1) mediate reconciliation of any disputes arising from compensation; 2) establish guidelines to define the scope of damage for compensation; 3) investigate and assess damage in order to accomplish

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<sup>664</sup> Toyohiro Nomura, Taro Hokugo and Chihiro Takenaka, ‘Japan’s Nuclear Liability System’ in NEA/OECD (ed), *Japan’s compensation system for nuclear damage: as related to the TEPCO Fukushima Daiichi nuclear accident*. (NEA/OECD 2012).

<sup>665</sup> A short form of “the Act Concerning Measures to Achieve Prompt and Assured Compensation for Nuclear Damage Arising from the Nuclear Plant Accident following the Great East Japan Earthquake and Exceptions to the Extinctive Prescription, etc. of the Right to Claim Compensation for Nuclear Damage” (No 97 of 11 December 2013). It is unofficial translation of 東日本大震災における原子力発電所の事故により生じた原子力損害に係る早期かつ確実な賠償を実現するための措置及び当該原子力損害に係る賠償請求権の消滅時効等の特例に関する法律 made by NEA/OECD in Nuclear Law Bulletin No. 94, Volume 2014/2.

the above two tasks. The second task of the Committee is especially important because the Compensation Act does not provide a detailed definition or scope of nuclear damage eligible for compensation.<sup>666</sup> In the Act, nuclear damage is simply defined as (Article 2.2):

Any damage caused by the effects of the fission process of nuclear fuel, or of the radiation from nuclear fuel etc., or of the toxic nature of such materials (which means effects that give rise to toxicity or its secondary effects on the human body by ingesting or inhaling such materials)<sup>667</sup>

The compensation guideline established by the Dispute Reconciliation Committee is not legally binding but, since they are decided by interdisciplinary and supposedly independent experts appointed by the MEXT, often considered as reference or authority document for the nuclear operator and court judges.<sup>668</sup> However, the scope of nuclear damage defined by the Committee following the Fukushima accident became the source of complaints for many accident victims. While the Committee's guideline was to recommend the basic line of compensation, acceptable to all parties including TEPCO, the TEPCO adopted it as the maximum ceiling of its liability, thus compensating only the damage listed in the guideline and rejecting many claims.<sup>669</sup> The role that this compensation guideline played in determining the protection status of Fukushima accident victims will be examined in detail in the next Chapter.

Lastly, under the Japanese nuclear liability regime, no specific litigation procedure is defined. Victims can thus file a claim and seek settlement individually or collectively either

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<sup>666</sup> NEA/OECD, 'Regulatory and Institutional Framework in Japan against the Background of Fukushima' (n 577); Osaka (n 658).

<sup>667</sup> The translation by NEA/OECD, *Japan's Compensation System for Nuclear Damage: As Related to the TEPCO Fukushima Daiichi Nuclear Accident*. (Nuclear Energy Agency 2012) 61.

<sup>668</sup> Nomura, Hokugo and Takenaka (n 664).

<sup>669</sup> Michiko Hiraoka and Masafumi Yokemoto, 'The System and Problems of Nuclear Compensation (Original Title: Genpatsu Baisho No Shikumi to Mondai Ten)', *In Masafumi Yokemoto and Toshihiko Watanabe (eds), Genpatsusaigai ha naze hikintou na fukkou wo motarasunoka (Why does nuclear disaster induce imbalanced reconstruction? : Toward "Reconstruction of Human Life" and Community Revival from Fukushima Accident)* (Minerva Shobo 2015).

directly at TEPCO, through the mediation centre created under the Reconciliation Committee, or at any civil court. No priority is given to either of the procedures and no court is designated as a special court to deal with nuclear damage.<sup>670</sup> This possibly leads to a situation where contradictory decisions will be made on the similar claims.

In summary, the content of the Japanese nuclear liability regime is very similar to those of other major nuclear countries and international conventions with a few variations. Nuclear third-party liability represents one of the rare liability regimes existing for industrial activities of private actors (predominantly) where the state almost systematically engages itself in paying up damage compensation so as to *de facto* protect the industry from bankruptcy, in addition to the protection of the public, in case of accidents. This peculiar nature of the nuclear liability regime originates from the imperative imposed by the development of civil nuclear programme in the beginning, which is valid even today: without the special state protection regime, civil nuclear programme involving private actors would not have simply been feasible. The Japanese Science and Technology Agency (merged to the MEXT in 2001) published an explicative report on nuclear liability regime in 1991, which elucidates this special characteristic of the regime:

(W)hile other laws related to damage compensation and indemnification primarily aim to facilitate claim and ensure adequate compensation and indemnification for victims, nuclear liability law places importance on *the sound development of nuclear industry* in addition to victim protection. Moreover, while other laws had been instituted based on the societal demand for victim protection through historic experiences, nuclear

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<sup>670</sup> Vasquez-Maignan (n 344). According to the article, the revised version of two international conventions now has a provision to appoint a single court to process all nuclear claims in case of accidents (the 1997 Protocol to amend the Vienna Convention and the 2004 Protocol to amend Paris Convention).

liability law was essentially created, not based on experiences, but on the demand for future assurances (for the industry and the public).<sup>671</sup>

This is also affirmed in the Compensation Act (Article 1): ‘(t)he purpose of this Act is to protect persons suffering from nuclear damage and *to contribute to the sound development of the nuclear industry*’.<sup>672</sup> After the Fukushima accident, the latter objective became the subject of review by the Advisory Committee on Nuclear Damage Compensation System created in May 2015 within the AEC to discuss the reform of the Compensation Act. Finally, the majority of committee members (except one member) were in favour of retaining the objective as it is.<sup>673</sup>

## **Section 2: Fukushima Emergency Response**

On 11 March 2011, a magnitude 9.0 earthquake struck off the Pacific coast of Tohoku in north-eastern Honshu, the main island of Japan. The tremor triggered a tsunami that had a mean inundation height of 10–15 m and a run-up height of 40 m in some places.<sup>674</sup> About 19,000 people lost their lives, nearly 400,000 houses were either severely damaged or completely destroyed. It was the most powerful earthquake ever recorded in Japan and one of the world’s biggest earthquakes after the 2004 Indian Ocean Earthquake (M 9.1–9.3). The then Japanese Prime Minister, Naoto Kan, described the disaster as the worst crisis that Japan had ever experienced since World War II.

The disaster did not end there. These earthquake and tsunami caused fatal damage to the installation of Fukushima Daiichi (No. 1) Nuclear Power Plant (F1NPP), situated 230 km

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<sup>671</sup> STA, ‘原子力損害賠償制度(改訂版)(Nuclear Damage Compensation System [Revised Version])’ (Japanese Science and Technology Agency 1991); cited by JELI, ‘原子力損害賠償法に関する国内外の検討 (Deliberation on Nuclear Damage Liability Law in and Outside Japan)’ (Japanese Energy Law Research Institute 2017) No. 135 (Preface). Translation from Japanese by R. Hasegawa. Brackets added.

<sup>672</sup> Translation made by NEA/OECD, *Japan’s Compensation System for Nuclear Damage* (n 667). (emphasis added)

<sup>673</sup> Osaka (n 658).

<sup>674</sup> Hasegawa, ‘Disaster Evacuation from Japan’s 2011 Tsunami Disaster and the Fukushima Nuclear Accident’ (n 42).

north of Tokyo. With emergency diesel generators flooded by the tsunami, the plant lost all power supply, unable to restart the cooling system, which led to core meltdowns and hydrogen explosions at three out of six reactors on site. Massive amounts of radioactive materials were released into the atmosphere and the ocean from the crippled reactors. The Japanese government faced an enormous task of dealing with three disasters at the same time: earthquake, tsunami, and a major nuclear accident.

This section first examines the initial reaction and the organisation of emergency response by the Japanese government, which can be best described as chaotic, improvising, and lack of communication (§1). Following the IAEA definition of the emergency phase, this paragraph analyses the period from the date of the accident (11 March 2011) until the declaration of “cold shutdown” (16 December 2011) by the then Prime Minister Yoshihiko Noda, the state of the NPP which regained the control of damaged reactors.<sup>675</sup> The second half of the section then probes into emergency protective actions implemented (and those not implemented) by the authorities and the consequences of these actions (and non-actions) to the affected population (§2). The analysis of this paragraph is largely based on the findings from the three independent accident investigation committees established after the accident: one commissioned by the Cabinet, the second by the Diet, and the third by a private thinktank.<sup>676</sup>

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<sup>675</sup> However, the IAEA specifies that the term “cold shutdown” used by the Japanese government differs from the terminology used by the IAEA and others. See IAEA, ‘The Fukushima Daiichi Accident: Technical Volume 3/5 Emergency Preparedness and Response’ (International Atomic Energy Agency 2015) 103; Geoff Brumfiel, ‘Fukushima Reaches Cold Shutdown’ [2011] *Nature* <<https://doi.org/10.1038/nature.2011.9674>> accessed 7 February 2023. The IAEA specifies three conditions to achieve the state of “cold shutdown”: the reactor pressure vessel’s temperature is less than 100 degrees Celsius, the release of radioactive materials from the primary containment vessel is under control, and public radiation exposure by additional release is being significantly held down. Brumfiel argues that in the case of Fukushima Daiichi, the second criterion had not been achieved at the time of the declaration because TEPCO was injecting half-a-million litre of water a day to cool down melted fuels at three reactors and the toxic waste water which was in contact with the melted fuels was leaking into the ocean.

<sup>676</sup> The Investigation Committee on the Accident at the Fukushima Nuclear Power Stations was established by the cabinet decision on 24 May 2011 and submitted the Final Report on 23 July 2012.; National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission (NAIIC) was created by the Diet of Japan on 7 October 2011 and published its report in July 2012.; The Independent Investigation Commission is a private sector initiative of Rebuild Japan Initiative Foundation established by a former editor-in-chief of Asahi Shimbun, Yoichi Funabashi. The Commission published its report in March 2012.

For the analysis of the consequences, the case study particularly relies on the result of field interviews with the affected population and concerned municipalities.

## **§1: Ineffective and Futile EP&R Plan**

The scale of the TEPCO F1NPP accident was far beyond the accident scenario which the government had chosen to design the EP&R plan: a non-severe accident with small or short radiation release. As a result, the Japanese authorities were completely taken by surprise and quickly overwhelmed by the scale of the accident. This paragraph first briefly presents the scale of the accident so as to contextualise the study (A) and then examines the actual organisation of the NERHQ and the local NERHQ in the wake of the accident and the initial decision-making and communication to deal with the situation and to protect the population from the accident effects (B).

### **A. The Context and Scale of the Accident**

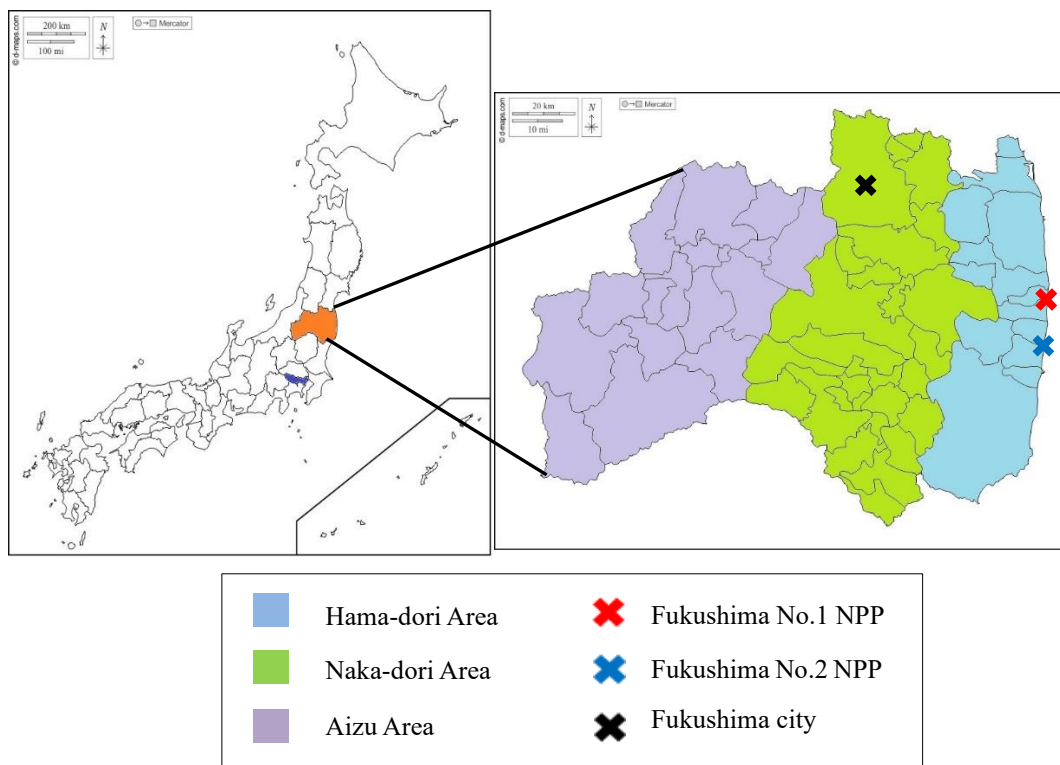
The F1NPP was operated by the country's major private power company, Tokyo Electricity Power Company (TEPCO, hereafter).<sup>677</sup> Equipped with six reactors, it was one of the oldest nuclear installations in the country, nearly 40 years in operation at the time of the accident. TEPCO operates another nuclear power plant with four reactors in Fukushima Prefecture, Fukushima Daini (No.2) Nuclear Power Plant (F2NPP), situated 30 km south along the coast from the F1NPP. The F2NPP was hit by the same earthquake and tsunami but did not result in an accident. As the NAIIC report also pointed out, the Fukushima Daiichi accident occurred not only due to an exceptional natural catastrophe but also human errors.

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<sup>677</sup> Japan has ten electricity companies who operate commercial nuclear power plants. They are Hokkaido Electric Power Company, Tohoku Electric Power Company, Tokyo Electric Power Company, Chubu Electric Power Company, Hokuriku Electric Power Company, Kansai Electric Power Company, Chugoku Electric Power Company, Shikoku Electric Power Company, Kyushu Electric Power Company, and the Japan Atomic Power Company.

Fukushima Prefecture is situated in the region of Tohoku, in northern Honshu, the main island of Japan (see Figure 1 above). It has the third-largest surface area in Japan, 14,000 km<sup>2</sup>, of which 70% is covered by forests and mountains. The prefecture has close to two million inhabitants with one of the lowest population densities in the country. Fukushima Prefecture comprises three areas (see Figure 5 below): *Hama-dori* on the coast, hosting two TEPCO NPPs, thus affected the most by the accident, *Naka-dori* in the middle, the political and economic centre of the Prefecture where the capital (Fukushima city) is situated, and *Aizu* located inland to the west, the tourist destination.

Figure 5: Fukushima Prefecture, its Three Areas and Nuclear Power Plants<sup>678</sup>



<sup>678</sup> Source: d-maps.com <[https://d-maps.com/carte.php?num\\_car=126047&lang=fr](https://d-maps.com/carte.php?num_car=126047&lang=fr)> accessed 24 April 2023, arranged by R. Hasegawa.



The Fukushima disaster emitted a significant quantity of radioactive materials in the atmosphere and the ocean, contaminating a vast territory and affecting the lives of millions. The total Fukushima release is reported to be between 33-50% of the Chernobyl emission, depending on radioelements.<sup>679</sup> For example, a total amount of caesium-134 and -137 released into the air from the F1NPP is estimated as 58 petabecquels (PBq) while that of Chernobyl rose to 168 PBq.<sup>680</sup> Considering the Fukushima accident released another 27 PBq of caesium in the form of liquid directly into the ocean,<sup>681</sup> the total caesium discharge equals a half of the Chernobyl disaster release. However, the difference with the Chernobyl disaster is that 70-80% of the Fukushima atmospheric release was pushed by west wind and fell on the side of ocean,<sup>682</sup> thus significantly reducing the extent of land contamination compared to the Soviet accident. The Fukushima accident contaminated an area of 8,424 km<sup>2</sup>, equivalent to two third of the Ile-de-France region, with more than 40,000 Bq/m<sup>2</sup> (or 5 mSv/year) of caesium-137 in equivalent),<sup>683</sup> affecting the lives of 1.6 million people residing in 102 towns over ten prefectures (See Figure 6 below).<sup>684</sup> In the case of Chernobyl, the contaminated territory was extended far beyond: an area as large as 145,000 km<sup>2</sup>, impacting the lives of 6 million people over three countries.<sup>685</sup>

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<sup>679</sup> IRSN, 'Impact Environnemental d'un Accident Nucléaire : Comparaison Entre Tchernobyl et Fukushima' (n 12).

<sup>680</sup> *ibid.*

<sup>681</sup> *ibid.*

<sup>682</sup> Tetsuji Imanaka, 'チェルノブイリと福島：事故プロセスと放射能汚染の比較 (Chernobyl and Fukushima: The Comparison of Accident Process and Radiological Contamination)' (2016) 86 Kagaku 0252.

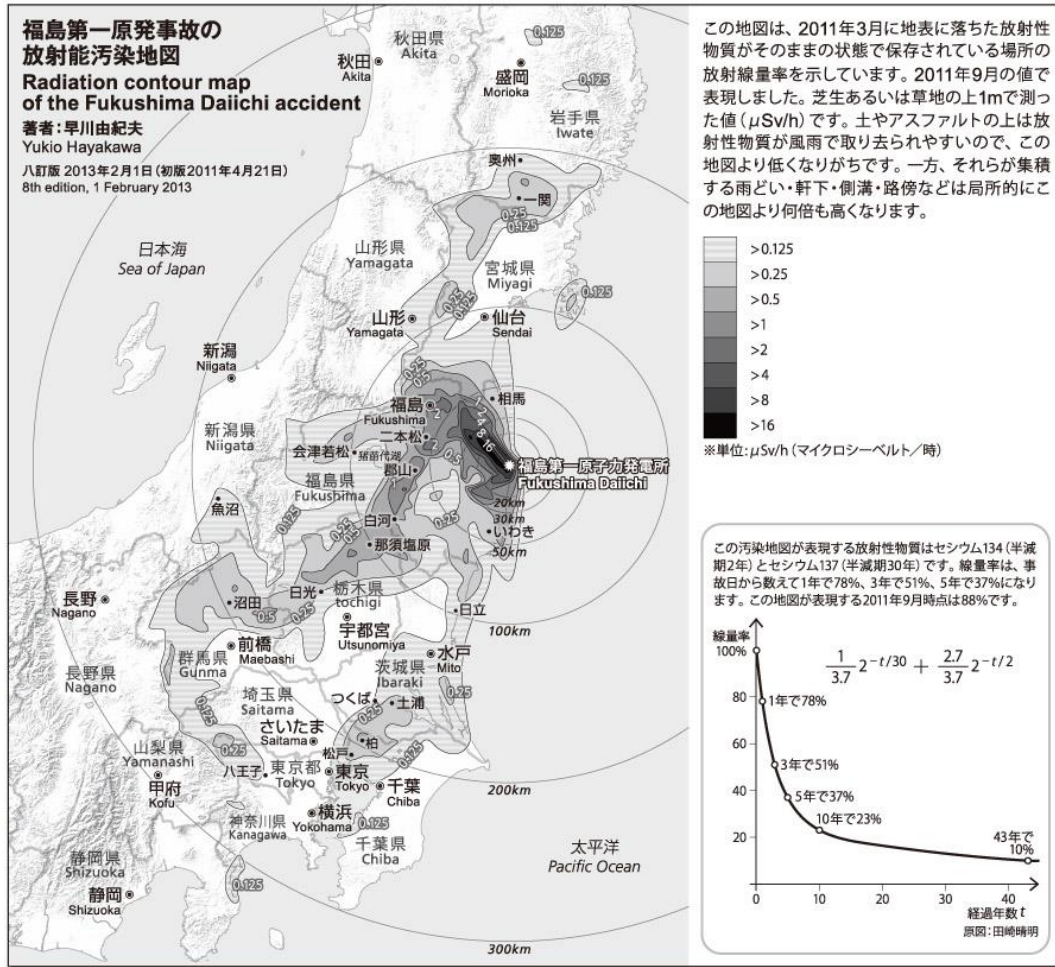
<sup>683</sup> The equivalent to the Radiation Controlled Area (RCA) according to the Japanese legislation, as analysed earlier. Furthermore, IAEA considers any materials or surface with levels of contamination over 0.4 Bq/cm<sup>2</sup> (4,000 Bq/m<sup>2</sup>) for beta and gamma emitters "contaminated". See IAEA, 'Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (2012 Edition): Specific Safety Guide' (IAEA 2014) IAEA Safety Standards Series No. SSG-26 15.

<sup>684</sup> The number of people living in the contaminated territories is not available in any official documents and statistics. The number here was cited from the book, Sawano (n 8), a late professor in Social System Engineering at Kanazawa Seiryō University, specialist in Geographic Information System (GIS), who calculated the number by using GIS from the raw data made available by National Nuclear Security Administration (NNSA) of American Department of Energy (DOE) in October 2011.

<sup>685</sup> Sawano (n 14); Imanaka, 'チェルノブイリと福島：事故プロセスと放射能汚染の比較 (Chernobyl and Fukushima: The Comparison of Accident Process and Radiological Contamination)' (n 682).

A total of 110,000 people were displaced under the government’s evacuation order and more than 50,000 people are reported to have fled their homes without the government’s order. More than 10 years after the accident, only 30% of the evacuees under the government’s order returned home to the former evacuation zone.<sup>686</sup>

Figure 6: The Map of Fukushima Radiation Fallout as of March 2011<sup>687</sup>



<sup>686</sup> Yoshida, ‘避難指示解除区域の住民帰還頭打ち 福島第一原発事故被災地、移住率3割にとどまる (The Return of Evacuees to the Former Evacuation Zone Hit the Ceiling, the Rate of Inhabitation at 30% in the Affected Areas of the Fukushima Daiichi Nuclear Accident)’ (n 40).

<sup>687</sup> The map was made and edited by Yukio Hayakawa, a professor of geology (volcanology) at Gunma University (Japan), and found at his website <<http://kipuka.blog70.fc2.com/blog-category-20.html>> consulted 31 January 2023.

In regard to health effects, more than 60 hospice patients died at the time of the accident due to sudden and unprepared evacuation to other hospitals.<sup>688</sup> A total of 2,250 persons have also lost their lives within several years of the accident due to a deterioration of their chronic illnesses as well as suicides, which were recognised as disaster-related deaths by the local police and authority.<sup>689</sup> Prolonged refuge, difficult living conditions at temporary shelters, post-traumatic stress, and a feeling of loss of their home, farmlands, or life in general, are said to have contributed to these indirect disaster casualties. Among children, about 300 cases of thyroid cancer have been found out of 300,000 who were aged between 0-18 years old at the time of the disaster in Fukushima Prefecture.<sup>690</sup> The annual incident rate for child thyroid cancer (0-19 years old) in Japan is 3.2 cases per 1,000,000.<sup>691</sup> Despite the scientific evidences,<sup>692</sup> the Japanese government still denies the causal link between the higher incidence of thyroid cancer among Fukushima children and the accident.<sup>693</sup> But there are still many unknowns as regards the Fukushima health impact due to the nature of radiation effects, which

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<sup>688</sup> Source: NAHC (n 20).

<sup>689</sup> Source: Reconstruction Agency, the report on the number of disaster related death from the Great East Japan Disaster, dated on 30 September 2018, published on its website on 28 December 2018 <[www.reconstruction.go.jp/topics/main-cat2/sub-cat2-6/20181228\\_kanrenshi.pdf](http://www.reconstruction.go.jp/topics/main-cat2/sub-cat2-6/20181228_kanrenshi.pdf)> accessed on 10 April 2019

<sup>690</sup> Source: Fukushima Prefecture, Reference material (3) ‘甲状腺検査結果の状況 (The Status of Thyroid Examination Result)’ submitted to the 46<sup>th</sup> Prefectural Oversight Committee Meeting for Fukushima Health Management Survey, available only in Japanese at <<https://www.pref.fukushima.lg.jp/site/portal/kenkocoyosa-kentoiinkai-46.html>> accessed 30 December 2022

<sup>691</sup> Source: National Cancer Centre Japan, Cancer Information Service, Cancer Statistics in Japan <[https://ganjoho.jp/en/professional/statistics/table\\_download.html](https://ganjoho.jp/en/professional/statistics/table_download.html)> accessed 20 May 2019. See also Kota Katanoda and others, ‘Childhood, Adolescent and Young Adult Cancer Incidence in Japan in 2009–2011’ (2017) 47 Japanese Journal of Clinical Oncology 762.

<sup>692</sup> H Toki and others, ‘Relationship between Environmental Radiation and Radioactivity and Childhood Thyroid Cancer Found in Fukushima Health Management Survey’ (2020) 10 Scientific Reports (Nature) 4074; Hidehiko Yamamoto, Keiji Hayashi and Hagen Scherb, ‘Association between the Detection Rate of Thyroid Cancer and the External Radiation Dose-Rate after the Nuclear Power Plant Accidents in Fukushima, Japan’ (2019) 98 Medicine e17165; cited by UNHRC, ‘Joint Communication from Special Procedures (The Special Rapporteur on Toxics and Human Rights; The Special Rapporteur on Human Rights and the Environment; the Special Rapporteur on the Right to Food; the Special Rapporteur on Freedom of Peaceful Assembly and of Association; The Special Rapporteur on the Right to Health; The Special Rapporteur on the Human Rights of IDPs; the Special Rapporteur on the Rights to Water and Sanitation)’ (n 100).

<sup>693</sup> MoE, ‘放射線による健康影響等に関する統一した基礎資料 (Booklet to Provide Basic Information Regarding Health Effects of Radiation)’ (Japanese Ministry of the Environment 2021) <<https://www.env.go.jp/chemi/rhm/r3kiso-shiryo/r3kiso-10-03-19.html>> accessed 28 February 2023.

may manifest decades later or in the next generations, and thus the complete picture will only be known in the future.

In 2023, 12 years after the disaster, crippled reactors are kept under cold shutdown but the accident has not ended yet. Clean-up activities at F1NPP are still on-going with several challenges. The most difficult of all is decommissioning, retrieving melted fuels which emit deadly amount of radioactive substances from the bottom of containment vessel or the ground. The government announced that the operation would take 40 years, but most experts judge that it would take much longer. Another challenging task is to find solutions for highly contaminated water (groundwater and rainwater) which comes in contact with melted fuel and leaks into groundwater toward the sea. TEPCO needs to drain by pump and stocks about 130 tons of such water every day in 1,000 tanks made available on site, each of which can contain up to 1,000 tons<sup>694</sup>. The amount of such water reached 1.3 million tons in March 2023 and the F1NPP is running out of space for the storage (the overall capacity of stock on site is said to be 1.37 million tons).<sup>695</sup> In April 2021, the Japanese government announced its plan to release such a water into the sea from 2023 (summer) after filtering and removing most of the radioactive elements from the water.<sup>696</sup> The plan had already been validated by IAEA in 2020.<sup>697</sup>

In terms of the accident cost, METI estimated in 2016 that it would be 22 trillion yen (200 billion USD), of which 8 trillion yen (72 billion USD) for decommissioning, 8 trillion yen

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<sup>694</sup> The amount of the contaminated water that TEPCO had to drain and stock per day was reduced from 470 tons/day (average in 2014) to 130 tons/day (average in 2021). Source: METI website <[https://www.meti.go.jp/earthquake/nuclear/decommissioning/committee/fukushimayougikai/2022/26/shiryou\\_04.pdf](https://www.meti.go.jp/earthquake/nuclear/decommissioning/committee/fukushimayougikai/2022/26/shiryou_04.pdf)> accessed 26 April 2023.

<sup>695</sup> *ibid*

<sup>696</sup> Dennis Normile, 'Japan Plans to Release Fukushima's Wastewater into the Ocean' [2021] *Science* <<https://www.science.org/content/article/japan-plans-release-fukushima-s-contaminated-water-ocean>> accessed 5 December 2022. As reported in the article, despite the filtering process, the wastewater contains a large quantity of tritium in addition to smaller quantities of other radionuclides such as ruthenium, cobalt, strontium, and plutonium.

<sup>697</sup> IAEA, 'Review Report: IAEA Follow-up Review of Progress Made on Management of ALPS Treated Water and the Report of the Subcommittee on Handling of ALPS Treated Water at TEPCO's Fukushima Daiichi Nuclear Power Station' (International Atomic Energy Agency 2020) 2 April 2020.

(72 billion USD) for compensation, and 6 trillion yen (54 billion USD) for decontamination.<sup>698</sup> However, TEPCO reported in 2022 that it had already paid 10 trillion yen (90 billion USD) for compensation alone.<sup>699</sup> In response to the government's estimate, a major economic thinktank, the Japan Centre for Economic Research (JCER), produced its own estimate in 2019: a total cost between 35-80 trillion yen (292-666 billion euros), which represents 7-15% of the country's GDP.<sup>700</sup>

## **B. Chaotic Institutional Arrangement for Emergency Response**

Desensitised for long by the myth of absolute safety, the Japanese authorities were completely taken by surprise and literally at a loss when the accident occurred. Its initial handling and decision-making were extremely chaotic, in a constant state of improvisation, where protective actions were devised without a reference to legal and regulatory bases and in lack of communication between stakeholders. Many of the key decision-makings were conducted behind closed doors among Cabinet members without any records on the content of such discussions.<sup>701</sup> Indeed, the minutes of all NERHQ meetings were only reconstituted and published in March 2012, one year after the accident, under the pressure from the public. Moreover, three independent accident investigation committees mentioned earlier probed into these internal discussions by interviewing the Cabinet members including the Prime Minister,

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<sup>698</sup> MEXT, '東電改革提言 (TEPCO Reform Recommendations)' (TEPCO Reform Committee/Japan Ministry of Economy, Trade and Industry 2016).

<sup>699</sup> Source: TEPCO website at <[https://www.tepco.co.jp/fukushima\\_hq/compensation/results/index-j.html](https://www.tepco.co.jp/fukushima_hq/compensation/results/index-j.html)> consulted 31 January 2023.

<sup>700</sup> JCER (n 343).

<sup>701</sup> NAIIC (n 20). According to the report, it was only in January 2012, ten months after the accident, that the government first admitted that minutes had not been compiled for the official meetings dealing with the disaster including those of NERHQ. After facing a public outcry, the government published the "reconstructed" minutes of these meetings in February-March 2012. They were made retrospectively by relevant ministry officials who had attended the meeting, recollecting information from their personal notes and other attended members, so it is quite unclear whether they accurately or sufficiently reflected the actual discussions.

other ministry officials and experts, and elucidated what had happened inside the NERHQ during the immediate phase of the emergency.

As described in the previous section, the Japanese EP&R plan was entirely built on the accident scenario that involves only a minor release of radiation on the premise that a severe accident was impossible to occur in Japan. As such, the existing disaster response system quickly proved ineffective, or almost irrelevant, in facing the magnitude of the Fukushima Daiichi accident. In the plan, disaster response was supposed to be organised by the tripartite structure consisted of the Nuclear Emergency Response Headquarters (NERHQ) headed by the Prime Minister, the Emergency Response Centre (ERC) formed by NISA, and the Local NERHQ established within an Off-Site Centre (See Figure 4). The Local NERHQ in fact plays a key role in devising protection measures for the affected population since it was specifically tasked to design the evacuation plan and communicate it to the affected municipalities.

Though in the actual disaster, none of them functioned properly. Due to the unexpected power blackout and security concerns at the station, the ERC could not gather critical information from the troubled plant as planned, which prevented it from playing the role of a principal information and expertise provider to the NERHQ.<sup>702</sup> Meanwhile, the Local NERHQ took four days before being established because the Off-Site Centre turned out to be completely ill-equipped and not adapted to a radiation emergency. In fact, the Centre was located just 5 km from the crippled Daiichi station and thus there was no electricity, no internet connection, nor telephone network following the accident. Moreover, the building was not equipped at all

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<sup>702</sup> *ibid*; Cabinet Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company, 'Interim Report' (n 134); Cabinet Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company, 'Final Report' (n 134). According to these reports, NISA safety inspectors visiting the site at the time of the accident could not get information from TEPCO workers as they were completely occupied by their tasks of containing the accident. As the situation got worsened and radiation dose increased at the site on 14 March, the inspectors evacuated from the NPP to the Off-Site Centre for their safety. As a result, Local NERHQ, ERC, and NERHQ lost the direct information source from the accident site.

against radiation fallout. There was no radiation filter at the air duct nor air-tight windows and doors. So when hydrogen explosions occurred at the plant, the Centre was exposed to high doses of radiation. As a result, some personnel who were supposed to assemble at the Centre did not arrive as they judged it too dangerous to be stationed at the Centre.<sup>703</sup>

Given the circumstances and having lost trust in the capacity of nuclear regulators (NISA and NSC) to deal with the disaster, the newly elected then Prime Minister Naoto Kan decided to take matters into his own hands by bringing in his own handpicked advisors.<sup>704</sup> Many of the initial emergency protective actions were thus decided or improvised by him in consultation with his advisors at the Prime Minister's Office, *Kantei*, in isolation from the ERC and other emergency response units.<sup>705</sup> The NERHQ was thus replaced by the Prime Minister himself and a small circle of his advisors staged at the fifth floor of the *Kantei*, and the ERC which was located at NISA/METI's building, became a simple execution unit of the Prime Minister's decisions instead of a key emergency actor. When the Local NERHQ was finally established on 15 March at the Fukushima Prefectural Office in Fukushima city, 60 km away from the F1NPP, most evacuation orders had already been issued by *Kantei*. The following figure shows the actual institutional structure established in the wake of the accident (Figure 7).

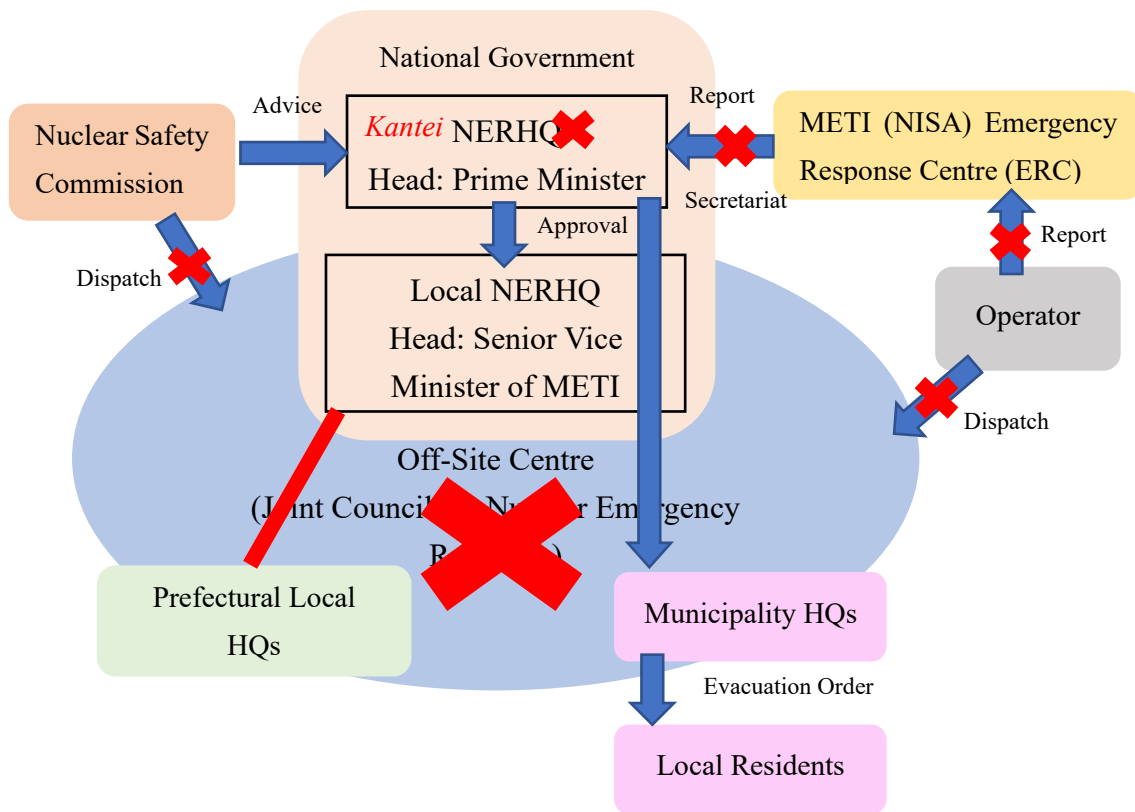
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<sup>703</sup> Asahi Newspaper Special Reporting Unit, *プロメテウスの罠—明かされなかった福島原発事故の真実 (The Trap of Prometheus: The Non-Disclosed Facts About the Fukushima Nuclear Accident)* (Gakken 2012) 72–74.

<sup>704</sup> He was appointed as Prime Minister in June 2010 for the first time after the Democratic Party of Japan (DPJ) won the general election in 2009 taking a large majority at the National Diet replacing the Liberal Democratic Party (LDP) for the first time, which had dominated the nation politics since the end of World War II. The accident occurred just two years after this historic victory of DPJ.

<sup>705</sup> NAIIC (n 20); Cabinet Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company, 'Interim Report' (n 134); Cabinet Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company, 'Final Report' (n 134).

Figure 7: The Actual Institutional Arrangement for Fukushima Emergency Response



The chain of command and communication was so disrupted that some protection measures recommended by Nuclear Safety Commission (NSC) were often not implemented in the field because such instruction did not reach the Fukushima prefectural government or the Local NERHQ in time.<sup>706</sup> The radiation dose norms set in the legislation to protect the public and workers from radiation hazards were systematically relaxed during the emergency, some of which have not been rectified to the original norms even after the emergency phase. These aspects will be further examined in the following paragraph.

The failure in communication also occurred between the authorities and the concerned population. From the field interviews and the Parliamentary and Cabinet investigations reports, it was found that the central and prefectural governments systematically failed to communicate

<sup>706</sup> NAIIC (n 20); Cabinet Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company, 'Interim Report' (n 134).



the essential information to the concerned population concerning their safety at the critical moment. What is troubling is that the authorities had possessed such information, albeit incomplete, and seemed to withhold it from the public for weeks, only to disseminate it later under public discovery or pressure. This time-lagged communication became the rule not only during the emergency response phase but also in the beginning of the transition phase. The information concerning the gravity of the accident, radiological situation of the impacted area, and risk assessment on public health was often inexplicit or simply not forthcoming. For example, NAIIC investigation revealed that the use of the term “core meltdown” had been systematically avoided by NISA officers at press conferences even though they were aware of such a fact.<sup>707</sup> The NISA spokesperson who had mentioned the possibility of “meltdown” in a press conference as early as on 13 March 2011 was quickly replaced by another spokesperson and NISA did not officially admit the fact until 6 June 2011, nearly three months after the accident.<sup>708</sup>

But the most notorious case of delayed or withheld communication was to do with the radiation simulation and monitoring data of the Fukushima release. The Japanese EP&R plan envisaged emergency protective actions – sheltering, evacuation, and iodine tablet intake – to be decided based on the dose projections made by the System for Prediction of Environmental Emergency Dose Information (SPEEDI, hereafter). The system had been developed by the Japan Atomic Energy Research Institute (JAERI)<sup>709</sup> under the Science and Technology Agency (STA, later integrated to MEXT) since the 1980s with an investment of 130 million euros, designed to predict the likely pathway of radioactive materials emitted from a damaged nuclear

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<sup>707</sup> NAIIC (n 20) (Chapter 3).

<sup>708</sup> *ibid.*

<sup>709</sup> JAERI will be merged to another STA-administered agency, Japan Nuclear Cycle Development Institute (JNC), and become Japan Atomic Energy Agency (JAEA) in 2005, following the Central Government Reform of 2001.

power plant by calculating the weather and geographical conditions of the concerned area.<sup>710</sup> From the first day of the accident, NISA (ERC) and MEXT officials started to use the SPEEDI to predict the pathway of radiation leaks from the crippled station. While NISA (ERC) had conducted 45 simulations on the Fukushima radioactive plume using SPEEDI between 11-16 March 2011,<sup>711</sup> only a few of them were actually sent to *Kantei* where evacuation plans of the residents were drawn. In fact, accident investigation reports found that executive members of the Cabinet including the Prime Minister had not been aware of the very existence or purpose of SPEEDI until 16-20 March (5-10 days later).<sup>712</sup>

Meanwhile, the SPEEDI results had been communicated to the US army as early as 14 March 2011 by the Japanese Foreign Ministry upon a specific request made by the US Embassy.<sup>713</sup> The US government seemed to know the Japanese nuclear emergency response system better than the Head of the State at the time. While the Prime Minister, the commander-in-chief of the emergency response, was not informed on the SPEEDI data, it had been directly transmitted to the Fukushima Prefectural Government on 12 March 2011 via 86 emails sent by the MEXT.<sup>714</sup> However, the Prefecture Government not only failed to communicate such information to the concerned municipalities but also deleted most of these emails. When interrogated by the investigation committee as to why the emails containing SPEEDI information had been deleted, Fukushima Prefecture officials simply explained: ‘these emails contained attachment files that were too heavy for our system to deal with’.<sup>715</sup> The SPEEDI

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<sup>710</sup> Shunji Matsuoka, *福島原発の失敗：事故対応過程の検証とこれからの安全規制 (The Failure of Fukushima Nuclear Power Station: Review of Disaster Response Process and Future Safety Regulation)* (Waseda University Press 2012).

<sup>711</sup> Most important emissions of radioactive substances from the Fukushima Daiichi reactors had occurred between 15-16 March 2011.

<sup>712</sup> Asahi Newspaper Special Reporting Unit (n 703); Rebuild Japan Initiative Foundation (n 134).

<sup>713</sup> Matsuoka (n 710) 38; Rebuild Japan Initiative Foundation (n 134) 176.

<sup>714</sup> NAHC (n 20).

<sup>715</sup> Asahi Shimbun, ‘福島県、拡散予測データ消去を謝罪 受信容量確保が理由 (Fukushima Prefecture Apologises for Deleting SPEEDI Data Due to Limited Data Stock Capacity)’ *Asahi Shimbun* (20 April 2012).

data was finally disclosed to the public a few months later when the public learned about the existence of SPEEDI data through media reports and started to accuse the government of hiding information. Interrogated as to why the disclosure of SPEEDI data took so long, the Special Advisor to the Prime Minister at the time, Goshi Hosono, responded in a press conference that according to NISA, MEXT and NSC, the data was not reliable due to the uncertainty of source terms and they wanted to *avoid causing panic* among the population by disclosing them.<sup>716</sup>

While the SPEEDI information was kept from the public (and the Prime Minister), MEXT dispatched a radiation monitoring team to the field as early as on 15 March, four days after the accident, following the pathway of radioactive plume predicted by the SPEEDI.<sup>717</sup> The team discovered high radiation doses spread in the areas outside the declared evacuation zones. For example, 330 microsieverts ( $\mu\text{Sv}$ ) per hour (the level which would reach 100 mSv in 13 days) was found in Namie town.<sup>718</sup> In other towns such as Iitate and Minamisoma, similarly high doses were detected in the areas that were not under evacuation orders. But these results were not immediately communicated to the concerned municipalities nor the residents. Meanwhile, the then Chief Cabinet Secretary Yukio Edano repeatedly stated in the press conference that radiation doses detected in these areas ‘are not at the level where immediate effects on the human body will occur’ without disclosing the dose data.<sup>719</sup> The residents of the concerned areas were thus left without such information and exposed to high levels of radiation

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<sup>716</sup> Cabinet Secretariat, ‘政府・東京電力統合対策室合同記者会見（平成 23 年 5 月 2 日）(The Government/TEPCO Joint Press Conference Held on 2 May 2011)’ (2 May 2011) <[http://www.cas.go.jp/jp/genpatsujiko/pdf/godokaiken\\_110502.pdf](http://www.cas.go.jp/jp/genpatsujiko/pdf/godokaiken_110502.pdf)> accessed 28 February 2023.

<sup>717</sup> Asahi Newspaper Special Reporting Unit (n 703) 61–62; Cabinet Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company, ‘Interim Report’ (n 134) 288.

<sup>718</sup> Asahi Newspaper Special Reporting Unit (n 703) 62; Cabinet Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company, ‘Interim Report’ (n 134) 288.

<sup>719</sup> Cabinet Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company, ‘Final Report’ (n 134) 332.

until the government finally decided to evacuate the areas one month later.<sup>720</sup> The NAIIC investigation report concluded that ‘the government effectively abandoned their responsibility to ensure the public safety’ in these instances.<sup>721</sup>

## **§2: Improvised Emergency Protective Actions**

Under this chaotic emergency management, protective actions were decided by different actors, *Kantei* (the Prime Minister and his advisors), the NSC, and the Fukushima Prefectural Governor, and communicated to the concerned municipalities for action. This paragraph examines how the core protective actions planned in the NSC Guide and other guidelines have been actually implemented in the Fukushima emergency. It looks into evacuation or sheltering (A), ITB intake (B), and the chosen reference level (C), and investigates the consequences of these protection measures on the affected population (D).

### **A. Chaotic Evacuation and Shelter-Indoors**

Evacuation and sheltering are the main emergency protection strategy envisaged in the EP&R plan. To trigger these measures, the NSC’s Nuclear Emergency Guideline suggested a dose band of 10-50 mSv without specifying the time frame nor the modus operandi of these measures. Municipalities were not equipped with any evacuation or shelter-indoors plans at the time of the accident. Under the pre-existing EP&R, the Local NERHQ located at Off-Site Centre would be tasked to define sheltering and evacuation zones, and upon a green light from NERHQ, to instruct concerned Mayors to issue evacuation orders to their residents. During the actual crisis, none of this functioned since the Local NERHQ was not established until the

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<sup>720</sup> In May 2013, Namie town filed a claim against TEPCO and the State at the Alternative Dispute Resolution (ADR) Centre established under the MEXT, demanding additional compensation for having caused unnecessary radiation exposure to its residents and other damages to their lives.

<sup>721</sup> NAIIC (n 20) 38; cited by Hasegawa, ‘Disaster Evacuation from Japan’s 2011 Tsunami Disaster and the Fukushima Nuclear Accident’ (n 42).

fourth day of the accident. In addition, the newly elected government members including the Prime Minister were unfamiliar with most of these procedures and legislations.<sup>722</sup> As a result, sheltering and evacuation measures were crafted on the spot by the Prime Minister and his advisors at *Kantei* in Tokyo with little knowledge of the pre-fixed procedures and little information on the accident and radiological situations. They improvised as the situation developed at the accident site.

During the emergency phase, a total of 10 evacuation/sheltering orders were issued by the *Kantei* and the Prefectural Governor. These evacuation zones were first determined upon the simple distance from the accident site without taking into account the radiological situation on the ground due to lack of such information. This is the first series of evacuation orders issued during the first two weeks following the accident. The second batch of evacuation orders was then emitted one month after the accident for the areas detected with high radiation doses. These zones were thus defined based on the radiological situation. None of these measures were prescribed in the pre-existing EP&R plan, which had estimated to evacuate only a limited area within the EPZ (8-10 km radius), and thus had to be newly invented by the *Kantei* and relevant authorities on the spot.

### 1. The First Evacuation Orders (11-25 March): Distance-Based

During the first two weeks of the accident, seven different evacuation and sheltering instructions had been issued from the authorities. In the absence of any instructions from the government, the Fukushima Prefectural Governor first took the initiative of issuing an evacuation order for the area of 2 km radius from the F1NPP on the first day of the accident.

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<sup>722</sup> Democratic Party of Japan (DPJ) won the general election in 2009 taking a large majority at the National Diet for the first time replacing the Liberal Democratic Party (LDP) which had dominated national politics since the end of World War II. The accident occurred just two years after this historic victory of DPJ. The new Cabinet led by Naoto Kan started only in June 2010, nine months before the accident.

Although the Governor does not have such jurisdiction prescribed in the law, his action was largely justifiable under the exceptional circumstance. The *Kantei* headed by the Prime Minister subsequently issued an evacuation order for the area of 3 km radius and a sheltering order to the area between 3-10 km radius, just 30 minutes following the Governor's order. On the second day (12 March) where the first hydrogen explosion occurred at one of the damaged reactors, the *Kantei* issued two more evacuation orders within 12 hours, at the 10 km radius area first and then at the 20 km radius. So, within a matter of 24 hours, the evacuation zone was enlarged from 2 km to 20 km radius.

When two more explosions occurred on 14-15 March, the government issued a sheltering order for the area between 20 km to 30 km radius, which remained effective for *10 days* without any further instructions,<sup>723</sup> after which the residents in the area were simply told to evacuate on their own or continue to shelter indoors (!). The NAIIC report severely criticised this government's action by stating that 'the government abandoned its responsibility to protect the lives and safety of the public' by leaving residents to decide for themselves whether or not to evacuate without providing any referential information as regards their safety.<sup>724</sup> The chronological list of evacuation and sheltering orders is shown in the table below (Table 10).

Table 10: Chronological List of Fukushima Evacuation Orders

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<sup>723</sup> Both ICRP and IAEA recommend that sheltering shall not last more than 48 hours. In the French EP&R plan, the duration of the sheltering measure is limited to a half day.

<sup>724</sup> NAIIC (n 20) Chapter 4, 6.

	Date	Time	Criteria	Measure
<b>Distance-Based</b>	11 March	15:42	<i>Accident occurs at the Fukushima Daiichi NPP</i>	
		20:50	2 km radius	Compulsory evacuation (by Fukushima governor)
		21:23	3 km radius	Compulsory Evacuation
			Between 3-10 km radius	Shelter indoors
	12 March	5:44	10 km radius	Compulsory Evacuation
		18:25	20 km radius	Compulsory Evacuation
	15 March	11:01	Between 20–30 km radius	Shelter indoors
	25 March		Between 20–30 km radius	Evacuation “on their own”
<b>Radiation-Based</b>	21 April		20 km radius	Designated as <b>Restricted Area</b> (Prohibited Entry)
	22 April		Areas with dose value over 20 mSv/year	<b>Deliberate Evacuation Area</b> (Evacuate within 1 month)
			Area between 20-30 km radius excluding Iwaki city	Renamed as <b>Evacuation Prepared Area</b>
	16 June		Spots beyond 30 km radius with dose value over 20 mSv/year	Evacuation recommended

However, some of these initial evacuation orders were not actually informed to the municipalities concerned. The NAIIC survey revealed that none of the municipalities, except two host towns of the damaged plant, were informed of the first instructions. This happened because the *Kantei*, the Fukushima prefectural government, and the affected municipalities could not establish a proper communication channel in the beginning of the crisis due to power cuts and telecommunication breakdowns caused by the earthquake and tsunami. Under the

circumstances, Mayors took their own initiatives to evacuate their residents.<sup>725</sup> For example, Naraha town who hosts the Fukushima Daiini (No.2) NPP had decided to evacuate all residents based on the information provided by TEPCO employees of the F2NPP before the *Kantei* issued an order.<sup>726</sup> Katsurao village had also instructed all residents to evacuate 11 days before the government's instruction.<sup>727</sup>

The distance-based initial orders affected a total of 12 municipalities (entire or a part of their territories) - Futaba, Okuma, Namie, Tomioka, Minamisoma, Naraha, Kawauchi, Tamura, Katsurao, Hirono, Iwaki and Iitate – and their 110,000 inhabitants (see Figure 8 below).<sup>728</sup>

Without a proper evacuation plan or preparation, most residents were left on their own to figure out and improvise their own evacuation using their own cars (if they were lucky enough to have some fuels left in the tank). This created a gigantic traffic jam on the route and delayed the whole evacuation process. Moreover, as the evacuation zone was expanded from 2km to 30 km radius in a matter of four days, the residents were forced to evacuate multiple times from one place to another with scant information about what happens next. The NAIIC survey found that 20 per cent of the residents indeed moved more than six times from one shelter to another. Moreover, at the time of evacuation, they were so poorly informed on the gravity of the accident and the risk of radiation exposure that they left their homes without taking any extra clothes, food, administrative papers or money, thinking that it would be a

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<sup>725</sup> NAIIC (n 20).

<sup>726</sup> Hasegawa, 'Disaster Evacuation from Japan's 2011 Tsunami Disaster and the Fukushima Nuclear Accident' (n 42).

<sup>727</sup> NAIIC (n 20).

<sup>728</sup> Source: Supporting document (5-1) to the First Dispute Reconciliation Committee for Nuclear Damage Compensation held on 15 April 2011 in MEXT, which can be found (in Japanese only) at [http://www.mext.go.jp/b\\_menu/shingi/chousa/kaihatu/016/attach/\\_icsFiles/afieldfile/2011/04/18/1305143\\_1.pdf](http://www.mext.go.jp/b_menu/shingi/chousa/kaihatu/016/attach/_icsFiles/afieldfile/2011/04/18/1305143_1.pdf), consulted on 15 September 2019.



matter of three or four days before they could return home.<sup>729</sup> In some cases, they evacuated without knowing why they had to evacuate in the first place. According to the same survey, 80 per cent of the residents did not even know that an accident had occurred at F1NPP on the first day.<sup>730</sup> In this chaos, some residents also fled to the areas where radiation dose was higher than their original place of residence because they were not informed of the MEXT's radiation monitoring result or the SPEEDI information, as described earlier, and stayed in the highly contaminated areas until they were also designated as evacuation zone more than a month later.

## 2. The Second Evacuation Orders (April to June 2011): Radiation-Based

More than a month following the accident, the government issued another series of evacuation orders based on the radiation level on the ground. The government chose the effective dose level of 20 millisievert per year (20mSv/year) from external radiation exposure as a threshold criterion to designate new evacuation zones. This is in fact inconsistent with the ICRP/IAEA recommendations which calculate the effective dose from both external and internal exposures. From this decision onwards, 20 mSv/year which only accounts for external exposure dose became the reference level that guided all the post-accident policies. This new evacuation zone is called Deliberate Evacuation Area where the residents were instructed to evacuate within one month. The Deliberate Evacuation Area was spread over four towns, Namie, Minamisoma, Iitate and Kawamata. Kawamata town was added for the first time in the evacuation zones (see Figure 8 below). At the same time, the government designated the area within the 20 km radius from the F1NPP station (already an evacuation zone) as a Restricted Zone to which entry was strictly prohibited. Also, the area between 20 to 30 km radius (former sheltering/self-evacuation zone) was renamed as Evacuation Prepared Area (see Figure 8

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<sup>729</sup> Hasegawa, 'Disaster Evacuation from Japan's 2011 Tsunami Disaster and the Fukushima Nuclear Accident' (n 42).

<sup>730</sup> NAHC (n 20) 52.

below). With the new instructions, the evacuation zone was formally divided into three areas: Restricted Zone (within 20 km radius), Evacuation Prepared Area (between 20-30 km radius), and Deliberate Evacuation Area (more than 20 mSv/year). This made the total number of affected municipalities to 12 and that of affected residents to 146,000.<sup>731</sup>

But why did the government take more than one month before evacuating the population from these highly contaminated areas despite the fact that it had already known the existence of such areas since mid-March? Indeed, the first MEXT's radiation monitoring mission detected several contamination spots outside the evacuation zone as early as on 16 March 2011. Moreover, the IAEA had advised the Japanese government to evacuate Iitate village (outside the then evacuation zone) on 30 March when the IAEA mission team discovered the radiological contamination of soil which exceeded IAEA's criteria for evacuation from the soil samples taken in the village.<sup>732</sup> In spite of this, the NERHQ did not issue the evacuation order until 22 April. The Parliamentary investigation on the accident revealed that this was mainly due to the oppositions expressed by the Fukushima Prefecture and the Mayor of Iitate village who did not want to expand the evacuation zone in his prefecture or his village (beyond the 30 km radius from the troubled power plant).<sup>733</sup> They were worried that such expansion would create "unnecessary confusion" and panic among Fukushima and Iitate inhabitants.<sup>734</sup> These attitudes of the central and local authorities suggested, as the NAIIC report concluded, that the safety of the citizens was not their top priority in the Fukushima nuclear emergency response. Then, what would it be? The following sub-paragraphs (C and D) attempt to find the

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<sup>731</sup> Source: The Supporting Document (5-1) to the First Dispute Reconciliation Committee for Nuclear Damage Compensation held on 15 April 2011 in MEXT, which is found at (in Japanese only) <[http://www.mext.go.jp/b\\_menu/shingi/chousa/kaihatu/016/attach/\\_icsFiles/afeldfile/2011/04/18/1305143\\_1.pdf](http://www.mext.go.jp/b_menu/shingi/chousa/kaihatu/016/attach/_icsFiles/afeldfile/2011/04/18/1305143_1.pdf)>, consulted 1 February 2023.

<sup>732</sup> NAIIC (n 20); IAEA website, 'Fukushima Nuclear Accident Update Log' at <https://www.iaea.org/newscenter/news/fukushima-nuclear-accident-update-log-45>, consulted on 9 December 2019.

<sup>733</sup> *ibid* Chapter 4, 26.

<sup>734</sup> *ibid* Chapter 4, 26.

answers to this question. In the end, the Deliberate Evacuation Zone was designated by the government despite these oppositions on 22 April, one month after the accident.

Three months following the accident, the government issued a new type of evacuation measure called “radiation hotspots” based on the reference level of 20 mSv/year. These hotspots are officially called Specific Spots Recommended for Evacuation, a newly invented measure which did not exist in the NSC’s guideline. The measure was created after the MEXT’s radiation monitoring team discovered more areas contaminated by the radiation fallout outside the evacuation zones in June 2011.<sup>735</sup> According to the internal documents disclosed upon the request from Date city residents in December 2014, the concept of hotspots was born out of a negotiated compromise among the government, Fukushima Prefecture and the concerned municipality who were all reluctant to issue an evacuation order to these areas, thus further expanding the evacuation zone.<sup>736</sup> The designation of hotspots is thus not an evacuation order but a recommendation for evacuation, which does not oblige the family to evacuate, leaving such choice to respective households.<sup>737</sup> In fact, the hotspots are individual houses detected with an ambient radiation dose that exceeds 20mSv/year. Once recognised as a hotspot by the government, the family living in the house became eligible for financial compensation if they choose to evacuate. A total of 260 hotspots were recognised in three municipalities: 117 in Date

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<sup>735</sup> Source: The response of the Prime Minister to the question asked by a member of the House of Representatives, Taro Kimura, who inquired on the criteria and procedure involved in designating the hotspots on 22 August 2011. For the inquiry, see the website of the House of Representatives at <[http://www.shugiin.go.jp/internet/itdb\\_shitsumon.nsf/html/shitsumon/a177412.htm](http://www.shugiin.go.jp/internet/itdb_shitsumon.nsf/html/shitsumon/a177412.htm)> consulted 1 February 2023. For the answer from the Prime Minister, see the same website at <[https://www.shugiin.go.jp/internet/itdb\\_shitsumon.nsf/html/shitsumon/b177412.htm](https://www.shugiin.go.jp/internet/itdb_shitsumon.nsf/html/shitsumon/b177412.htm)> consulted 1 February 2023

<sup>736</sup> The document is available on the website of a NPO, Clearing House for Information Disclosure (only in Japanese) at <<http://clearinghouse.main.jp/web/cao0005.pdf>> consulted 1 February 2023.

<sup>737</sup> According to the same declassified document (ibid), the government was extremely careful in crafting and naming this measure so as to differentiate it from the evacuation order prescribed under the Nuclear Emergency Act. The measure was basically formulated as a support package and not as an administrative measure based on laws. As such, the government’s responsibility for the hotspots residents is not the same as that for those under evacuation orders.

city, 142 in Minamisoma city, and 1 in Kawauchi village. Date city was thus the 13<sup>th</sup> municipality to be affected by the government's evacuation measure. However, the designation of hotspots in fact depended a lot on the initiative of Mayors.<sup>738</sup> For example, Fukushima city also found 9 spots (houses) with doses of more than 20 mSv/year in June, but they were not officially recognised as hotspots because the city refused to designate hotspots despite the plea from its residents.<sup>739</sup> The case of Fukushima city will be further examined in the following paragraph (D).

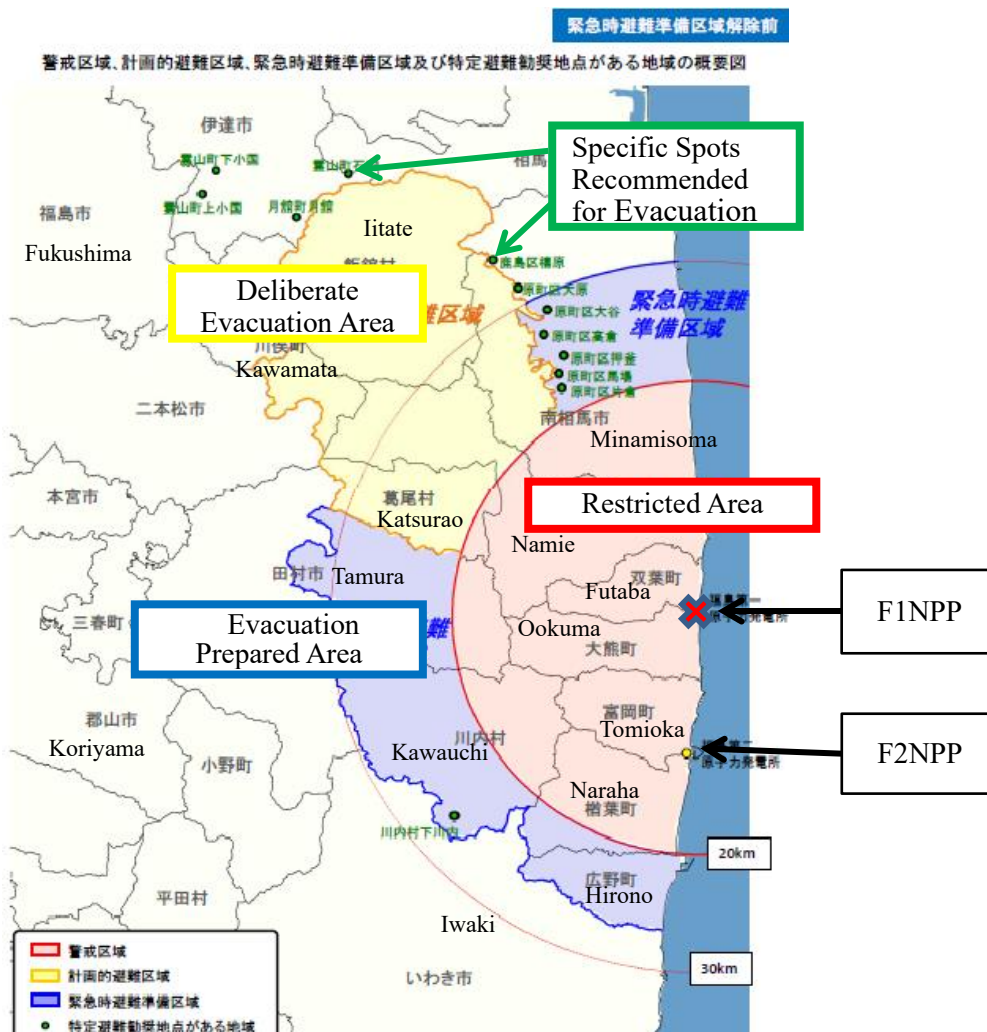
In summary, during the emergency phase, four different types of evacuation zones (or measure) were defined by the Japanese government: Restricted Zone (within 20 km radius), Evacuation Preparation Area (between 20-30 km radius), Deliberate Evacuation Zone (more than 20 mSv/year), and Radiation Hotspots (more than 20 mSv/year) (see Figure 8 below). A total of 13 municipalities had been affected by them. In September 2011, the evacuation order for Evacuation Preparation Area (between 20-30 km radius) was lifted by the government, thus leaving only the Restricted Area and the Deliberate Evacuation Area as evacuation zones and the Hotspots as a special evacuation measure.

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<sup>738</sup> Fassert and Hasegawa (n 42).

<sup>739</sup> Masaru Shimizu, '避難勧奨地点 指定基準にばらつき 住民「納得できない」 (“Not Convinced”, Residents Complains the Incoherent Criteria for the Designation of Hotspots)' *Mainichi Shimbun* (4 November 2011). Also, see the press release of an environmental NGO, Friends of the Earth, published on 9 September 2011, who participated in a meeting between Fukushima city officials and the residents to discuss about the designation of hotspots (only in Japanese) at <[http://www.foejapan.org/energy/news/pdf/110921\\_1.pdf](http://www.foejapan.org/energy/news/pdf/110921_1.pdf)> consulted 1 February 2023

Figure 8: Map of Fukushima Evacuation Zones (11 March-30 September 2011)<sup>740</sup>



## B. Failed Iodine Intake

The Iodine tablet intake is another core emergency protective action prescribed in the Japanese nuclear EP&R plan. In the NSC’s Nuclear Emergency Guide, ITB intake was recommended for persons under 40 years old with the dose criterion of 100 mSv equivalent dose to childhood thyroid. Just like the decision on evacuation, the implementation of the ITB

<sup>740</sup> Source: METI

intake was supposed to be determined and implemented by the Local NERHQ upon an approval from the NERHQ.

Two days following the accident (13 March 2011), the Nuclear Safety Commission (NSC) advised the ERC to administer stable iodine tablets for residents who were still inside the 20 km radius from the troubled power station (the evacuation zone). The ERC sent this advice to the Local NERHQ on the next day, but the Local NERHQ was busy relocating to the Prefectural Office building that day and could not take any actions. Finally on 16 March, five days after the accident, the Local NERHQ gave instruction to the Fukushima prefectural government but the Prefecture became aware of the existence of such instruction only on 18 March.<sup>741</sup> By that time, it was too late to take the ITB tablet as the massive radiation release had already occurred a few days earlier on 15 March. According to the Fukushima nuclear emergency guideline, the Prefectural Governor also had the authority to instruct the administration of iodine tablets for residents, either on their own judgement or under the instruction from NERHQ.<sup>742</sup> The Governor finally did not instruct the ITB intake to the concerned municipalities and residents despite the fact that these municipalities had all sufficient stock of stable iodine tablets in their Municipal Offices. The NAIIC report evoked the responsibility of the Governor for the failed implementation of the ITB in the Fukushima emergency.

In the absence of instruction from the Governor or the Local NERHQ, some municipalities took their own initiatives to implement the measure. For example, Miharu town, situated 50 km from the crippled nuclear station, decided to administer the iodine tablets to residents on 15 March without any instruction from the government or the prefecture.<sup>743</sup> When

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<sup>741</sup> NAIIC (n 20) Chapter 4, 80-81.

<sup>742</sup> *ibid* Chapter 4, 80.

<sup>743</sup> NAIIC (n 20).

the Fukushima prefectural government found out about it, it issued an order to Miharu town officials to suspend the administration and recall the tablets by insisting that no such instruction had been given by the NERHQ. Miharu town finally decided to ignore the order and go ahead with implementation. Three other municipalities, Tomioka, Futaba and Okuma, did the same thing, some of whom implemented it as early as 12-13 March. As a result, except for these exceptional cases, the Fukushima residents at risk of exposure could not take iodine tablets to protect themselves due to the miscommunication and the inaction of the central and prefectural authorities.

### **C. Reference Level of 20 mSv/year and the Controversy**

The most controversial post-Fukushima policy decided by the Japanese government is unmistakably the reference dose of 20 mSv/year. According to the Japanese legislation and international radiological protection norms, the dose level represents 20 times the public dose limit and equal to the dose limit fixed for workers. In fact, such a reference level was first chosen by the MEXT to apply to schools in the Fukushima Prefecture. When the Prefecture asked the NERHQ for advice on reopening schools after the accident, MEXT issued a notice ‘Provisional View on the Use of School Building and Schoolyards, etc. in Fukushima Prefecture’ on 19 April, suggesting that : 1) schools detected with *external* exposure doses of more than 20 mSv/year can still open the school by limiting the children’s outdoor activities to less than one hour per day; 2) schools detected with external exposure doses below 20 mSv/year can operate normally.<sup>744</sup> In other words, the Ministry of Education judged the dose level below 20 mSv/year “safe” for children while it still allows children to go to school where they may be exposed to more than 20 mSv/year radiation dose as long as outdoor activities are limited.

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<sup>744</sup> MEXT, ‘福島県内の学校の校舎・校庭等の利用判断における暫定的考え方について (Provisional View Regarding the Use of School Buildings and Schoolyards in Fukushima Prefecture)’ (n 29).

The first point of controversy is that this policy ultimately allows children to be exposed to more than 20 mSv/year radiation dose in schools while the areas detected with such dose levels were instructed to evacuate under government orders. It represented a major policy incoherence with the government's evacuation policy as well as from the standpoint of radiation protection for children who are generally more sensitive to radiation effects than adults. In fact, a total of 43 schools located outside the evacuation zones were detected with dose levels exceeding 20 mSv/year and 414 schools with more than 10 mSv/year radiation doses in Fukushima Prefecture at the time.<sup>745</sup> Many of them were situated in Fukushima city, the Prefectural capital.

Secondly, the dose level of 20 mSv/year was in fact decided against the advice from the Nuclear Safety Commission. The NAIIC investigation revealed that MEXT had sought advice from the NSC on the choice of the reference level for school opening. The NSC specifically recommended that: 1) the 20 mSv/year benchmark 'should be used on a limited basis'; 2) the reference dose should account for both internal and external exposure doses; and 3) from these points, the level should be set around *10 mSv/year*.<sup>746</sup> Despite this specific advice, MEXT went ahead with its original idea of 20 mSv/year. The NAIIC report thus concluded that '(d)oubts remain about the extent to which MEXT considered the health and safety of children' in this case.<sup>747</sup>

### 1. The Real Motives Behind the 20 mSv/year Reference Level

But why was MEXT stubbornly fixated on 20 mSv per year? To answer this question, the Cabinet accident investigation reports shed some light. According to its investigation,

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<sup>745</sup> NAIIC (n 20) Chapter 4, 99.

<sup>746</sup> *ibid* Chapter 4, 98.

<sup>747</sup> *ibid* Chapter 4, 99.



MEXT had two major preoccupations at that time. First, the Ministry was extremely sensitive to on-going internal discussions of NERHQ concerning the reference dose level to issue additional evacuation orders, which finally came out three days after the MEXT's notice for school opening for Fukushima Prefecture. Secondly, the Ministry was being extremely careful not to make a false step with the newly appointed Fukushima Prefecture Radiation Health Risk Advisor, Shunichi Yamashita, who had explained to the population earlier that the dose below 100 mSv did not affect health nearly at all.<sup>748</sup> In addition, Fukushima Prefecture was reported to be very hostile to the idea of school closures. According to the Prefecture, such closures would give the impression that Fukushima was a dangerous place to live, in which case 'the prefectural survival would be under threat'.<sup>749</sup> From these accounts, the primal concern of the Ministry and the Prefecture was not so much about public health or the safety of children, but the political face-saving and the survival of the Prefecture.

There were other motives behind the decision of the 20 mSv/year dose level, shown by media reports. For example, *Asahi Shimbun*<sup>750</sup> reported that the then Minister of State for Nuclear Emergency Management and Preparedness, Goshi Hosono, had once suggested the reference dose of 5 mSv/year to replace the 20 mSv/year level in one of the internal meetings among Cabinet members in October and November 2011, six months after the MEXT's decision.<sup>751</sup> But such a proposal had been finally rejected by other members of the Cabinet who worried that the 5 mSv/year reference dose would increase the number of evacuees and associated compensation payments. Indeed, a simulation exercise conducted by the French

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<sup>748</sup> Medical Professor at Nagasaki University, Shunichi Yamashita, was appointed by the Fukushima Governor as the Fukushima Radiation Health Risk Advisor as early as 19 March 2011. During the public lecture given on 21 March 2011 in Fukushima city, he stated the following: 'Radiation does not affect those who smile. It affects anxious people. This fact has been scientifically proven by animal testing'. 'People who drink alcohol have less radiation effect'. He faced many criticisms and protests from Fukushima residents afterwards.

<sup>749</sup> Yoichi Funabashi, *Countdown to Meltdown*, vol 2 (Bungei-Shunshu 2012) 366.

<sup>750</sup> One of the major national newspapers in Japan. Others are *Yomiuri Shimbun*, *Mainichi Shimbun*, and *Nikkei* (Japan Economic News

<sup>751</sup> Sekine (n 35).

IRSN in May 2011 showed that if the Japanese government had chosen the threshold of 10 mSv/year instead of 20 mSv/year, it would have displaced 70,000 more people in Fukushima.<sup>752</sup> Some scholars also suggested that the 20 mSv/year was selected in order to avoid evacuating the key cities of Fukushima Prefecture such as Fukushima city and Koriyama city for economic and symbolic reasons. Tomoya Yamauchi, a professor of radiation physics at Kobe University, who had conducted radiation measurements in Fukushima city upon the request of its residents, expressed his view as to why radiation hotspots had not been officially recognised in the city during an interview:

I basically think that this is because the government had chosen the economy over the protection of citizens [...] in its post-accident policies [...]. Fukushima city is the capital of the prefecture. It is symbolic. You can't evacuate the capital city without recognising the significance of accident consequences.<sup>753</sup>

Yet, these political and economic calculations for choosing the reference dose are not completely surprising when one reads again the NSC's Emergency Guide. As shown in the previous section, the Guide emphasises that protective actions shall not be determined solely on the basis of contamination levels but by considering other factors such as the feasibility of the measures, the associated risks, *the scale of population affected by the measures*.<sup>754</sup> Moreover, this NSC's view is largely shared by international nuclear and radiation authorities. It indeed reflects the justification and optimisation principles of radiation protection. In this respect, the Japanese government's actions were in conformity with the normative framework of international nuclear regulations. Indeed, the IAEA endorsed the Japanese 20 mSv/year dose

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<sup>752</sup> IRSN, 'Evaluation Au 66eme Jour Des Doses Externes Projetées Pour Les Populations Vivant Dans La Zone de Retombée Nord-Ouest de l'accident Nucléaire de Fukushima - Impact Des Mesures d'évaluation Des Populations' (Institut de radioprotection et de sûreté nucléaire 2011) Rapport DRPH/2011-10.

<sup>753</sup> Fassert and Hasegawa (n 42) 45, 94.

<sup>754</sup> NSC, '原子力施設等の防災対策について (Regulatory Guide: Emergency Preparedness for Nuclear Facilities)' (n 593) 23. (emphasis added)

reference in the 2014 Fukushima mission report by stating that ‘in remediation situations, any level of individual radiation dose in the range of 1 to 20 mSv per year is acceptable and in line with the international standards and with the recommendations from the relevant international organisations, e.g. ICRP, IAEA, UNSCEAR and WHO’.<sup>755</sup>

## 2. Controversies and Criticisms

The dose policy of 20 mSv/year sparked vivid controversies and protests not only from the affected communities but also the scientific community in Japan. The most spectacular example of such protests came from a government insider, Special Advisor to the Cabinet on radiological protection issues, Toshiso Kosako, who resigned the post in a televised press conference on 30 April 2011, protesting in tears against the government’s decision to apply 20mSv/year reference level to children in Fukushima. In the press conference, he stated:

It is completely wrong to use such a standard for schools that are going to run a normal school curriculum in which case a standard similar to usual radiation protection measurement (1mSv per year, or even in exceptional cases, 5mSv) ought to be applied [...]. We have to note that it is very rare even among the occupationally exposed persons (84,000 in total) to be exposed to radiation dose of 20mSv per year. I cannot possibly accept such a level to be applied to babies, infants and primary school students, not only from my scholarly viewpoint but also from my humanistic beliefs.<sup>756</sup>

Kosako also criticised the government’s “utter disregard” for laws, guidelines and manuals regarding the EP&R in devising the Fukushima emergency protective actions and its “short-

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<sup>755</sup> IAEA, ‘Final Report: The Follow-Up IAEA International Mission on Remediation of Large Contaminated Areas Off-Site the Fukushima Daiichi Nuclear Power Plant, Tokyo and Fukushima Prefecture, Japan 14-21 October 2013’ (IAEA 2014) NE/NEFW/2013 11.

<sup>756</sup> His speech at the press conference, translated in English by Tanaka Izumi, is available on the website of The Asia-Pacific Journal “Japan Focus”, available at <<http://japanfocus.org/events/view/83>> consulted 2 February 2023

sighted” policymaking and “flexible responses”.<sup>757</sup> Also, he qualified the actions of the NSC “insufficient to a considerable degree”, not playing the assumed role as a guardian of lawful procedures and established norms on radiological protection.

In fact, Kosako’s view on the 20 mSv/year benchmark was shared by the majority of radiation experts in Japan. The survey conducted among radiation experts before the accident indeed showed that the “safe” dose considered for children was on average 8.5 mSv/year, in which a half of the respondents chose the dose less than 1 mSv/year.<sup>758</sup> From this survey result, the authors of the study thus concluded that applying the 20 mSv/year dose criterion for children was not acceptable for 50-90% of radiation experts in Japan.

The national lawyers’ federation, Japan Federation of Bar Associations (JFBA), and the national doctors’ association, Japan Medical Association, both issued statements urging the government to carefully reconsider the choice of dose level by taking into account the fact that children were more sensitive to radiation exposure.<sup>759</sup> The JFBA expressed serious concerns that such a dose level represented 20 times the public dose limit and four times the dose criteria for Radiation Controlled Area (RCA) regulated by the MHLW’s Ordinance on the Prevention of Ionizing Radiation Hazards and other regulatory texts. It notably stated that ‘easing the radiation standard in the midst of an accident compromises the safety of the citizenry’.<sup>760</sup>

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<sup>757</sup> *ibid*

<sup>758</sup> Miwa Miura and others, ‘Radiation Risk Perception by Radiation Professionals - Survey Results Just before the Radiological Accident at the Tokyo Electric Power Company Fukushima Daiichi Nuclear Power Plant’ (2013) 12 *Japanese journal of radiation safety management* 46.

<sup>759</sup> Japan Medical Association, ‘文部科学省「福島県内の学校の校舎・校庭等の利用判断における暫定的考え方」に対する日本医師会の見解 (The Opinion of the Japan Medical Association on the MEXT’s “Provisional View on the Use of School Building/Schoolyard, Etc. in Fukushima Prefecture”)’ (2011) 12 May 2011 <[http://dl.med.or.jp/dl-med/teireikaiken/20110512\\_31.pdf](http://dl.med.or.jp/dl-med/teireikaiken/20110512_31.pdf)> accessed 2 February 2023; JFBA, ‘Statement Concerning the Government’s “Provisional Guideline for the Utilization of School Buildings, Grounds, and Related Facilities in Fukushima Prefecture”’ (Japan Federation of Bar Associations 2011) 22 April 2011 <<https://www.nichibenren.or.jp/en/document/statements/20110422.html>> accessed 2 February 2023.

<sup>760</sup> JFBA, ‘Statement Concerning the Government’s “Provisional Guideline for the Utilization of School Buildings, Grounds, and Related Facilities in Fukushima Prefecture”’ (n 759).

Referring also to the example of the Chernobyl Law adopted by the former Soviet authorities after the 1986 Chernobyl accident, which notably fixed the reference dose at 5 mSv/year to relocate the affected population, the JFBA urged the government to reduce the reference dose level to 5 mSv/year and apply the dose limit of 1 mSv/year at least for children, pregnant women and their families.<sup>761</sup>

The 20 mSv/year policy also triggered a public protest, rarely seen in Japan. On 23 May, 650 persons including 70 parents from Fukushima Prefecture gathered in front of the MEXT building and handed a written demand to the Minister to retract this policy.<sup>762</sup> As a response, MEXT published a reviewed policy paper on 27 May which simply announced a budget increase for decontamination of schools and a distribution of more Geiger counters but did not ultimately change the reference dose level of 20 mSv/year.<sup>763</sup>

Protests against the 20 mSv/year also became legal actions. They are two group actions which specifically contest the legal validity of such a dose level: one brought by 201 parents in June 2015 to Fukushima District Court, so-called ‘Group Action Against Radiation Exposure of Children’<sup>764</sup>, and the other filed by 808 residents of Minamisoma city in April 2015, so-called

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<sup>761</sup> JFBA, ‘東京電力第一、第二原子力発電所事故における避難区域外の避難者及び居住者に対する損害賠償に関する指針についての意見書 (Opinion Paper in Relation to the Guideline on Damage Compensation for the Evacuees and Residents in Out-of-Zone Areas in the Context of the TEPCO Fukushima Daiichi and Daini Nuclear Power Plant Accidents)’ (Japan Federation of Bar Associations 2011) 24 November 2011 <<https://www.nichibenren.or.jp/document/statement/year/2011/111202.html>> accessed 2 February 2023; JFBA, ‘「被災者生活支援等施策の推進に関する基本的な方針 (案)」に関する会長声明 (President’s Statement Regarding “The (Draft) Basic Framework Regarding the Promotion of Disaster Victims Life Support Measures”)’ (n 34); JFBA, ‘避難住民の帰還に当たっての線量基準に関する会長声明 (President’s Statement Regarding the Dose Standard for the Return of Evacuees)’ (n 34).

<sup>762</sup> OurPlanet-TV (n 31).

<sup>763</sup> MEXT, ‘福島県内における児童生徒等が学校等において受ける線量低減に向けた当面の対応について (Provisional Measures to Reduce Radiation Doses Received by Children and Students at Schools, Etc. in Fukushima Prefecture)’ (Japan Ministry of Education, Culture, Sports, Science and Technology 2011) 27 May 2011 <[https://www.mext.go.jp/a\\_menu/saigaijohou/syousai/1306590.htm](https://www.mext.go.jp/a_menu/saigaijohou/syousai/1306590.htm)> accessed 2 February 2023.

<sup>764</sup> Translation of 子ども脱被ばく裁判 by R. Hasegawa. The website of the plaintiff’s team (Japanese only) <<https://fukushima-sokaisaiban.blogspot.com/>> accessed 28 March 2023

‘Group Action Against the 20 mSv/year’<sup>765</sup>. Both actions demand the retraction of government measures decided on the basis of the 20 mSv/year dose reference. The legal arguments of the plaintiff and court decisions of these actions will be analysed in detail in the next Part (Part Two Title II Chapter 1).

Facing growing criticism, the government tried to justify the choice of the 20 mSv/year level by referring to international norms established by the UNSCEAR, ICRP and IAEA. Notably, it established the Working Group on Risk Management of Low-Dose Radiation Exposure under the Cabinet Secretary in November 2011 by appointing radiation experts from NIRS, RERF, Nagasaki University, and Fukushima Medical University, those who had been regularly consulted by the government on radiological matters even before the accident. The Working Group produced a report in December 2011, which basically validated the government’s decision by stating that the ‘risk of cancer development from radiation at levels of 100 mSv or lower is considered so slight *according to international consensus* that such risk is concealed by carcinogenic effects from other causes (e.g. smoking, obesity, unbalanced diet, etc)’.<sup>766</sup> This is typically the viewpoint of the threshold model on low-dose risk, which opposes the LNT model adopted by the ICRP, the IAEA, and other nuclear regulators. According to the standpoint of the Working Group, the reference dose of 20 mSv/year poses almost no threat since the risk arising from ‘radiation at levels of 100 mSv or lower’ is ‘so slight’.

The 20mSv/year principle, once it was affirmed by the Working Group, became *de facto* an authority or a doctrine dictating all the post-accident protection measures including the

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<sup>765</sup> Translation of 南相馬・避難 20 ミリシーベルト基準撤回訴訟 by R. Hasegawa. The website of the plaintiff’s team (Japanese only) <<http://minamisouma.blogspot.com/>> accessed 28 March 2023

<sup>766</sup> Cabinet Secretariat (n 36) 5. Emphasis added.

compensation policy, which has never been reviewed until today, more than 10 years after the accident.

#### **D. Major Consequences: “Voluntary” Evacuation and Forced Immobility**

These Fukushima emergency response policies produced two major consequences on the population: displacement (1) and forced immobility (2).

##### **1. Two Types of Displacements**

One of the distinctive aspects of nuclear disaster displacement is that it produces two patterns of movements: *mandatory* evacuation of residents under government’s orders, and *spontaneous* evacuation of residents without evacuation orders.<sup>767</sup> The number of evacuees is one good indicator. In fact, more than one year after the accident, the number of evacuees increased instead of decreased in Fukushima. Reported as 146,000 in April 2011,<sup>768</sup> the number of evacuees in/from Fukushima recorded an all-time high in June 2012, more than one year after the disaster, reaching 163,000.<sup>769</sup> The main cause of this phenomenon is to do with “voluntary” evacuation.<sup>770</sup> Also called self-evacuation or out-of-zone evacuation, this is the pattern of displacement most frequently observed in the *Naka-dori* area of Fukushima Prefecture where two major cities, Fukushima city and Koriyama city, are located. Despite the distance of 50-60 km from the damaged power plant, these cities were significantly affected by

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<sup>767</sup> Hasegawa, ‘Disaster Evacuation from Japan’s 2011 Tsunami Disaster and the Fukushima Nuclear Accident’ (n 42); Hasegawa, ‘Returning Home after Fukushima: Displacement from a Nuclear Disaster and International Guidelines for Internally Displaced Persons.’ (n 42).

<sup>768</sup> Source: The Supporting Document (5-1) to the First Dispute Reconciliation Committee for Nuclear Damage Compensation held on 15 April 2011 in MEXT, which is found at (in Japanese only) <[http://www.mext.go.jp/b\\_menu/shingi/chousa/kaihatu/016/attach/\\_icsFiles/afieldfile/2011/04/18/1305143\\_1.pdf](http://www.mext.go.jp/b_menu/shingi/chousa/kaihatu/016/attach/_icsFiles/afieldfile/2011/04/18/1305143_1.pdf)> consulted 1 February 2023.

<sup>769</sup> Source: Reconstruction Agency <<http://www.reconstruction.go.jp/topics/120613hinansya.pdf>>

<sup>770</sup> Many official documents refer to these displaced residents as “voluntary” evacuees. But the field interview with some of them found that their evacuation had been far from voluntary. They felt obliged to leave their towns under the threat of radiation exposure to protect their children in the absence of government’s protection measures. See Hasegawa, ‘Disaster Evacuation from Japan’s 2011 Tsunami Disaster and the Fukushima Nuclear Accident’ (n 42).

radioactive fallout from the accident (See the Figure 6 above). Radiation doses in this area sometimes reached as high as or higher than those detected within evacuation zones. Despite such a level of contamination, *Naka-dori* residents were told by the authorities to stay put since the doses did not exceed the reference value of 20 mSv, thus considered “safe” to live. Under the circumstance, some families who were not reassured by the government’s dose criterion decided to flee of their own accord, most often, in order to protect their children from radiation exposure. Many of these evacuees consisted of mothers with small children, leaving behind their husbands to work so as to keep their household income.<sup>771</sup> Most often, they were the families who had financial means, family support (esp. from grandparents), relatives outside Fukushima, or sensitivity toward environmental risks.<sup>772</sup>

These *kuiki-gai* (out-of-zone or outside-zone) evacuees,<sup>773</sup> however, were not properly recognised as accident victims by the authorities and as a result, rarely counted in official statistics. We can only estimate the number from statistical gaps of various official reports. When Fukushima Prefecture and the Reconstruction Agency<sup>774</sup> reported the number of evacuees from Fukushima Prefecture as 163,000 in June 2012, NERHQ announced the number

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<sup>771</sup> In Japan where traditional values are still upheld in the society, many women are housewives principally taking care of children and men are often the breadwinner of the household.

<sup>772</sup> Hasegawa, ‘Disaster Evacuation from Japan’s 2011 Tsunami Disaster and the Fukushima Nuclear Accident’ (n 42); Masahito Takahashi, ‘自主避難者の社会的・心理的特性—放射線恐怖症という「誤解」 (Social and Psychological Characteristic of Self-Evacuees: “Misunderstanding” of Radiophobia)’ in Institute of Disaster Area Revitalization (Kansai Gakuin University), JCN and SAFRAN (eds), *原発避難白書 (White Paper on Nuclear Evacuation)* (Jinbun Shoin 2015). It is also based on the result of field interviews conducted with residents and out-of-zone evacuees from the *Naka-dori* region during 2012-2018. Notwithstanding, Takahashi’s research did not establish the correlation between families’ income level and the “voluntary” evacuation.

<sup>773</sup> Criticised as discriminatory, the authorities have slowly changed the term from “voluntary evacuees” or “self-evacuees” to a more neutral “*kuiki-gai* (out-of-zone) evacuees”. This doctoral research also uses this latter term to describe these evacuees.

<sup>774</sup> The special government agency was created in 2012 with a 10-year mandate following Japan’s 2011 disaster, dedicated to the reconstruction of the Tohoku region affected by the earthquake, the tsunami and the nuclear accident.



of evacuees under evacuation orders as 89,000.<sup>775</sup> The difference of 74,000 can thus be attributed to the number of *kuiki-gai* evacuees, in which a small number of tsunami evacuees is also included. In one of the rare official reports, Fukushima Prefecture gave the estimated number of out-of-zone evacuees as 50,327 in September 2011.<sup>776</sup> From these data, it can be said that out-of-zone evacuees composed at least one third of all the evacuees from the nuclear accident. Despite this fact, the government and Fukushima Prefecture have largely ignored their plight and accorded very little assistance to them.

The non-recognition of their status by the authorities created community divisions and tensions within these affected out-of-zone areas. In fact, many residents who stayed in the area were also very anxious about the radiological contamination, especially for their children, but could not move in the absence of government's aid. The resident survey conducted by Fukushima city in September 2012, 18 months after the accident, found that 34 per cent of the remaining residents still wished to evacuate if they could and 90 per cent of the respondents were worrying about the future health of their children.<sup>777</sup> To cope with these anxieties, many of them tried to convince themselves of government's reassurances and get on with life by avoiding the topic of radiation risk or contamination.<sup>778</sup> In this context, some of them began to criticise those who left on their own as well as other stayers who openly expressed concerns

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<sup>775</sup> The total evacuee number from Restricted Zone and Deliberative Evacuation Area. Source: Supporting document (5-1) to the First Dispute Reconciliation Committee for Nuclear Damage Compensation held on 15 April 2011 in MEXT, which can be found (in Japanese only) at [http://www.mext.go.jp/b\\_menu/shingi/chousa/kaihatu/016/attach/\\_icsFiles/afieldfile/2011/04/18/1305143\\_1.pdf](http://www.mext.go.jp/b_menu/shingi/chousa/kaihatu/016/attach/_icsFiles/afieldfile/2011/04/18/1305143_1.pdf), consulted on 15 September 2019.

<sup>776</sup> Source: Supporting document (2-1) to the 16th Dispute Reconciliation Committee for Nuclear Damage Compensation held on 10 November 2011 in MEXT, which can be found (in Japanese only) at [http://www.mext.go.jp/b\\_menu/shingi/chousa/kaihatu/016/shiryo/\\_icsFiles/afieldfile/2011/11/11/1313180\\_2\\_2.pdf](http://www.mext.go.jp/b_menu/shingi/chousa/kaihatu/016/shiryo/_icsFiles/afieldfile/2011/11/11/1313180_2_2.pdf), consulted on 15 September 2019.

<sup>777</sup> Source: Fukushima City Homepage, accessible (in Japanese) at <http://www.city.fukushima.fukushima.jp/kohoka-koho/shise/kocho/anketo/documents/14143.pdf>, consulted on 18 September 2019.

<sup>778</sup> Hasegawa, 'Disaster Evacuation from Japan's 2011 Tsunami Disaster and the Fukushima Nuclear Accident' (n 42). Information collected from the interviews with residents and out-of-zone evacuees from the Naka-dori region during 2012-2018.

about radiation risks. They regarded “voluntary” evacuees as egoists and deserters who had selfishly escaped hardship and abandoned their peers and communities.<sup>779</sup> The stayers who voiced their concerns, often mothers who worry about radiation effects on children, were also labelled as cowards or troublemakers, making Fukushima appear unsafe to live in the eyes of the general public and thus jeopardising the collective effort to overcome the fallout from the disaster.<sup>780</sup>

As such, talking about radiation risk quickly became a taboo in these out-of-zone areas and the normalisation of lives in contaminated territories became the policy priority of both central and local authorities.<sup>781</sup> Those who broke the taboo, most often women, were rebuked sometimes by their husbands, community leaders, and even mothers-in-laws, and categorised by the authorities and public radiation experts as being hysterical and emotional who do not understand the “science-based” knowledge on low-dose radiation risks. As Beck ingeniously described in his book, the risk society often becomes a “scapegoat society” in which ‘it is not the hazards, but those who point them out that provoke the general uneasiness’.<sup>782</sup> Ultimately, dangers can always be ‘interpreted away’ unlike hungers which ‘cannot be satisfied by denial’.<sup>783</sup>

This was a social disaster – the secondary disaster after the nuclear disaster – caused by the post-Fukushima government policies which placed a cap on the disaster assistance with

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<sup>779</sup> *ibid*; Fassert and Hasegawa (n 42). The term “community” was often used by the evacuees and affected residents during interviews to designate their living quarters where neighbours formed a sort of social safety net of mutual aid. Many expressed a strong sense of belonging to these microcosmic communities rather than to the town itself.

<sup>780</sup> Hasegawa, ‘Disaster Evacuation from Japan’s 2011 Tsunami Disaster and the Fukushima Nuclear Accident’ (n 42); Slater, Morioka and Danzuka (n 44). The information collected by interviews with government officials, residents and out-of-zone evacuees from the *Naka-dori* region.

<sup>781</sup> Aya H Kimura, *Radiation Brain Moms and Citizen Scientists* (Duke University Press 2016); Slater, Morioka and Danzuka (n 44); cited by Fassert and Hasegawa (n 42).

<sup>782</sup> Beck (n 563) 75.

<sup>783</sup> *ibid*.

the reference dose of 20 mSv/year. Often, the evacuees from these areas felt abandoned by their government, communities, friends, and even their husbands and other family members who opposed self-evacuation.<sup>784</sup> As such, once they evacuated, it was difficult for them to return due to stigmatisation within the community. Moreover, they often found themselves in a precarious financial situation since they had to keep two household expenses: one in Fukushima (e.g., husband) and the other in the place of refuge (e.g., mother and children).

## 2. Forced Immobility: “Trapped” in Contaminated Territories

For those who stayed, the situation was no easier, especially for those who had no choice but to stay against their will due to lack of government assistance. In addition, they faced criticism and marginalisation within their own communities if they expressed their concerns. Indeed, these stayers represent the often forgotten and neglected victims of environmental disasters. They are, in environmental migration terms, “trapped populations”, individuals who are held against their will in contaminated territories due to lack of ability or resources.<sup>785</sup> In the case of Fukushima accident, people were compelled to stay because of the government’s decision to raise the reference dose to 20 mSv/year and the subsequent lack of evacuation assistance for the areas contaminated below that level. Some scholars called this hostage-like situation as “evacuation within the community”<sup>786</sup> or “evacuation in daily lives”<sup>787</sup> where

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<sup>784</sup> Fassert and Hasegawa (n 42).

<sup>785</sup> Foresight, ‘Migration and Global Environmental Change: Future Challenges and Opportunities’ (The Government Office of Science, UK 2011) Final Project Report; Richard Black and Michael Collyer, “Trapped” Populations: Limits on Mobility at Time of Crisis’ in Susan F Martin, Sanjula Weerasinghe and Abbie Taylor (eds), *Humanitarian Crises and Migration: Causes, Consequences and Responses* (Routledge 2014); Black and others (n 126); Caroline Zickgraf, ‘Immobility’ in Robert McLeman and François Gemenne (eds), *Routledge Handbook of Environmental Displacement and Migration* (Routledge 2018).

<sup>786</sup> Translation of 地域内避難 by R. Hasegawa. The term was proposed by Akira Imai, *自治体再建—原発避難と「移動する村」* (*Reconstruction of Municipalities: Nuclear Evacuation and “Mobile Town”*) (Chikuma Shinsho 2014).

<sup>787</sup> Translation of 生活内避難 by R. Hasegawa. The term was proposed by Yusuke Yamashita, Takashi Ichimura and Akihiko Sato, *人間なき復興—原発避難と国民の「不理解」をめぐって* (*The Reconstruction Without Humans: Nuclear Evacuation and Citizens’ “Incomprehension”*) (Chikuma Bunko 2016).

residents live like fugitives in their own communities, trying to “escape” radiation exposure in their everyday lives. The life in evacuation-in-place consists of avoiding certain foodstuff, refraining from going to some places (due to hotspots), and constantly measuring and monitoring radiation doses, which all end up restricting and dictating their daily lives.<sup>788</sup>

However, this is the ideal post-accident life promoted by the ICRP and the IAEA. According to their guidelines, the key protection measure for the affected population after large nuclear accidents is that they acquire the “radiological protection culture” through training and conducting “self-help” radiation protection actions by themselves, controlling where they go and what they eat.<sup>789</sup> In these recommendations, however, the question of spontaneous evacuation and individual’s right to make his/her own mobility choice is rarely mentioned or addressed.

Though not all the stayers are in the situation of forced immobility (i.e., there are residents who prefer to stay despite contamination for various reasons), 1.6 million people were potentially put in such a situation after the Fukushima accident.<sup>790</sup> Yet, neither Fukushima Prefecture nor the government has set up any comprehensive programme to assist out-of-zone evacuees and stayers, other than decontamination and a nominal compensation payment (as we will see below), thus leaving these communities deeply divided and traumatised. This lack of recognition and assistance of out-of-zone residents in contaminated territories led to a nationwide legal action against the State and TEPCO, which surged in 2013-2014. The Fukushima group lawsuits will be closely examined in the next Part (Part Two, Title II).

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<sup>788</sup> Fassert and Hasegawa (n 42).

<sup>789</sup> ICRP, ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.’ (n 38).

<sup>790</sup> Sawano (n 14) 126. Sawano estimated the number of persons living in the area contaminated by Fukushima fallout with doses that exceed 5 mSv/year as 1.6 million. This thesis thus deducted 100,000, the approximate number of evacuees under government’s orders, from this total to estimate the number of trapped persons.

## Conclusion of Chapter 1

In December 2006, five years before the accident, an opposition member of House of Representatives, Hidekatsu Yoshii, asked a question to the government on the current preparedness of Japanese nuclear power stations against the situation of station black out (SBO).<sup>791</sup> The then Prime Minister, Shinzo Abe (his first term as PM), responded that there had never been any incident of SBO in Japan and therefore the METI had not conducted a simulation exercise of such an event.<sup>792</sup> In other words, since it had never happened before, they did not have to prepare for it. The NSC's Regulatory Guide confirmed this point by stating that long-term loss of power does not have to be considered since the provision of power is "highly reliable" in reactor facilities.<sup>793</sup>

This episode aptly characterises the state of the Japanese nuclear emergency preparedness before the Fukushima accident. The EP&R plan was deeply flawed, intentionally underestimating the accident risk so as not to "scare off" the population from nuclear installations or the nuclear programme in general, which fed in turn the narrative of "absolute safety" myth. In fact, regulators were trapped in a vicious circle of downplaying the risk in order to gain public confidence, which finally impaired them from reinforcing the safety of the installations. Operators were fearful of strict safety requirements which would increase the operation cost and so lobbied the regulator for flexible regulations. The economic logic

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<sup>791</sup> SBO is a situation where both external AC power supply and on-site emergency power sources (typically, generators) are lost, which precisely happened at the Fukushima nuclear power plant and subsequently disabled the cooling system of reactors.

<sup>792</sup> The written answer from PM Abe to the question of Mr Yoshii can be found at (in Japanese): [http://www.shugiin.go.jp/Internet/itdb\\_shitsumon.nsf/html/shitsumon/b165256.htm](http://www.shugiin.go.jp/Internet/itdb_shitsumon.nsf/html/shitsumon/b165256.htm), consulted on 19 June 2019

<sup>793</sup> NSC, '発電用軽水型原子炉施設に関する安全設計審査指針 (Regulatory Guide for Reviewing Safety Design of Light Water Nuclear Power Reactor Facilities)' (Nuclear Safety Commission 1977) published 14 June 1977 as amended Guideline 9; Translation of the title by NERHQ, 'Report of Japanese Government to the IAEA Ministerial Conference on Nuclear Safety - The Accident at TEPCO's Fukushima Nuclear Power Stations -' (n 577).

superseded the concern for safety, in which regulators placed under the Ministry to promote the nuclear industry became largely toothless and finally complicit.

Here, there is an interesting parallel with the development of the civil nuclear programme in the US where the American regulator, AEC, was also very keen not to stir public fear and oppositions against the nuclear programme, thus cancelling the requirement for exclusion zones around nuclear facilities and underestimating public health effects of an accident. The difference in the Japanese case is that regulators themselves, including the government, overestimated their technical capabilities and believed in the myth of absolute safety, according to which it was impossible for Japan to have a severe accident.

The fear of scaring off the population from the nuclear programme also led to promoting and selecting radiation experts who believed in the “safety” or the “benefit” of low-dose radiation effects and tended to underestimate radiation risk in general. As such, radiation protection legislation in place at the time of the accident had at least a 20-year lag with the ICRP recommendations.

Not surprisingly, the emergency response to the Fukushima disasters was extremely chaotic and patchy. Without a proper EP&R plan, the regulators and government executives were completely overwhelmed and at a loss, trying constantly to invent and improvise mitigation measures. The flagship emergency measures – iodine intake, sheltering and evacuation – were either partially implemented or not implemented at all. In the absence of prescribed protection minimum standards, nuclear disaster response became a product of political compromise, balancing the protection of health and lives of citizens against the economic cost of evacuation measures (i.e., compensation amount) and the question of

territorial survival. This led to a situation where a significant number of residents including children were constrained to live in contaminated territories after the accident.

Judging from these consequences on the population, the Fukushima emergency protection actions undertaken by the Japanese government can be qualified as largely inadequate, deficient, and concerning. However, the Japanese case may not be an isolated or deviant example in nuclear disaster protection. On the contrary, it is rather an expected outcome from the perspective of the international nuclear normative regime, coherent with its protection principles of optimisation and justification.





## Chapter 2: Post-Accident Protection: The Fukushima Status

On 16 December 2011, nine months after the accident, the then Prime Minister Yoshihiko Noda declared that the F1NPP had reached the state of “cold shutdown”, thus regaining control of damaged reactors. Although this was a symbolic announcement than a practical one, not corresponding exactly to the state of “cold shutdown” defined by the IAEA, it marked the end of the emergency phase, the period ‘once the source has been brought under control’ and where ‘no further significant accidental releases or exposures resulting from the event are expected’.<sup>794</sup> This chapter examines the protection policies and measures undertaken after the declaration, the recovery and long-term phase of the Fukushima accident, which created the *de facto* Fukushima protection status for accident victims.

After the “cold shutdown” declaration, the function of NERHQ was gradually transferred to several key ministries, most importantly to the Ministry of Economy, Trade and Industry (METI), the Ministry of Education, Culture, Sports, Science and Technology (MEXT) and the Ministry of Environment (MoE). The post-emergency protection of accident victims was mainly assigned to the METI, the principal promoter and regulator of the nuclear energy programme in Japan. The Ministry thus became the key decision-maker of the Fukushima post-accident policies concerning the lifting of evacuation orders, the return of evacuees, and the reconstruction of affected municipalities. However, the Ministry was also assigned to another task after the accident: to revive the nuclear sector. In fact, the METI’s 2019 White Paper on Energy fixed the objective to increase the nuclear energy share from 3% in 2017 to 20-22% by 2030, which meant that the Ministry was responsible for the restart of nuclear power plants all

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<sup>794</sup> IAEA and others, ‘Arrangements for the Termination of a Nuclear or Radiological Emergency’ (n 390) 9.

over Japan.<sup>795</sup> Just like before the accident, the Ministry was given a conflictual dual task which was difficult to reconcile.

After METI, MEXT was also given an important role to play for the protection of accident victims in the recovery phase: to define the Fukushima compensation scheme through the creation of the Dispute Reconciliation Committee for Nuclear Damage (Reconciliation Committee). Therefore, METI and MEXT became the two main actors determining the Fukushima protection status in the recovery phase, just like they had been for the development of the nuclear energy sector before the accident. Meanwhile, MoE was assigned to a new task, largely unfamiliar to the Ministry before the accident: to supervise a new nuclear regulation agency, Nuclear Regulation Authority (NRA, hereafter),<sup>796</sup> and to organise the entire decontamination operation. The NRA regrouped the regulatory functions of the Nuclear and Industrial Safety Agency (NISA/METI) and the Nuclear Safety Commission (NSC), finally separating nuclear regulation from promotion in Japan. However, in the post-Fukushima operation, the role of NRA was limited to on-site issues, overseeing the clean-up and decommissioning of the Fukushima Daiichi NPP.

The METI's mandate for the post-accident victim protection was implemented through the Nuclear Victims Livelihood Support Team (METI Support Team, hereafter), the antenna office of the METI officials, established within the NERHQ during the emergency phase and then transferred to the Reconstruction Agency in the recovery phase. The Reconstruction Agency was established under the Cabinet in February 2012, one year following the disaster,

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<sup>795</sup> ANRE/METI, 'エネルギーに関する年次報告(エネルギー白書 2019) (Annual Report on Energy/The 2019 White Paper on Energy)' (Ministry of Economy, Trade and Industry 2019). Before the F1NPP accident, nuclear energy share was 25 % (2010). Following the accident, the operation of all the nuclear power plants in Japan was halted for safety checks. As of February 2023, only eight reactors out of 54 (the total number of reactors in operation before the accident) have been given green light by the newly established Nuclear Regulation Authority (NRA) to restart.

<sup>796</sup> The creation of the NRA was enacted by the Act for Establishment of the Nuclear Regulation Authority (Act No. 47 of 27 June 2012) and the Authority was officially established in September 2012.

which aimed at coordinating the government effort to rehabilitate and reconstruct the Tohoku region, affected by the earthquake, tsunami, and the Fukushima nuclear accident.<sup>797</sup> All critical matters related to the protection of accident victims in the recovery phase were thus decided by the METI Support Team of the Reconstruction Agency.

This chapter first introduces the key post-accident protection policies defined by the government, essentially the METI team, and analyses their consequences on the affected population (Section I). Secondly, it explores the other pillar of post-accident protection – damage compensation – defined by the Reconciliation Committee of the MEXT (Section II). The analysis of these two schemes – livelihood support and damage reparation – aims to understand the overall victim support system, “the Fukushima status”, established by the Japanese government. For such probe, the thesis relies a lot on the findings from field interviews conducted with stakeholders in Japan between 2012-2018 under two research projects.

## **Section 1: Fukushima Recovery Programme**

As shown in the previous chapter, the Japanese nuclear preparedness had not envisaged a severe accident and did not thus have any long-term recovery plan. After the Fukushima accident, the Japanese government had to enact new laws and invent new policies to cope with the magnitude of its consequences and problems. The most challenging task of all is to deal with the long-term radiological contamination of territories and the protection of people from such contamination.

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<sup>797</sup> The creation of the Agency was prescribed in the Basic Act on Reconstruction in Response to the Great East Japan Earthquake (Act No. 76 of 24 June 2011), Article 24. The Agency was initially created for a limited time period of 10 years, which was extended to 20 years (until March 2031). The translation of the Act by the Japanese Law Translation ([https://www.japaneselawtranslation.go.jp/en/laws/view/2434#je\\_ch4at1](https://www.japaneselawtranslation.go.jp/en/laws/view/2434#je_ch4at1)).

The grand scheme of post-Fukushima recovery was drawn on the base of the Act on Special Measures for the Reconstruction and Revitalization of Fukushima<sup>798</sup> (the Reconstruction Act, hereafter) which was adopted in March 2012, one year after the accident. Combined with another key law for post-accident recovery, the Act on Special Measures Concerning the Handling of Environmental Pollution by Radioactive Materials Discharged by the Nuclear Power Station Accident Associated with the Tohoku District-Off the Pacific Ocean Earthquake that Occurred on March 11, 2011 (the Decontamination Act, hereafter)<sup>799</sup>, the Reconstruction Act forged the foundation of the Fukushima post-accident strategy: decontamination, reconstruction, and risk communication. None of these laws, however, contained any measures related to permanent relocation or resettlement of the affected population.

Under this bipartite scheme, the recovery priority was placed on the neutralisation or “reclaiming” of contaminated territories by a pharaonic-scale decontamination operation and a massive infrastructure and business investment programme. These programmes were accompanied by an intensive information campaign which largely downplayed radiation risk related to low doses. Catchphrases such as “fear radiation *correctly*” and “dispel radiation fears” were extensively employed by many official communications and government policy documents, emphasising the harmlessness of radiation doses at and under 100 mSv and repeating the conclusion made by the WG on Risk Management of Low-Dose Radiation Exposure in December 2011. Through these programmes, central and local authorities promoted the return of evacuees to former evacuation zones, instead of long-term relocation,

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<sup>798</sup> Act No. 25 of 31 March 2012. Translation of 福島復興再生特別措置法 by the Ministry of Justice available at < <https://www.japaneselawtranslation.go.jp/en/laws/view/2582>> accessed 8 February 2023.

<sup>799</sup> Act No.110 of 30 August 2011. Translation of 平成 23 年 3 月 11 日に発生した東北地方太平洋沖地震に伴う原子力発電所の事故により放出された放射性物質による環境の汚染への対処に関する特別措置法 by the Ministry of Environment. The English version of the Act is available at <[http://josen.env.go.jp/en/policy\\_document/pdf/special\\_act.pdf](http://josen.env.go.jp/en/policy_document/pdf/special_act.pdf)> accessed 8 February 2023.

and the remaining of out-of-zone residents in contaminated territories, discouraging self-evacuation. The Fukushima post-emergency strategy is also marked by the retained 20 mSv/year reference dose, applied to all key recovery policies such as lifting evacuation orders and defining the compensation scheme. As such, David Boilley, a nuclear physicist and the president of a French NGO, ACRO<sup>800</sup>, gave the following title to his annual Fukushima report in 2013: ‘Fukushima, Two Years After, Return to the *Abnormal*’.<sup>801</sup>

This first section of the chapter examines in detail major Fukushima recovery policies, notably decontamination (§1), reconstruction & risk communication (§2), and the promotion of return (§3), after which it probes and identifies the consequences of these policies on the affected residents and communities (§4).

### **§1: Decontamination: Reconquest of Contaminated Territories**

The push for decontamination initially came from the municipalities in the out-of-zone contaminated areas in Fukushima Prefecture.<sup>802</sup> Some of these areas, as shown in the previous chapter, were detected with radiation doses that exceeded the 20 mSv/year benchmark but were not designated as radiation hotspots, nor included in evacuation zones, due to political and economic reasons (e.g., Fukushima city). In this context, MEXT’s 20 mSv/year policy for school activities triggered an outcry not only from the parents but also from the larger scientific

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<sup>800</sup> ACRO is an acronym for l’Association pour le Contrôle de la Radioactivité dans l’Ouest (Association for the Radioactivity Control in the West; translation by R. Hasegawa), established in 1986 in the wake of the Chernobyl accident. It monitors radioactivity in the environment and advocates for a more participatory and democratic decision-making on the issues related nuclear energy.

<sup>801</sup> David Boilley, ‘Fukushima, Deux Ans Après, Retour à l’anormale’ (ACRO 2013) <<https://www.acro.eu.org/fukushima-deux-ans-apres-retour-a-lanormal/>> accessed 8 February 2023; Boilley gave the same title to the report at the 5th anniversary of the accident. See David Boilley, ‘Fukushima cinq ans après, retour à l’anormale’ (ACRO 2016) <[http://fukushima.eu.org/wp-content/uploads/2016/03/Fukushima\\_retour\\_a\\_lanormale\\_ACRO\\_2016.pdf](http://fukushima.eu.org/wp-content/uploads/2016/03/Fukushima_retour_a_lanormale_ACRO_2016.pdf)> accessed 8 February 2023. The English translation of the title is done by R. Hasegawa (emphasis added)

<sup>802</sup> Yayoi Isono, ‘除染の問題と課題 (The Problems and Challenges of Decontamination)’ in Takehisa Awaji, Ryoichi Yoshimura and Masafumi Yokemoto (eds), 福島原発事故 賠償の研究 (*Fukushima Nuclear Accident: the Compensation Study*) (Nihon Hyoron Sha 2015).

community so much so that the municipalities were pressured from all sides to do something about it. Decontamination, which was initially a desperate call from “trapped” parents to protect children in contaminated territories, gradually became an ingenious solution and a policy priority for local and central authorities to convince anxious residents to stay in the contaminated territories, thus preventing the evacuation of major cities of the Prefecture, as well as to enable the rapid return of evacuees to former evacuation zones. For decontamination, the government was estimated to spend a total of 20 trillion yen (181 billion USD), double the amount estimated for damage compensation (10 trillion yen: equivalent 90 billion USD).<sup>803</sup>

In fact, decontamination was the first recovery strategy which the Japanese government has come up with, as early as May 2011, when things were far from clear if and when the F1NPP would be put under control.<sup>804</sup> Like other Fukushima protection measures, decontamination had neither been prescribed nor existed in Japanese nuclear legislation prior to the accident and thus the government had to invent it from scratch. In August 2011, the Decontamination Act<sup>805</sup> was enacted by the Diet based on the NERHQ policy document ‘Basic Concept for the Promotion of Decontamination’ which set the purpose, the target and the rough content of decontamination activities.<sup>806</sup> The Act notably designated the Ministry of the Environment (MoE) to be in charge of the policymaking and implementation of decontamination operations.

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<sup>803</sup> JCER (n 343).

<sup>804</sup> One of the documents presented at the 15th Nuclear Emergency Response Headquarters (NERHQ) meeting, held on 17 May 2011, already lists decontamination as a core strategy for the return of evacuees. It is available at (in Japanese only) <[https://www.kantei.go.jp/jp/singi/genshiryoku/dai15/15\\_04\\_gensai.pdf](https://www.kantei.go.jp/jp/singi/genshiryoku/dai15/15_04_gensai.pdf)> accessed 8 February 2023

<sup>805</sup> The Act on Special Measures Concerning the Handling of Environmental Pollution by Radioactive Materials Discharged by the Nuclear Power Station Accident Associated with the Tohoku District-Off the Pacific Ocean Earthquake that Occurred on March 11, 2011 (cited above)

<sup>806</sup> Translation of 除染推進に向けた基本的考え方 by R. Hasegawa. The document is available (in Japanese only) at <[https://www.mext.go.jp/b\\_menu/shingi/chousa/kaihatu/016/shiryo/\\_icsFiles/afieldfile/2011/09/21/1311103\\_7\\_2.pdf](https://www.mext.go.jp/b_menu/shingi/chousa/kaihatu/016/shiryo/_icsFiles/afieldfile/2011/09/21/1311103_7_2.pdf)> accessed 8 February 2023

The initial decontamination targets were fixed as reducing the ambient radiation dose to less than 20 mSv/year in evacuation zones and to below 1 mSv/year in out-of-zone areas contaminated with radiation doses of more than 1 mSv/year and less than 20 mSv/year. The MoE designated the first target zone as Special Decontamination Areas (Special Areas, hereafter)<sup>807</sup> and the latter zone as Intensive Contamination Survey Areas (Survey Areas, hereafter)<sup>808</sup>. The Special Areas comprised essentially 11 municipalities under evacuation orders while the Survey Areas consisted of 104 municipalities spread across eight prefectures.<sup>809</sup> From the extent of the Survey Areas, it becomes clear that Fukushima fallout affected much wider territories beyond official evacuation zones.

However, “environmental remediation”<sup>810</sup> operations were often criticised by the affected residents as ineffective in reducing doses. According to evacuee surveys, 80% of the respondents considered such operations as having little to no effect.<sup>811</sup> Indeed, decontamination operations can never cleanse or eliminate radioactivity. They essentially consist of scraping off topsoil about 1-5 cm from the surface, cutting grass and trees, and washing roofs and exterior walls of the house with high-pressure water hoses. The removed soil and branches are then put in plastic container bags and stored in nearby temporary storage sites. Some residents therefore started to call decontamination (*josen* in Japanese), *isen* – “contamination transfer” – by which

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<sup>807</sup> Article 25 of the Decontamination Act

<sup>808</sup> Article 32 of the Decontamination Act

<sup>809</sup> MoE first published the list of 102 municipalities on 28 December 2011 (<https://www.env.go.jp/press/14598.html>, accessed 8 February 2023) and added two more on 28 February 2012 (<https://www.env.go.jp/press/press.php?serial=14879>, accessed 8 February 2023). All the municipalities in the *Naka-dori* region of Fukushima Prefecture were included in the Survey Areas. The eight prefectures are Fukushima, Miyagi, Iwate, Ibaragi, Tochigi, Gunma, Chiba and Saitama. Importantly, the Survey Area municipalities, despite such designation, can get to decide whether or not to implement decontamination at all. A such, after their own monitoring surveys, 5 out of 104 designated municipalities decided not to implement decontamination. See Isono (n 802).

<sup>810</sup> The term the MoE uses for decontamination

<sup>811</sup> Akira Imai, ‘原発災害避難者の実態調査（3次）（The Third Survey of Nuclear Evacuees）’ (2012) 402 *The Japan Research Institute for Local Government Monthly*.

radioactive substances are simply removed from one place and transferred to another, remaining in the same environment.

Furthermore, decontamination primarily targeted residential areas – individual houses, schools, public parks, roads and farmlands – and not mountains and forests which in fact cover 70% of the territory of Fukushima Prefecture on average. In certain affected municipalities, mountains and forests occupy as much as 90% of the territory. To make matters worse, they are the most radionuclide-concentrated area since trees and soil absorb and stock radioactivity like a sponge. Without the decontamination of mountains, the reduction of doses in these rural areas has limitations. In field interviews, residents complained that radiation dose, reduced immediately after decontamination operations, could go back to the previous level after a few months.<sup>812</sup> Transportable by water and mud, radioactive substances can travel back to the post-decontamination area, especially in the spring when snow melts and water runs down to the valley from nearby mountains, carrying radionuclides with it.<sup>813</sup> Under the pressure from the municipalities, the MoE finally agreed to a limited decontamination of mountains and forests only when houses are built right next to them.<sup>814</sup> Notwithstanding, when all the decontamination operations were completed for Special Areas (11 municipalities) in March 2017, none of the Areas achieved the dose level of less than 1 mSv/year, the level before the

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<sup>812</sup> From field interviews with affected residents during 2013-2018.

<sup>813</sup> The cases where the radiation dose increased after decontamination after pouring rain were also reported in the MoE's Decontamination Guideline, the 2<sup>nd</sup> edition (May 2013), available at [http://josen.env.go.jp/material/pdf/josen-gl-full\\_ver2\\_supplement\\_1803.pdf](http://josen.env.go.jp/material/pdf/josen-gl-full_ver2_supplement_1803.pdf), consulted on 13 January 2020.

<sup>814</sup> According the MoE's decontamination guidebook ([http://josen.env.go.jp/material/pdf/josen-gl02\\_ver2\\_supplement\\_1609.pdf](http://josen.env.go.jp/material/pdf/josen-gl02_ver2_supplement_1609.pdf)), the decontamination of mountains entails removing fallen leaves and topsoil and cutting branches within a 20-meter range from concerned houses.



accident, which was increasingly demanded by the evacuees as a condition of their return to former evacuation zones (the issue is further dealt with in the following §4).<sup>815</sup>

Curiously, the limited effectiveness of decontamination in reducing doses seemed to have been recognised by the government from the outset. NERHQ's first policy document on decontamination fixed the dose reduction target as 50% less for public exposure in Special Areas, of which 40% reduction would be achieved by natural decay process of radioactivity and weathering effects, and only 10% would be attained by decontamination.<sup>816</sup> In spite of this known low efficiency, the government is expected to spend 20 trillion yen (181 billion USD) for decontamination operations and the storage of waste produced by the operations.<sup>817</sup>

But why does the government invest so much in an operation that is known to have only limited effects in reducing doses and thus protecting the population? It is indeed inconsistent with the principle of optimisation which the Japanese government strictly followed in designing emergency protection actions in the Fukushima accident. As for the reason, some researchers point to the policy priority which the Japanese government chose for the post-Fukushima recovery – the “reconquest” of contaminated territories –, contrary to the 1986 Chernobyl accident where a large-scale mandatory relocation was chosen as the main protection strategy for the population, thus abandoning the contaminated territories.<sup>818</sup> By choosing

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<sup>815</sup> MoE, 除染・中間貯蔵施設・放射性物質汚染廃棄物処理の現状、成果及び見通し(The Status, Result and Prospect on Decontamination, Interim Storage Facility, and Radiological Waste Management, a presentation dated on 3 March 2020, available at [http://josen.env.go.jp/material/pdf/outcome\\_outlook\\_170303.pdf](http://josen.env.go.jp/material/pdf/outcome_outlook_170303.pdf), consulted on 5 March 2020; cited by Haruka Fujiwara and Masafumi Yokemoto, ‘福島復興政策を検証するー財政の特徴と住民帰還の現状 (The Review of Fukushima Reconstruction Policies: The Budget Characteristics and the State of Evacuee Return)’ in Takehisa Awaji and others (eds), 原発事故被害回復の法と政策 (*Laws and Policies for Nuclear Accident Damage Reparation*) (Nihon Hyoron Sha 2018).

<sup>816</sup> MoE, ‘Basic Concept for the Promotion of Decontamination’, 26 August 2011, available at [https://www.mext.go.jp/b\\_menu/shingi/chousa/kaihatu/016/shiryo/\\_icsFiles/afldfile/2011/09/21/1311103\\_7\\_2.pdf](https://www.mext.go.jp/b_menu/shingi/chousa/kaihatu/016/shiryo/_icsFiles/afldfile/2011/09/21/1311103_7_2.pdf), consulted on 7 March 2020.

<sup>817</sup> JCER (n 343).

<sup>818</sup> Isono (n 802); Topçu, ‘Catastrophes nucléaires et « normalisation » des zones contaminées : Enjeux politiques, économiques, sanitaires, démocratiques et éthiques.’ (n 319); Fassert (n 494).

decontamination instead of relocation as a protection strategy, the Japanese policy *de facto* imposed the population to continue living in contaminated territories (outside evacuation zones) and return to contaminated territories (evacuation zones).

## §2: Reconstruction with ‘Risk Communication’ to Downplay Radiation Risk

Coupling with decontamination, reconstruction was the other flagship policy of the Fukushima recovery, defined by the Reconstruction Act<sup>819</sup> and the Basic Guidelines for the Reconstruction and Revitalization of Fukushima<sup>820</sup> published by the Reconstruction Agency in July 2012. The reconstruction envisioned by the said legislation consists of following measures: lifting evacuation orders, decontamination, rebuilding infrastructures, housing support for returnees, facilitating new business investments, and promoting local industry such as tourism, fishery and agriculture. The total budget allocated to the Fukushima reconstruction is very difficult to pinpoint and separate from the overall budget of reconstruction dedicated to the Great East Japan Triple Disaster which includes the earthquake, the tsunami and the nuclear accident.<sup>821</sup> From 2010-2017 (seven years), a total of 30 trillion yen (272 billion USD) was spent on the Triple Disaster reconstruction, of which 60% was used on infrastructure projects and only 12% was spent on victims’ support projects.<sup>822</sup> If we look at the budget item entitled ‘Related to Nuclear Disaster Reconstruction’, although the Fukushima reconstruction is also paid by other items from the Triple Disaster budget, the budget allocation is quite similar: of

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<sup>819</sup> The Act on Special Measures for the Reconstruction and Revitalization of Fukushima (2012), cited above.

<sup>820</sup> Reconstruction Agency, ‘福島復興再生基本方針 (Basic Guidelines for the Reconstruction and Revitalization of Fukushima)’ (Reconstruction Agency 2012) 13 July 2012 <<http://www.reconstruction.go.jp/topics/houshinonbun.pdf>> accessed 13 April 2023.

<sup>821</sup> Haruka Fujiwara and Masafumi Yokemoto, ‘福島復興政策を検証する—財政の特徴と住民帰還の現状 (The Review of Fukushima Reconstruction Policies: The Budget Characteristics and the State of Evacuee Return)’ in Takehisa Awaji and others (eds), *原発事故被害回復の法と政策 (Laws and Policies for Nuclear Accident Damage Reparation)* (Nihon Hyoron Sha 2018) 264.

<sup>822</sup> Koichi Miyairi, ‘復興行財政の実態と課題—今東日本大震災の復興行財政に問われているもの— (The Status and Challenges of Reconstruction Budget Policy: The Current Issues at Stake for the Reconstruction Budget Policy of the Great East Japan Disaster)’ (2015) 45 *環境と公害 (Research on Environmental Disruption)* 2; cited by Fujiwara and Yokemoto (n 815).

the total 5.3 trillion yen (48 billion USD), 73% of the budget item was spent on decontamination and only 9% was allocated to promoting evacuees' repatriation and rebuilding the lives of the population in Fukushima Prefecture.<sup>823</sup>

In the Fukushima Reconstruction Act, most actions are dedicated to boosting the local economy and reconstructing infrastructure, but there is one chapter, out of nine, which deals specifically with the protection of the affected population. Chapter IV of the Reconstruction Act is dedicated to 'measures for eliminating health concerns due to radiation and for creating a living environment where people can live with peace of mind', comprising the following actions: health check-ups, food tests for contamination, decontamination, risk communication to dispel radiation fears, and educational activities to increase 'public understanding of radiation, such as the effects of low dose exposure to radiation on human bodies'. Throughout the texts, the word "radiation" is mainly used in the context of dispelling fears among the population, and not to deal specifically with its risk, as if such risk were either negligible or inexistent. Moreover, it makes no mention of long-term relocation or resettlement of the population as if there were no other options than repatriation. As such, some researchers argued that the Fukushima reconstruction policy was in essence the return promotion scheme.<sup>824</sup> In out-of-zone affected areas, the reconstruction strategy focused on business investment, physical infrastructure, and decontamination also functioned as a means to maintain the population in place and attract new people from outside Fukushima.

As a matter of fact, the reconstruction scheme designed by the Reconstruction Act targets only the residents who stay or return to Fukushima Prefecture.<sup>825</sup> The evacuees who

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<sup>823</sup> Fujiwara and Yokemoto (n 815).

<sup>824</sup> *ibid*; Yusuke Yamashita, 「復興」が奪う地域の未来—東日本大震災・原発事故の検証と提言 (*The Future of Local Communities Taken Away by 'Reconstruction': Analysis and Proposals of Great East Japan Disaster and Nuclear Accident*) (Iwanami Shoten 2017); Isono (n 802).

<sup>825</sup> Yamashita, Ichimura and Sato (n 787); Yamashita (n 824).

choose to resettle outside the Prefecture, as well as the residents who decide to evacuate of their own accord, do not benefit from this reconstruction package. On the other hand, any newcomers who come to settle in Fukushima Prefecture, attracted by new job opportunities, would benefit from the reconstruction scheme in the same way as returnees or stayers. In other words, those who do not follow the vision of “reconstruction” defined by the authorities are *de facto* left to themselves to rebuild their lives on their own.<sup>826</sup> The authors of the book, ‘Reconstruction Without Humans’, argue that the Fukushima reconstruction plan does not reflect at all the wishes and needs of the affected population and thus ask the following question: ‘this reconstruction, it is for whom and for what purpose?’.<sup>827</sup>

Field interviews with municipal officials suggest some answers to such a question. An official of Naraha town where the evacuation order was lifted in 2015 gave a realistic prospect for the future of the town: ‘After a certain point, no more residents will come back. In view of this, the municipality tries to attract new people to settle in town and fill the population gap by creating new jobs through State subsidies for reconstruction’.<sup>828</sup> In this vision, the priority is rather placed on the reconstruction of the municipality, ensuring its survival, than the reconstruction of the lives of its residents relocated elsewhere. Just like the compensation scheme as shown below, the Fukushima reconstruction became a biased policy benefiting some and excluding others according to individual mobility choices.

This reconstruction strategy was accompanied by intensive risk communication campaigns which largely downplayed radiation risk related to low-dose exposure. Under the catchphrase of “fear radiation correctly”, central and local authorities published information

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<sup>826</sup> Yamashita, Ichimura and Sato (n 787); Yamashita (n 824).

<sup>827</sup> Yamashita, Ichimura and Sato (n 787) 51. Translation of the title by R. Hasegawa.

<sup>828</sup> Interview with a town official (Mr E) in Naraha conducted on 29 September 2015 in the context of the SHINRAI project.

brochures, organised numerous seminars animated by radiation experts, and created textbooks for school children to learn about radiation risk. The “correct” information promoted by the government was always based on the threshold theory according to which health effects are very little at cumulative radiation doses at and below 100 mSv, the view established by the WG on low-dose radiation risk held in December 2011.<sup>829</sup> In these communications, risk evaluation made by government-appointed experts was presented as an “objective” view grounded on “scientific evidences”, dismissing the views of citizens and civil society organisations, especially those of women and mothers, as “subjective” or “non-scientific” based on emotions.<sup>830</sup>

Some scholars began to call this risk communication, “the birth of a new safety myth”, where the “accident-free myth” perpetrated by the nuclear industry and regulators prior to the Fukushima accident was replaced by the “radiation-safety myth” promoted by central and local authorities.<sup>831</sup> This new safety myth ended up capturing the authorities in a similar fashion as did the reactor safety myth: it ultimately hindered the implementation of robust radiation protection measures for residents who lived in the contaminated areas. The authorities fell again in a vicious cycle: since they insisted that the out-of-zone contaminated areas were “safe” to live, they lost justification to impose comprehensive radiation protection measures for the remaining and returning residents.

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<sup>829</sup> Masashi Shirabe, Reiko Hasegawa and Christine Fassert, ‘From Risk Communication to Participatory Radiation Risk Assessment’ [2015] Fukushima Global Communication Programme Working Paper Series. No.21, December 2015. United Nations University, Tokyo. <<https://i.unu.edu/media/ias.unu.edu-en/news/12850/FGC-WP-21-FINAL.pdf>> accessed 20 May 2019; Shimazono (n 629) and others.

<sup>830</sup> Slater, Morioka and Danzuka (n 44); Shimazono (n 629); Aya H Kimura, ‘Fukushima ETHOS: Post-Disaster Risk Communication, Affect, and Shifting Risks’ (2018) 27 *Science as Culture* 98; Fassert and Hasegawa (n 42).

<sup>831</sup> Yamashita (n 824); Shimazono (n 629) and others.

The emphasis on the “safety” of these areas to live finally went so far as to dismiss any cautious and doubtful opinions as “harmful rumours”.<sup>832</sup> Indeed, combating “harmful rumours” has become one of the top reconstruction priorities of the authorities.<sup>833</sup> Originally, the term was used in the context where consumers avoided buying agricultural products from Fukushima on the supposedly “false” premise that all the produce was contaminated by radiation. Certainly, there was some misinformation or exaggeration circulated on the internet about the scope of food and land contamination in Fukushima, but the suspicious attitude of the public was also understandable in the context where a large nuclear accident occurred with a massive release of radioactive substances into the atmosphere. But soon, the fight against “harmful rumours” was extended to target any expressions of fear or anxiety over radiation risk within the affected communities.<sup>834</sup> In particular, mothers who worried about radiation effects on their children were often criticised as transmitting their psychological distress and instability to children, and thus were responsible for the deterioration of psychological wellbeing of children: children would get sick, not from radiation exposure, but from the exaggerated radiation fears of their mothers.<sup>835</sup> The radiation fear, first dismissed as unfounded, was later cast as a personal pathology or psychological problem of the person (most often, a woman) and also accused as a culprit for disseminating “harmful rumours” and jeopardising the Fukushima reconstruction.

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<sup>832</sup> Masafumi Yokemoto, ‘不均等な復興とは何か (What Is Imbalanced Reconstruction?)’ in Masafumi Yokemoto and Toshihiko Watanabe (eds), *原発災害はなぜ不均等な復興をもたらすのか—福島事故から「人間の復興」、地域再生へ* (*Why does nuclear disaster induce imbalanced reconstruction?: Toward the “Reconstruction of Human Lives” and Community Revival from the Fukushima Accident*) (Minerva Shobo 2015); Slater, Morioka and Danzuka (n 44).

<sup>833</sup> For example, the government created an inter-ministerial taskforce to dispel “harmful rumours” since 2013 (原子力災害による風評被害を含む影響への対策タスクフォース) financing various activities to reinforce the testing of agricultural and fishery produce, disseminate the information emphasising the “safety” of the territories and products, and organise promotion events for the Fukushima products and tourism (see the site of Reconstruction Agency at <https://www.reconstruction.go.jp/topics/main-cat1/sub-cat1-4/20131121192410.html>).

<sup>834</sup> Slater, Morioka and Danzuka (n 44).

<sup>835</sup> Shoko Kurokawa, ‘心の除染」という虚構 (*The Fabricated ‘Decontamination of the Heart’*) (Shueisha International 2017); Kimura (n 781).

As such, the question of radiation risk has become a taboo and anybody who brings up the subject was reprimanded or ostracised in the affected communities under the banner of the “Fukushima reconstruction”.<sup>836</sup> For the same reason, certain words such as “contamination”, “contaminated territories” and “irradiation” were avoided at all costs and never used in official communications and publications.

### §3: Promotion of Return to Contaminated Territories

This bipartite Fukushima reconstruction strategy reposed on decontamination and reconstruction with “risk communication” was then fully employed to encourage the return of evacuees. The repatriation of evacuees was in fact the top recovery objective fixed by the government even during the emergency phase. Only four months after the accident (July 2011), Nuclear Safety Commission (NSC) first published the guideline entitled, ‘Basic Concept on Radiological Protection for the Future Lifting of Evacuation Orders and Reconstruction’,<sup>837</sup> which provided some guidance on dose values for lifting evacuation orders and radiological protection measures upon the return of evacuees. As analysed in the previous chapter, the pre-Fukushima disaster plan did not envisage any long-term recovery measures including the lifting evacuation orders and the creation of restricted zones. The only document which referred to the post-emergency period was the 2005 NSC’s Basic Concept on Technical Advice related to Issuance of Lifting the State of Nuclear Emergency,<sup>838</sup> published following the Tokai JOC criticality accident. The post-Tokai (JOC) Basic Concept however did not set particular dose values for lifting evacuation orders but simply emphasised that the public dose limit (1

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<sup>836</sup> Slater, Morioka and Danzuka (n 44).

<sup>837</sup> NSC, ‘今後の避難解除、復興に向けた放射線防護に関する基本的な考え方について (Basic Concept on Radiological Protection for the Future Lifting of Evacuation Orders and Reconstruction)’ (Nuclear Safety Commission 2011) published 19 July 2011 <[https://www.kantei.go.jp/jp/singi/genshiryoku/dai18/18\\_11\\_gensai.pdf](https://www.kantei.go.jp/jp/singi/genshiryoku/dai18/18_11_gensai.pdf)> accessed 9 February 2023. Translation of the title by R. Hasegawa

<sup>838</sup> NSC, ‘原子力緊急事態解除宣言等に対する技術的助言に関する基本的考え方について (Basic Views on the Technical Advice Related to the Declaration of the End of Nuclear Emergency)’ (n 622).

mSv/year) should be taken into account in selecting the recovery dose level. The guidance in the post-Fukushima Basic Concept was a little more specific. In the absence of the Japanese legislation on that subject, NSC suggested adopting the ICRP standards and advised the government to choose a reference dose value from *the lower part* of 1-20 mSv/year for recovery protective actions and to set the long-term goal of 1 mSv/year. Moreover, it stressed the importance of involving community representatives in the planning of protection measures.

But when the NSC was asked one month later by the NERHQ to provide specific conditions for lifting evacuation orders, it slightly modified the recommendation. The new document states that evacuation orders shall be lifted when *radiation exposure dose of a resident* becomes less than 20 mSv/year in the concerned area.<sup>839</sup> A month after the publication, the government lifted the evacuation order for Evacuation Preparation Area, the zone between 20-30 km radius from the F1NPP, on 30 September 2011. This was three months before the official declaration of “cold shutdown” whereby the government proclaimed having regained the control of damaged reactors at F1NPP.

Following the declaration of “cold shutdown”, the NERHQ presented a grand strategy to lift evacuation orders and promote the return of evacuees to evacuation zones. The Basic View and Future Reflections on Restricted Zone and Evacuation Zones after the Termination of Step 2 (the Basic View after Step 2, hereafter), published in December 2011, defines three conditions for lifting evacuation orders: 1) the exposure dose of a resident in the area is less than 20mSv/year; 2) physical and social infrastructures such as electricity, gas, water, sanitation,

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<sup>839</sup> NSC, ‘東京電力株式会社福島第一原子力発電所事故における緊急防護措置の解除に関する考え方について(The View on the Termination of Emergency Protection Measures Related to TEPCO Fukushima Daiichi Nuclear Power Plant Accident)’ (Nuclear Safety Commission 2011) published 4 August 2011 <[https://www.kantei.go.jp/jp/singi/genshiryoku/dai18/18\\_10\\_gensai.pdf](https://www.kantei.go.jp/jp/singi/genshiryoku/dai18/18_10_gensai.pdf)> accessed 9 February 2023. Emphasis added. The NSC’s dose guidance on the 20 mSv/year benchmark is slightly different from that used by the MEXT and MoE. For the NSC, the dose reference includes both external and internal exposure doses of an individual while the MEXT and MoE often use the 20 mSv/year benchmark for ambient radiation doses detected in the environment.



major roads, and communication as well as medical and nursing facilities, schools and grocery shops are restored; and 3) an ample consultation with stakeholders (the prefecture, municipalities and residents) is implemented.<sup>840</sup> It then proposes to reorganise evacuation zones according to the radiological situation of concerned areas using the criteria of 20 mSv/year, thus cancelling the distance-based zone, notably Restricted Zone (i.e., the area within 20 km radius from F1NPP).

The government justified this dose level by referring again to the conclusion of the WG on low-dose radiation risks,<sup>841</sup> and argued that cancer risk associated with radiation exposure to doses less than 20 mSv/year is ‘sufficiently low compared to such risk associated with drinking alcohol, smoking, obesity or lack of vegetable consumption’.<sup>842</sup> The government indeed adopted the same dose criterion, used for evacuating the population, for the returning of the population to the contaminated areas. This would theoretically mean that a person (or a child) could be exposed to cumulative radiation dose of 100 mSv in the following five years. As studied in the previous chapter, 100 mSv is the dose limit for radiation workers for the period of five years, which only concerns adults.

The most recent ICRP publication (2020) on the post-accident protection measures indeed recommends the reference dose of less than 10 mSv/year for long-lasting exposure situations in the recovery phase.<sup>843</sup> The JFBA, the Japanese lawyers’ federation, strongly

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<sup>840</sup> NERHQ, ‘ステップ 2 の完了を受けた警戒区域及び避難指示区域の見直しに関する基本的考え方及び今後の検討課題について (The Basic View and Future Reflections on Restricted Zone and Evacuation Zones after the Termination of Step 2)’ (Nuclear Emergency Response Headquarters/Government of Japan 2011) 26 December 2011 <[https://www.meti.go.jp/earthquake/nuclear/pdf/111226\\_01a.pdf](https://www.meti.go.jp/earthquake/nuclear/pdf/111226_01a.pdf)> accessed 9 February 2023. Translation of the title by R. Hasegawa

<sup>841</sup> Cabinet Secretariat (n 36).

<sup>842</sup> NERHQ, ‘ステップ 2 の完了を受けた警戒区域及び避難指示区域の見直しに関する基本的考え方及び今後の検討課題について (The Basic View and Future Reflections on Restricted Zone and Evacuation Zones after the Termination of Step 2)’ (n 840) 4.

<sup>843</sup> ICRP, ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.’ (n 38).

criticised this decision citing the Japanese legislation concerning the RCA and the example of Chernobyl Law and urged the government to adopt the public dose limit – 1 mSv/year – for the return of evacuees. This persistent use of the 20 mSv/year benchmark, even in the recovery phase, will shape the Fukushima compensation scheme, as seen below, which forms the basis of the Fukushima protection status.

Based on the Basic View after Step 2 document, the government reorganised evacuation zones in March 2012 (A), one year after the accident, and began lifting evacuation orders in 2014 (B), three years following the accident.

#### **A. Reorganisation of Evacuation Zones (March 2012: One Year After)**

As planned in the Basic View after Step 2, evacuation zones were restructured into three new zones in March 2012, one year after the accident (Figure 9). In contrast to the previous zoning which was based on both the distance and the radiological situation, new zones are solely based on the contamination level of the area.<sup>844</sup> According to this new zoning, the areas with doses less than 20 mSv/year are defined as ‘areas to which evacuation orders are ready to be lifted’ (Green Zone, hereafter)<sup>845</sup>. The areas with radiation doses between 20-50mSv/year are called ‘areas in which the residents are not permitted to live’ (Yellow Zone, hereafter). These two zones became the target area for intensive decontamination and early return of evacuees. The areas with doses of more than 50mSv/year, on the other hand, were designated as ‘areas where it is expected that the residents have difficulties in returning for a long time’ (Red Zone

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<sup>844</sup> Fassert and Hasegawa (n 42); Hasegawa and others (n 49). The authors show that the zoning also takes political and administrative interests into consideration in addition to the radiological situation.

<sup>845</sup> The area is not officially called Green Zone. The author of this thesis uses the term to simplify the name of the zone. In fact, the said area is coloured green on the official map published by the METI.

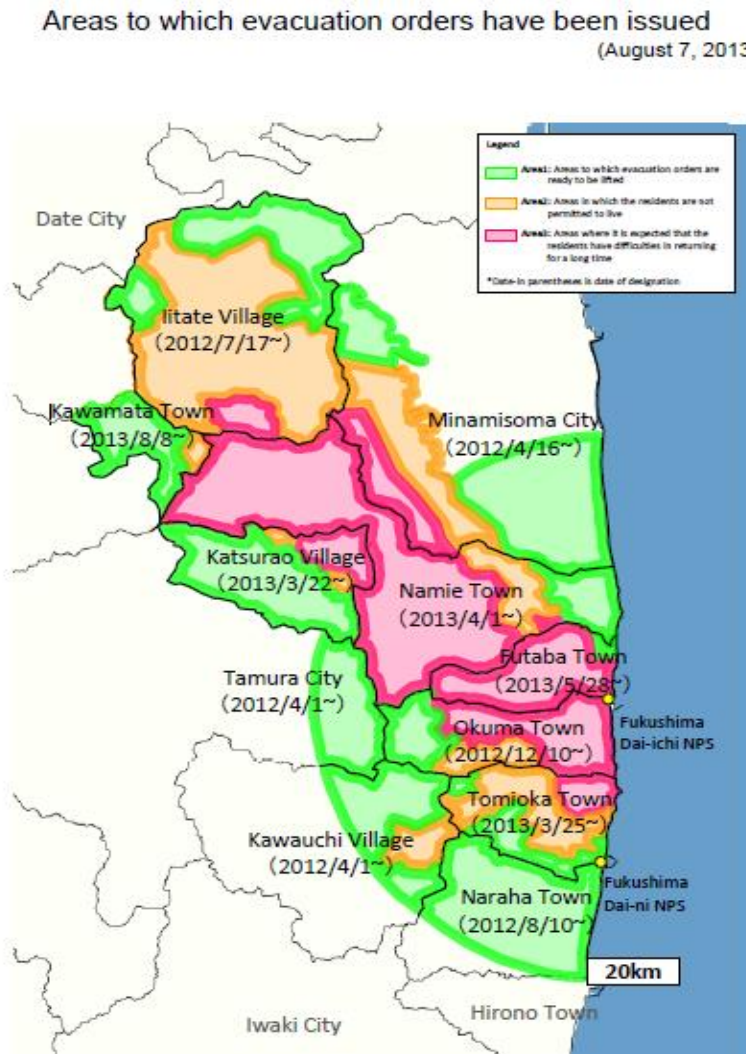
or Difficult-to-Return Zone, hereafter) and became the *de facto* area closed for human habitation.<sup>846</sup>

Meanwhile, this reorganisation of zones also reveals the government's true priority of the Fukushima recovery: territorial integrity and municipal survival. What becomes clear from the below map is that all the 11 municipalities affected by the evacuation orders are provided with a piece of Green Zone, the area where evacuation orders will be lifted, and evacuees will be able to return. The extreme example of this government's intention is Futaba town. Hosting the F1NPP jointly with Okuma town, 96% of Futaba's territory was highly contaminated by the radiation release and included in the Red Zone (more than 50 mSv/year). Despite this reality, the government designated the remaining 4% of the territory as Green Zone in the reorganisation. As such, none of the municipalities affected by the accident will be relocated elsewhere or "disappear" from the map. This is part of the "reclaiming" of contaminated territories, the Fukushima recovery strategy fixed by the government under the Reconstruction Act. As analysed in the previous Title, this was also one of the recovery priorities set by the French authorities in the event of a large nuclear accident. The Futaba case has a symbolic importance, shaping not only the entire Fukushima disaster management but also influencing the management of future large accidents in the world.

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<sup>846</sup> Notwithstanding, evacuation orders were also lifted in some parts of the Red Zone, namely in Futaba, Ookuma and Tomioka towns in recent years.

Figure 9: Map of Reorganised Evacuation Zones (March 2012)<sup>847</sup>



This rearrangement was determined by the government without consulting the concerned municipalities and population. The chosen dose threshold of 20 mSv/year was thus never put on the table for discussion with the stakeholders. The NERHQ’s policy paper only mentioned the stakeholder consultation in the context of deciding the timing of lifting evacuation orders and the management of new zones. Also, in the document, the term “resettlement” or “long-term relocation” was not mentioned at all though the term “return” appeared at least 10 times. Based on this reorganisation, evacuation orders were progressively

<sup>847</sup> Source: METI

lifted not only in Green Zone but also Yellow Zone and even some parts of Red Zone in the following years.

Two years after the reorganisation of evacuation zones, the government organised another expert committee, the Study Team on Safety (*Anshin*) and Security (*Anzen*) Measures for the Return of Evacuees under the auspices of the Nuclear Regulation Authority in September-November 2013.<sup>848</sup> While the Team was initially tasked to formulate actions to facilitate and encourage the return of evacuees, the outcome document ‘Practical Measures for Evacuees to Return Their Homes’ gave a more nuanced approach. It notably stated that ‘the Japanese Government must fully respect the decisions made by individual evacuees regardless of whether they return to their homes or not’ and shall ‘organise the assistance programme so as to avoid creating a divide between those who return and those who choose not to’.<sup>849</sup> This was probably owing to the fact that the NRA, placed under the MoE, had invited a few non-radiation experts from environmental and agricultural science fields in addition to traditional radiation experts to become members of the Team.

Based on this outcome document, the Cabinet published the second major policy paper on the Fukushima recovery ‘Toward the Acceleration of Fukushima Reconstruction from the Nuclear Disaster’ on 20 December 2013, which clearly stated that ‘the government proposes two-prong assistance programme consisted of early return support and new life support (i.e.,

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<sup>848</sup> The original name of the Study Team is 帰還に向けた安心安全対策に関する検討チーム, translated by R. Hasegawa. *Anshin* is translated here as “safety” but the word has a slightly different meaning in Japanese. While *Anzen* encompasses both security and safety, *Anshin* is rather a cognitive notion which designates ‘a feeling of being in security’ or ‘a feeling of reassurance’. Therefore, the title of the Study Team indicates that the government intended to come up with measures not only to ensure the safety of people upon return but also to convince people that it is safe to return.

<sup>849</sup> NRA, ‘Practical Measures for Evacuees to Return Their Homes’ (Nuclear Regulation Authority 2013) published 20 November 2013 1–2 <<http://www.nsr.go.jp/data/000067234.pdf>> accessed 9 February 2023. However, the quote is drawn from the original report in Japanese. The English version of the report does not have the statement.

resettlement) of the evacuees'.<sup>850</sup> Accordingly, MEXT's Reconciliation Committee for Damage Compensation issued new compensation guidelines on 26 December 2013 which enabled evacuees to purchase or reconstruct new homes in the place of resettlement.

However, the actual implementation of these policies on the ground was far from the promised "two-pronged" approach and paying 'full respect on the decisions made by individual evacuees'. Apart from the relocation house purchase compensation, almost all the support measures were designed to encourage the return of evacuees. In addition, the government also used a carrot-and-stick tactic to achieve such a goal. The new policy paper indeed proposed several financial incentives in the form of compensation such as additional house rehabilitation compensation and "early return compensation" to offset the inconvenience of daily lives upon return.<sup>851</sup> At the same time, it announced the end of the compensation for mental anguish related to evacuation (psychological compensation, hereafter) at one year from the lifting of evacuation orders. In fact, this compensation constituted the major financial assistance for evacuees, enabling them to sustain their evacuation life elsewhere.<sup>852</sup> The end of the compensation thus meant that evacuees would be cut off from this vital aid and constrained to return home (or resettle elsewhere).

In fact, as further analysed below, the government's assistance scheme in the Fukushima recovery is largely implemented by the compensation scheme. In other words, the Japanese government used TEPCO's damage compensation to finance its Fukushima recovery

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<sup>850</sup> NERHQ, '原子力災害からの福島復興の加速に向けて (Toward the Acceleration of Fukushima Reconstruction from the Nuclear Disaster)' (Nuclear Emergency Response Headquarters/Government of Japan 2013) 20 December 2013 1 <<https://www.env.go.jp/jishin/rmp/conf/10/ref03.pdf>> accessed 9 February 2023.

<sup>851</sup> NERHQ, '原子力災害からの福島復興の加速に向けて (Toward the Acceleration of Fukushima Reconstruction from the Nuclear Disaster)' (n 850). The translation of 早期帰還者賠償 in English done by R. Hasegawa

<sup>852</sup> For this compensation, evacuees from official evacuation zones and radiation hotspots received 100,000 yen (800 euros equivalent) per person per month.

strategies, orienting it in such a way as to achieve its goals. The announced termination of psychological compensation – the *de facto* evacuation assistance – is a typical example of such practice.

Not surprisingly, the announcement triggered a strong indignation among the evacuees who saw a government’s pressure to make them return against their will. Others felt as if they were given a one-year “sentence” in which they were compelled to choose between return and resettlement before they were ready or had all the necessary information enabling them to make a sound judgement. These policy announcements clearly indicated that the government’s priority was fixed on the return of evacuees for the Fukushima recovery despite the political statement on the “two-pronged” approach.

## **B. Termination of Evacuation Measure at All Costs**

After the publication of NERHQ’s policy papers, the government (the METI Victims Support Team) began to organize stakeholder consultations in the concerned municipalities one by one with the aim of swiftly lifting evacuation orders. Initially set to promote the return of evacuees, government’s priority ended up becoming the termination of evacuation measures at all costs by cutting off the vital assistance for evacuees so that they were constrained to return with the government’s full package or resettle elsewhere with partial assistance (or on their own). This sub-paragraph first examines how the lifting of evacuation orders was organised by the authorities (1) and secondly, how the evacuation assistance was progressively curtailed to terminate the evacuation of residents as a protection measure (2).

### **1. Imposed Lifting of Evacuation Orders**

Once decided by the government, the lifting of evacuation orders was impossible for the municipalities and evacuees to change or postpone. During field interviews, many evacuees

expressed their frustration and helplessness, feeling that their concerns and needs were simply ignored by the authorities in these consultations.<sup>853</sup> Indeed, the government called these consultations *setsumei-kai* in Japanese, which literally means “explanation meetings”. Ana Mosneaga, a migration specialist, notably called these meetings “the decide–announce–defend (DAD) model of policymaking” where consultations are geared toward setting in motion policies predetermined by the government rather than adjusting proposed policies in line with evacuees’ wishes.<sup>854</sup> Moreover, the meetings were organised behind closed doors without any presence of media, NGOs, legal or independent experts.<sup>855</sup> During an interview, an officer of the METI Victims Support Team affirmed that NGOs were not considered as stakeholders and thus excluded from these explanation meetings.<sup>856</sup> Without the presence of third parties, the power balance often works in favour of policymakers with financial means and executive capacities, leaving evacuees with no alternatives but to accept the proposed decision.<sup>857</sup> As such, evacuation orders were progressively lifted in Fukushima, regardless of the views and oppositions expressed by the evacuees.

The first evacuation order was lifted in Tamura city in April 2014, three years after the accident, upon the completion of decontamination operations in the city. According to the opinion poll taken before the lifting, only 6.7% of Tamura evacuees expressed their willingness to return while 34.5% were in favour of return but with certain conditions (e.g., further reduction of radiation doses) and another 30% were undecided.<sup>858</sup> As a result, the government

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<sup>853</sup> Fassert and Hasegawa (n 42).

<sup>854</sup> Ana Mosneaga, ‘Tackling Prolonged Displacement: Lessons on Durable Solutions from Fukushima.’ (United Nations University 2015) Policy Brief No.1.

<sup>855</sup> Hasegawa, ‘Returning Home after Fukushima: Displacement from a Nuclear Disaster and International Guidelines for Internally Displaced Persons.’ (n 42).

<sup>856</sup> Fassert and Hasegawa (n 42).

<sup>857</sup> Hasegawa, ‘Returning Home after Fukushima: Displacement from a Nuclear Disaster and International Guidelines for Internally Displaced Persons.’ (n 42).

<sup>858</sup> Reconstruction Agency, Fukushima Prefecture and Tamura city, ‘田村市住民意向調査 調査結果 (Tamura City Residents Survey: Results)’ (2013) published 5 February 2013 <[www.reconstruction.go.jp/topics/20130205\\_ikouchousa\\_sokuhoubettentamura.pdf](http://www.reconstruction.go.jp/topics/20130205_ikouchousa_sokuhoubettentamura.pdf)> accessed 9 February 2023.



faced a strong opposition from the evacuees during a series of explanation meetings. However, at the fourth meeting, the Vice Minister of METI unilaterally declared that he would lift the order as of 1 April 2014 on the basis of the “government’s judgement”.<sup>859</sup> The then Mayor of Tamura city, Yukei Tomitsuka, also added, ‘if this abnormal situation (i.e. evacuation) continues, residents will lose attachment to their hometown and the community will collapse’.<sup>860</sup> As such, the evacuation order in Tamura city was lifted as decided by the government in April 2014 while the majority of concerned evacuees were still sceptical or opposed to it.

The story was repeated in other municipalities: the government lifted evacuation orders based on its own prefixed criteria regardless of strong opposition from the residents. Each time, the METI Vice Minister defended such a decision by stating that ‘(t)he evacuation order is forcing people (to stay out of the evacuation zones) despite the Constitution guaranteeing them the right to choose their residence’ and ‘if the zones are no longer life-threatening, then we must consider lifting the evacuation orders’.<sup>861</sup> This statement raises two concerns.<sup>862</sup> First, the Vice Minister refers to Article 22 of the Constitution by only mentioning the citizens’ “right to repatriation” but fails to explain that such constitutional right also includes “the right to not returning”, in other words, to relocate or resettle in other parts of Japan.<sup>863</sup> The other concern is with the METI Vice Minister’s notion of “no longer life-threatening”. When there is a

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<sup>859</sup> Akio Fujiwara, ‘福島田村市 4月1日避難解除 「官僚は頭がいいんです」、判断押し切る (Evacuation Order Will Be Lifted on 1 April in Tamura City, Fukushima. “Ministry Officials Are Clever”, the Government Decision Pushed Through)’ *Mainichi Shimbun* (4 November 2011).

<sup>860</sup> Asahi Shimbun, ‘Government to Lift Fukushima Evacuation Order for 1st Time’ *Asahi Shimbun* (Tokyo, 24 February 2014). Brackets added.

<sup>861</sup> Asahi Shimbun, ‘Second Group of Fukushima Residents Given OK to Return Home in Evacuation Zone’ *Asahi Shimbun* (Tokyo, 18 August 2014).

<sup>862</sup> Hasegawa, ‘Returning Home after Fukushima: Displacement from a Nuclear Disaster and International Guidelines for Internally Displaced Persons.’ (n 42).

<sup>863</sup> Article 22 of the Constitution states that ‘(e)very person shall have freedom to choose and change his residence and to choose his occupation to the extent that it does not interfere with the public welfare’. Translation by *Kantei* (Prime Minister’s Office of Japan) at [https://japan.kantei.go.jp/constitution\\_and\\_government\\_of\\_japan/constitution\\_e.html](https://japan.kantei.go.jp/constitution_and_government_of_japan/constitution_e.html) accessed 8 February 2023

scientific controversy over low-dose radiation effects, how can the government justify that exposure to radiation doses at 20 mSv/year and less is no longer life-threatening? Moreover, is the “no longer life-threatening” radiological situation safe enough for people including children to live?

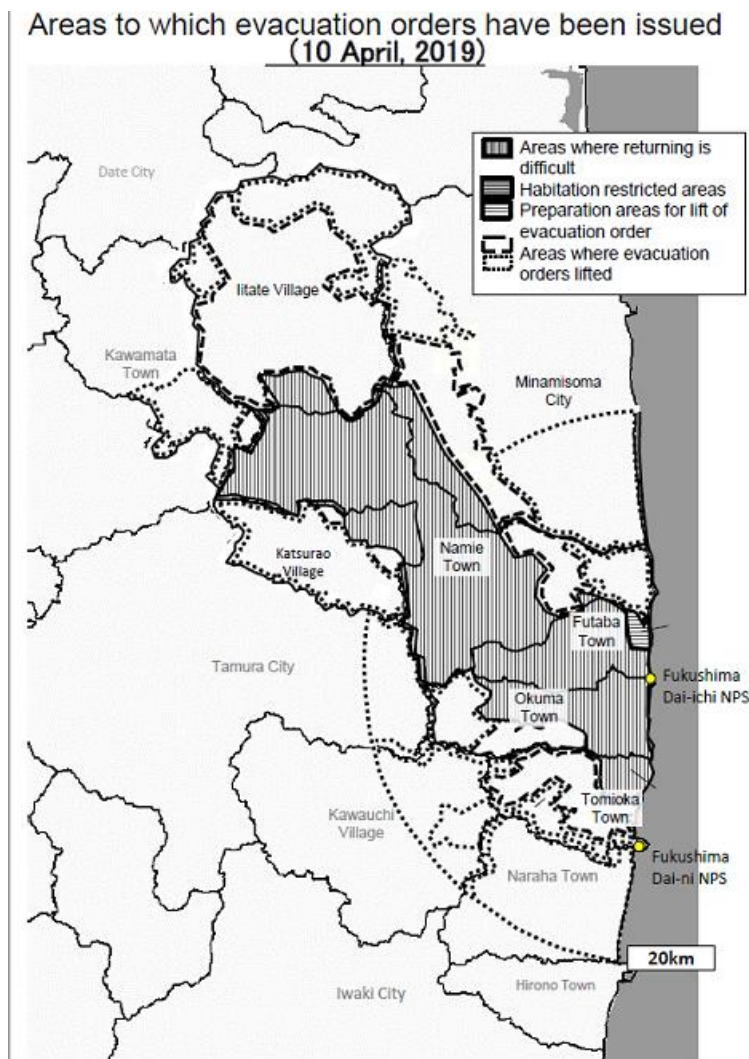
When the government was negotiating the third case of lifting in Naraha town, the NERHQ revised the policy paper on the acceleration of Fukushima reconstruction in June 2015.<sup>864</sup> The novelty of the revised policy was the extension of psychological compensation to seven years from the accident (until March 2018) instead of one year from the day when evacuation orders are lifted. And this was applied to all evacuation zones – Green and Yellow Zones – regardless of whether evacuation orders have been lifted or not and whether individuals decided to return or not.<sup>865</sup> For the first time, the document stated that lifting the order did not systematically oblige evacuees to return. This change of policy, which disassociated compensation payment from the lifting of orders, thereby ensuring the equal treatment of all evacuees from Green and Yellow Zones regardless of their mobility choices, significantly helped the government to accelerate the process of lifting evacuation orders. As a result, all the evacuation zones – Green and Yellow Zones – were neutralised by March 2017, six years after the accident, except the Red Zone and the two host towns of F1NPP (Futaba and Okuma) (see Figure 10 below).

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<sup>864</sup> NERHQ, ‘「原子力災害からの福島復興の加速に向けて」改訂 (Revised Version: Toward the Acceleration of Fukushima Reconstruction from the Nuclear Disaster)’ (Nuclear Emergency Response Headquarters/Government of Japan 2015) 12 June 2015.

<sup>865</sup> As for the Red Zone, since it had already been recognised as a “difficult-to-return” zone due to high radiation doses, the evacuees from that zone were already provided with a lump sum payment of seven-year’s worth of compensation.

Figure 10: Map of Evacuation Zones after March 2017<sup>866</sup>



As for radiation hotspots, the government had unilaterally decided the termination of all the hotspot designations in Date, Kawauchi, and Minamisoma by December 2014 based on the 20 mSv/year dose benchmark without organising stakeholder consultations.<sup>867</sup>

<sup>866</sup> Source: METI

<sup>867</sup> NERHQ, ‘伊達市における特定避難勧奨地点の解除について (Termination of Radiation Hotspot Designation in Date City)’ (Nuclear Emergency Response Headquarters/Government of Japan 2012) 14 December 2012; NERHQ, ‘川内村における特定避難勧奨地点の解除について (Termination of Radiation Hotspot Designation in Kawauchi Village)’ (Nuclear Emergency Response Headquarters/Government of Japan 2012) 14 December 2012; NERHQ, ‘南相馬市における特定避難勧奨地点の解除について (Termination of Radiation Hotspot Designation in Minamisoma City)’ (Nuclear Emergency Response Headquarters/Government of Japan 2014) 24 December 2014.

In 2019 and 2020, the government also lifted the evacuation order – Green and Yellow Zones - in Futaba and Ookuma towns, the two host towns of the F1NPP. As explained earlier, Futaba has a small area of Green Zone, populated only with 272 persons prior to the accident, where the town plans to reconstruct, create new jobs, restart farming, and attract new residents/commuters.<sup>868</sup> In addition, the government revised the Reconstruction Act in May 2018 which allowed Futaba town to decontaminate and reclaim another small area (5.6 km<sup>2</sup>) of the territory within the Red Zone, in addition to the small Green Zone area, with the aim of reconstructing and hosting a total of 2,000 returnees or new residents in town.<sup>869</sup> This zealous reconstruction plan was all decided by the town administration and approved by the State despite the fact that only 10% of the residents (about 600 persons) planned to return and 63% of them had already decided not to return to Futaba town according to the residents' survey in 2019.<sup>870</sup> Finally, the Fukushima recovery plan was decided and pushed through by central and local authorities, irrespective of the opinions or needs of the affected populations.

## 2. Termination of Evacuation Assistance

Government's evacuation assistance is composed of two core pillars: temporary housing assistance (in-kind) and psychological damage compensation (financial aid). These two measures enabled the residents under evacuation orders to subsist during temporary relocation, or to rebuild their new life in the place of relocation.<sup>871</sup> There were other support measures created by the government, such as tax reductions/exemptions, free medical check-ups, and

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<sup>868</sup> Source: Futaba Town website (<https://www.town.fukushima-futaba.lg.jp/9533.htm>)

<sup>869</sup> Futaba Town, '双葉町復興まちづくり計画 (第3次) (The 3rd Futaba Town Reconstruction Town Building Plan)' (Futaba Town, Fukushima 2022).

<sup>870</sup> Reconstruction Agency, '住民意向調査速報版 (双葉町) の公表について (Futaba Town Residents Survey: Preliminary Report)' (2019) published 27 December 2019 <[https://www.reconstruction.go.jp/topics/m19/12/191227\\_ikouchousa.pdf](https://www.reconstruction.go.jp/topics/m19/12/191227_ikouchousa.pdf)> accessed 10 February 2023.

<sup>871</sup> Kosuke Hino, '原発避難の発生と経過 (Emergence and Process of Nuclear Evacuation)' in Institute of Disaster Area Revitalization, Regrowth and Governance, JCN and SAFRAN (eds), *原発避難白書 (White Paper on Nuclear Evacuation)* (Jinbun Shoin 2015).

highway toll exemption, but the core of the evacuation life support was constituted by these two measures. However, the evacuees from out-of-zone areas – *kuiki-gai* evacuees – were excluded from the latter measure – psychological compensation (financial support) – and thus only relied on the shelter assistance to survive in evacuation. Thanks to this shelter measure, evacuees who fled across Japan could receive free housing in prefabricated shelters and public apartments or live in rent-subsidised flats in the place of their relocation.

But in March 2017, six years after the accident, the Fukushima prefectural government announced the termination of this shelter assistance.<sup>872</sup> This coincided with the termination of psychological damage compensation announced by the revised NERHQ’s policy paper, which would effect in March 2018. This meant the end of all public support for Fukushima evacuees.

When both the temporary housing assistance and the psychological damage compensation were stopped by the authorities, evacuees under evacuation orders were obliged to choose from a biased set of options: 1) repatriation with a comprehensive support package including house rehabilitation aid, employment opportunities, and new social services, or 2) resettlement with house construction/purchase aid only. In the latter option, evacuees had to rebuild their lives elsewhere almost on their own. For the out-of-zone evacuees, this meant that they were completely on their own to continue their evacuation or resettle in the place of their refuge. This “evacuation termination policy”<sup>873</sup> ultimately contributed to ending the “post-accident” phase, erasing the most visible traces of the accident and reinforcing the “normalisation” of contaminated territories.<sup>874</sup>

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<sup>872</sup> Temporary housing assistance is managed by the Fukushima Prefecture under the authority delegated by the government in accordance with the Disaster Relief Act (Act No. 118 of 18 October 1947). See Takeshi Fukuda, ‘応急仮設住宅制度の現状と課題 (Current Status and Challenges of Temporary Shelter Housing Scheme)’ (National Diet Library 2017) Issue Brief No. 966.

<sup>873</sup> The term was coined by Fujiwara and Yokemoto (n 815).

<sup>874</sup> Topçu, ‘Catastrophes nucléaires et « normalisation » des zones contaminées : Enjeux politiques, économiques, sanitaires, démocratiques et éthiques.’ (n 319); Fassert (n 494).

## **§4: Policy Consequences: Low Return Rate and Community Disintegration**

As shown above, the Fukushima bipartite recovery scheme – decontamination and reconstruction with “risk communication” – had one shared objective: to make residents return and retain the population in the Prefecture through the “normalisation” of contaminated territories. This policy produced specific consequences on the affected communities in former evacuation zones and out-of-zone contaminated areas. This sub-paragraph identifies and analyses these consequences, first in former evacuation zones (A) and secondly, in out-of-zone areas (B).

### **A. Former Evacuation Zones: Low Return Rate, “Marginal Communities”<sup>875</sup>, and Missed Opportunities**

The major consequences of the Fukushima recovery policy in former evacuation zones are described by the low return rate (1) and missed opportunities (2).

#### **1. Low Return Rate and the Birth of “Marginal Communities”**

The hastened lifting of evacuation orders at the 20 mSv/year dose benchmark resulted in the low rate of residents’ return to the former evacuation zones. As of September 2022, 11 years after the accident, the occupancy rate of former evacuation zones was 32% on average compared to the situation before the accident.<sup>876</sup> This rate includes not only returnees but also new residents who came to settle in former evacuation zones, attracted by new employment opportunities created by State assistance. Meanwhile, the situation greatly varies from one town to another. Tamura city, the first case of order-lifting, has an exceptionally high occupancy rate

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<sup>875</sup> The term was coined by Akira Oono, ‘山村の高齢化と限界集落 (Mountainous Aging Society and Marginal Communities)’ (1991) No. July 1991 Keizai.

<sup>876</sup> Yoshida, ‘避難指示解除区域の住民帰還頭打ち 福島第一原発事故被災地、移住率 3割にとどまる (The Return of Evacuees to the Former Evacuation Zone Hit the Ceiling, the Rate of Inhabitation at 30% in the Affected Areas of the Fukushima Daiichi Nuclear Accident)’ (n 40).

of 85%, followed by Naraha town with 64% and Minamisoma city with 60%. Futaba and Ookuma towns, the two host towns of the F1NPP, have an occupancy rate of less than 1% and 6% respectively.<sup>877</sup> This timid return of evacuees was quite predictable from the result of many evacuee surveys. One of them conducted before the lifting of evacuation orders in 2013 showed that only 6.3% of the respondents felt comfortable returning home at doses less than 20 mSv/year while the majority (67%) responded that they would feel safe to go back only when the dose level is reduced less than 1 mSv/year – public dose limit.<sup>878</sup>

The return of evacuees after the Fukushima nuclear disaster also had a demographic particularity: there was a very scant return of children and young generations. The average percentage of children (less than 15 years old) among the returnees is only 6% while that of the older generation (more than 65 years old) occupy 43%.<sup>879</sup> For some towns, the percentage of those over 65 even reaches 60-67%.<sup>880</sup> The Reconstruction Agency's evacuee surveys also confirm the trend: the younger the person is, the less likely he or she will return.<sup>881</sup> This indicates that many parents are still wary of the radiological situation in former evacuation zones and not convinced by the dose benchmark of 20 mSv/year despite the intensive “risk communication” of the government.

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<sup>877</sup> *ibid.*

<sup>878</sup> Takuya Tsujiuchi, ‘深刻さつづく原発事故被災者の精神的苦痛 - 帰還をめぐる苦悩とストレス (The Lasting Serious Psychological Suffering of Accident Victims: Agony and Stress Around the Issue of Return)’ (2014) Special Issue 852: イチエフ・クライシス (Fukushima Daiichi Crisis) Sekai 103; cited by Ryoichi Yoshimura, ‘「自主的避難者 (区域外避難者)」と「滞在者」の損害 (Damages Related to “Self (Out-of-Zone) Evacuees” and “Stayers”)’ in Takehisa Awaji, Ryoichi Yoshimura and Masafumi Yokemoto (eds), *福島原発事故 賠償の研究 (Fukushima Nuclear Accident: the Compensation Study)* (Nihon Hyoron Sha 2015).

<sup>879</sup> Yoshida, ‘避難指示解除区域の住民帰還頭打ち 福島第一原発事故被災地、移住率3割にとどまる (The Return of Evacuees to the Former Evacuation Zone Hit the Ceiling, the Rate of Inhabitation at 30% in the Affected Areas of the Fukushima Daiichi Nuclear Accident)’ (n 40).

<sup>880</sup> *ibid.*; The rate is from Kawauchi and Kawamata villages.

<sup>881</sup> Source: Reconstruction Agency (only in Japanese) (<https://www.reconstruction.go.jp/topics/main-cat1/sub-cat1-4/ikoucyousa/>) accessed 10 February 2023

In this context, one may ask a question as to what would become of these towns in 10 to 20 years.<sup>882</sup> What does a community look like when most residents are over 60, and there are very few people of a working age, or children? How long does such a town survive? In fact, when these returnees fall sick or need nursing help at home, they may have to leave the town again in search for suitable medical service or family care since most of their children chose to resettle elsewhere for the sake of their children and the available medical service in former evacuation zones is limited. In this respect, the return of evacuees after the Fukushima accident is ephemeral and unsustainable where it does not guarantee the survival or long-term existence of these affected municipalities.<sup>883</sup>

A Japanese sociologist, Akira Ono, coined the term “marginal communities” (*genkai shuraku* in Japanese) to describe villages at risk of eventual “extinction” where more than half of the inhabitants are over 65 years old.<sup>884</sup> The Fukushima recovery strategy pushed by the Japanese government finally seems to create these “marginal communities”. According to Yusuke Yamashita, a sociologist who closely studied the case of Tomioka town (former evacuation zone), the affected municipalities of the Fukushima disaster became the victim of the State-defined recovery policy.<sup>885</sup> Municipal budgets being totally dependent on the State following the disaster, the mayors did not basically have any choice but to accept the lifting of evacuation orders as imposed by the State. These municipalities cannot simply survive without State subventions and ‘therefore have, in a sense, lost their autonomy as municipalities’.<sup>886</sup>

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<sup>882</sup> Hasegawa, ‘Five Years on for Fukushima’s IDPs: Life with Radiological Risk and without a Community Safety Net’ (n 41); Fassert and Hasegawa (n 42).

<sup>883</sup> Hasegawa, ‘Five Years on for Fukushima’s IDPs: Life with Radiological Risk and without a Community Safety Net’ (n 41).

<sup>884</sup> Oono (n 875); cited by Yamashita (n 824).

<sup>885</sup> Interview conducted with Yusuke Yamashita in his office at Tokyo Metropolitan University, 20 March 2017, in Tokyo.

<sup>886</sup> *ibid*



## 2. Ignored Alternative Solutions and Missed Opportunities

Field interviews with the affected population also found that the low return rate was also caused by the government not taking into account divergent views expressed by the victims themselves. During the interviews, many evacuees expressed that the two-pronged solution – return or resettlement – proposed by the authorities did not correspond to their needs and wishes and that they felt forced into making a shaky decision for their future. The simple dichotomy of the choice indeed did not fully grasp the state of mind of many evacuees who were torn between “wanting to return home” and “cannot return home”.<sup>887</sup> The imposed dichotomy also created tension and division within the evacuee community where those reluctant to go back were stigmatised, accused of abandoning the community and dragging the whole process of early return and reconstruction of the communities. Previously united, evacuee communities began to split over the question of return. It ended up breaking up social relations and safety nets that had been cultivated over generations in some of these rural communities.

The imposed dichotomy also ignored alternative solutions proposed by the affected municipalities and evacuees, missing an opportunity for genuine durable solutions. The key notion missed by the State authorities is that the majority of evacuees wanted to return but at a later stage with a time span of 10-20 years.<sup>888</sup> During the interviews, many evacuees in their 30s and 40s with children said that they wanted to return home as soon as their children would grow up and leave their household, wishing that their children would also return one day. It showed their strong attachment to their communities as well as their pragmatic view on radiation risk in which they essentially wanted to protect children who are more sensitive to

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<sup>887</sup> Yokemoto, ‘不均等な復興とは何か (What Is Imbalanced Reconstruction?)’ (n 832); Imai, *自治体再建—原発避難と「移動する村」* (*Reconstruction of Municipalities: Nuclear Evacuation and “Mobile Town”*) (n 786); Fassert and Hasegawa (n 42).

<sup>888</sup> Fassert and Hasegawa (n 42).

radiation effects. In view of this, many researchers suggested the need for a third option: the concept of “long-term refuge in waiting”, *taihi* in Japanese.<sup>889</sup> To make *taihi* possible, Akira Imai, a specialist of municipal governance, proposed the concept of “transitional town” or “virtual town” (also called, “second town” by Yamashita and Kainuma)<sup>890</sup>, a form of collective temporary resettlement or “enclave” in another town until the return will be possible with the consent of the majority of residents.<sup>891</sup>

In fact, the Mayor of Iitate village, which was included in Green, Yellow and Red Zones, had already proposed in 2011 the creation of a dual-residence registry whereby residents could be registered in two municipalities, just like dual citizenship, both in the original town and in the town of long-term refuge with the intention of operationalising the concept of “transitional town”.<sup>892</sup> Other municipalities in Red Zones (Futaba, Ookuma, Namie and Tomioka) also expressed interest in this concept, and the Reconstruction Agency even started a consultation process between these municipalities and possible host municipalities in 2012, using the term “out-of-town community”.<sup>893</sup> However, the concept faced a strong opposition

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<sup>889</sup> Harutoshi Funabashi, ‘震災問題対処のために必要な政策議題設定と日本社会における制御能力の欠陥 (The Essential Policy Agenda Setting for Dealing with Disaster Issues and the Defects in Management Capacities of the Japanese Society)’ (2013) 255 *International Journal of Japanese Sociology*; Imai, *自治体再建—原発避難と「移動する村」 (Reconstruction of Municipalities: Nuclear Evacuation and “Mobile Town”)* (n 786); Yamashita (n 824); Yokemoto, ‘不均等な復興とは何か (What Is Imbalanced Reconstruction?)’ (n 832). Translation of the term by R. Hasegawa.

<sup>890</sup> Yusuke Yamashita and Hiroshi Kainuma, *原発避難論—避難の実像からセカンドタウン、故郷再生まで (The Theory of Nuclear Evacuation: From the Reality of Evacuation to Second Town and Hometown Revival)* (Akashi Shoten 2012).

<sup>891</sup> Imai, *自治体再建—原発避難と「移動する村」 (Reconstruction of Municipalities: Nuclear Evacuation and “Mobile Town”)* (n 786).

<sup>892</sup> Naritake Machida, ‘「仮の町」から復興公営住宅へ (From “Virtual Town” to Recovery Public Housing)’ in Institute of Disaster Area Revitalization, Regrowth and Governance, JCN and SAFRAN (eds), *原発避難白書 (White Paper on Nuclear Evacuation)* (Jinbun Shoin 2015) 204.

<sup>893</sup> The report of these consultation meetings can be consulted (in Japanese only) on the Reconstruction Agency’s website (<https://www.reconstruction.go.jp/topics/main-cat1/sub-cat1-4/20131129194216.html>).

from some potential host municipalities such as Iwaki city and subsequently it was not materialised in the end.<sup>894</sup>

Instead, the government (METI)'s recovery strategy was only fixed on the *swift collective return* and, to a lesser degree, *individual resettlement* of residents. It thus critically lacked the third option – collective resettlement – for which many, including municipal mayors, voiced their favour. Without such an option, the Fukushima recovery finally led to the disintegration of affected communities as only a handful returned home while the majority others were scattered all over Japan to rebuild their lives almost on their own.

In the absence of a collective resettlement option, some residents invented their own alternative solution: “in-between return and resettlement”. It consists of resettling to other cities but commuting every day to their original town for work during the day. This “half-return”, or “dual residency”<sup>895</sup>, allowed families to keep their jobs and social relationships in the original town and to provide necessary care for ageing parents while avoiding the risk of radiation exposure for children. In other cases, fathers returned home to resume work while mothers and children resettled in other areas. But these adaptive and creative solutions undertaken by evacuees were seldomly recognised or assisted by the authorities, thus leaving them to manage by themselves.

The Fukushima recovery designed and implemented by the Japanese government thus represents a huge missed opportunity for the protection of affected persons, which did not reflect the views and ingenious solutions proposed by the affected communities and individuals, resulting in an extremely inefficient and unbalanced use of financial resources. Ultimately, the

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<sup>894</sup> Hideaki Tsunoda, ‘原発避難自治体の「町外コミュニティ」構想と自治体再建の課題 (The Concept of “Out-of-Town Communities” Proposed by Nuclear Evacuation Municipalities and the Challenges of Municipality Reconstruction)’ (Jichiroren Institute of Local Government 2015) Research and Report No. 107.

<sup>895</sup> Mosneaga (n 854).

government has spent at least 20 trillion yen (181 billion USD) on decontamination alone, to achieve the return of only 30% of all evacuees to former evacuation zones. This leads us back to the question that was asked by Yamashita earlier: the Fukushima recovery programme, it was implemented for the recovery of whom and for what purpose?

## **B. Out-of-Zone Areas: Community Divide and Abandonment**

As examined earlier, decontamination was the only protection measure proposed to the inhabitants of out-of-zone contaminated areas, presented as the only solution to reduce exposure doses while excluding all other options such as evacuation or permanent relocation.

The case of Fukushima city is emblematic, illustrating well how central and local authorities handled the management of out-of-zone contaminated areas. In the wake of the accident, two districts located on the east end of Fukushima city, Watari and Oonami, bordering with Date city, found themselves with high radiation doses like many other towns in the *Nakadori* region (see the map above, Figure 5 and 6). Despite the distance of 60 km from the troubled station, the city was in the passage of radioactive plume and affected by radiation doses which were equal to some places inside evacuation zones. In June 2011, official radiation measurements showed that the entire districts were detected with doses which exceeded 1  $\mu\text{Sv}/\text{hour}$  (approximately 5  $\text{mSv}/\text{year}$ ), the half of which had dose levels of more than 2  $\mu\text{Sv}/\text{hour}$  (approximately 10  $\text{mSv}/\text{year}$ ).<sup>896</sup> The radiation monitoring team also found nine spots which met the criteria for radiation hotspots where the residents would receive evacuation

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<sup>896</sup> Source: Fukushima City website, found at <<http://www.city.fukushima.fukushima.jp/kankyo-houshasen/bosai/bosaikiki/shinsai/hoshano/sokute/shinai/sokute/documents/8901.pdf>>, <<http://www.city.fukushima.fukushima.jp/kankyo-houshasen/bosai/bosaikiki/shinsai/hoshano/sokute/shinai/sokute/documents/8907.pdf>> accessed 11 February 2023; cited by Fassert and Hasegawa (n )

assistance if they choose to do so.<sup>897</sup> Despite these findings, local and central authorities decided not to designate them as radiation hotspots and explained to Watari and Oonami residents that the city would rather decontaminate the area instead of evacuate the residents. In the first meeting the city organised for Oonami residents in September 2011, six months from the accident, Fukushima city officials refused to recognise them as radiation hotspots by saying: ‘Evacuation of inhabitants will make economy shrink. We’d like to implement decontamination with the cooperation of inhabitants’.<sup>898</sup> As such, no hotspots have been officially recognised in Fukushima city while a total of 117 hotspots had been recognised in Date city, bordering with Fukushima city (the other side of Oonami district), where the families received compensation for their evacuation.

Decontamination as the substitute for evacuation was accompanied by a massive information campaign to reassure the population living in these areas, which often downplayed low-dose radiation risks by insisting that under the exposure dose of 100 mSv, health risk was insignificant. The most demonstrative example is the appointment of Radiation Risk Management Advisor by the Fukushima Prefecture as early as 19 March 2011, eight days following the accident. The first Advisor, Shunichi Yamashita, a medical professor of Nagasaki University, provided many public lectures on radiation risk, especially in the *Naka-dori* area – out-of-zone contaminated areas. He claimed that radiation exposure of 100 mSv was safe, explaining: ‘As long as you smile, radiation will not come to you. Radiation will come to people

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<sup>897</sup> Despite the dose criteria fixed by MEXT (3.8  $\mu$ Sv/hour as equivalent of 20 mSv/year), municipalities have set up their own hourly dose criteria for designating Hotspots based on the yearly dose criteria of 20 mSv/year established by the government. For example, Date and Minamisoma cities adopted 3.0  $\mu$ Sv/hour at 1m above the ground as a threshold for designating Hotspots. In addition, they created special thresholds for children and pregnant women: 2.7  $\mu$ Sv/hour at 1 m above in Date city, and 2.0  $\mu$ Sv/hour at 50 cm above the ground in Minamisoma city. In Date city, a total of 117 Hotspots had been recognised and in Minami-soma city, 142 spots were designated. Fukushima city fixed its dose criteria for radiation hotspots at 3.1  $\mu$ Sv/hour.

<sup>898</sup> Source: a press release of an environmental NGO, Friends of the Earth, published on 9 September 2011, who participated in the meeting (only in Japanese), found at <[http://www.foejapan.org/energy/news/pdf/110921\\_1.pdf](http://www.foejapan.org/energy/news/pdf/110921_1.pdf)> accessed 11 February 2023.

who worry. This fact has been clearly proven by animal testing. People who drink alcohol thus have less impact from radiation'.<sup>899</sup> Dr Yamashita played an important role in shaping the post-accident policies of Fukushima Prefecture and the government, appointed as a key expert for many government expert committees, notably MEXT's Reconciliation Committee to define the Fukushima compensation scheme.

As explained in the previous chapter, the 20 mSv/year doctrine and this decontamination-prime policy triggered both spontaneous evacuation and forced immobility of residents in these areas. Obviously, there were also residents who were not wary about the radiological situation and happy to stay in these areas. However, as the Fukushima city survey conducted in 2012 showed earlier, 90% of respondents were still worried about radiation effects on their children. In the context where the central and local authorities relentlessly communicated the harmlessness of low-dose risks and labelled self-evacuees and anxious stayers as "cowards", "unscientific", and "egoistic", 'holding the recovery effort back',<sup>900</sup> these stayers began to also criticise evacuees and wary stayers. The affected communities in out-of-zone areas were thus divided over the migratory choice and the views on radiation risk, creating an atmosphere of mistrust and jealousy, where alerting voices were marginalised and rebuked.

This non-recognition or neglect of out-of-zone evacuees and "trapped" stayers was reflected in the compensation scheme defined by the MEXT's Reconciliation Committee. Indeed, the out-of-zone residents in contaminated territories received only nominal compensation, eligible only to a one-time lump sum payment of 80,000 yen (600 euros

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<sup>899</sup> The lecture was given by Dr Yamashita in Fukushima city on 21 March 2011. A part of his speech can be watched at this video (with French subtitle) <<https://www.youtube.com/watch?v=g0i7BgwNtiQ>> accessed 10 February 2023.

<sup>900</sup> Slater, Morioka and Danzuka (n 44) 493.

equivalent) per person as psychological compensation.<sup>901</sup> Also, they were not included in the support scheme of the METI Nuclear Accident Victims Support Team under the Reconstruction Agency. Compared to the evacuees from evacuation zones, they were treated as the “second-class” victims, considered little legitimate to receive official assistance. The problem was that some of these residents were living in the radiological situation which was close to the evacuation zone (Yellow Zones) or radiation hotspot designation, as shown above in the case of Fukushima city. They were barely assisted by the authorities and negatively regarded in their own communities. In field interviews, they often expressed the feeling of abandonment by the Fukushima Prefecture and the government and sometimes the sense of isolation from their friends and families.<sup>902</sup>

To address this issue, a group of lawmakers pushed through a bill at the Diet in June 2012, which proposed an alternative model of protection based on the human rights principles for the both “voluntary” evacuees and the (“trapped”) stayers in these out-of-zone areas. The enactment of the Nuclear Accident Victims and Children Support Act thus brought many hopes to these victims.<sup>903</sup> However, the government did not publish the “Basic Framework”, the policy document which specifies the implementation of the Act, more than one year after the enactment. Once it finally came out, the policy was the collection of already existing measures for the out-of-zone affected areas, which changed neither the government policies toward out-of-zone victims nor the plight of many affected out-of-zone residents.

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<sup>901</sup> For children and pregnant women at the time of the accident, the lumpsum amount was raised to 400,000 yen (3,000 euros equivalent) for stayers and 600,000 yen (4,500 euros equivalent) for evacuees.

<sup>902</sup> Fassert and Hasegawa (n 42); Akira Imai, ‘原発災害避難者の実態調査（5次）（The Fifth Survey of Nuclear Evacuees）’ (2016) 450 *The Japan Research Institute for Local Government Monthly*.

<sup>903</sup> Act on Promotion of Support Measures for the Lives of Disaster Victims to Protect and Support Children and Other Residents Suffering Damage due to Tokyo Electric Power Company's Nuclear Accident (Act No. 48 of 27 June 2012)

Notwithstanding, the content of the Fukushima Children Support Law provides an inspiring model of protection for nuclear disaster victims and thus will be further explored in the next Part (Part Two, Title II, Chapter 1).



## Section 2: Fukushima Compensation Scheme and the Fukushima Status

According to Black's Law Dictionary, compensation is defined as: 1) remuneration and other benefits received in return for services rendered; esp., salary or wages, 2) payment of damages, or any other act that a court orders to be done by a person who has caused injury to another (in theory, compensation makes the injured person whole), and 3) set-off.<sup>904</sup> In the case of the Fukushima nuclear accident, compensation falls within the second definition but in reality it functioned as the *de facto* state's financial assistance for victims in sustaining the life in evacuation, as shown in the previous section.<sup>905</sup> Instead of 'making the injured person whole', the Fukushima compensation only partially filled such a role and replaced a large part of state assistance for victims, which should have been implemented in addition to the compensation. Consequently, when the psychological compensation payment ended seven years after the accident, the majority of state support for victims ended as well, leaving them on their own to recover from the consequences of the disaster.<sup>906</sup> The Fukushima compensation scheme thus constituted the major post-accident protection scheme orchestrated by the Japanese government even though the damage had been originally caused by the tortious act of a privately-owned company, TEPCO.

This section first examines the organisation and scope of the Fukushima compensation scheme in order to understand what damages were regarded as legitimate and who were considered as legitimate victims by the Japanese government (§1). In this analysis, a focus will be placed on the compensation payable to individuals rather than to legal persons such as companies and business owners in order to keep in line with the main objective of this doctoral research: the protection of displaced and trapped persons in nuclear disasters. This first

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<sup>904</sup> Bryan A Garner (ed), *Black's Law Dictionary* (5th edition, Thomson Reuters 2016).

<sup>905</sup> Yamashita, Ichimura and Sato (n 787).

<sup>906</sup> Yokemoto and Hiraoka (n 50).

paragraph also provides a general sense of how citizens are protected from nuclear disaster damages in an advanced economy. The following paragraph then presents the categories of victim status created by the said compensation scheme, “the Fukushima status”, and analyses its consequences on the affected residents and communities (§2).

## **§1. The Framework of Fukushima Compensation Scheme**

The Fukushima nuclear accident activated the Compensation Act for the second time in Japanese civil nuclear history. It was first implemented at the JCO Tokai criticality accident in 1991. But the scale of Fukushima damage compensation quickly exceeded that of the JCO accident and reached an unprecedented level in any nuclear damage compensation schemes ever established in the world. This paragraph first looks at how this pharaonic scheme of compensation was organised and established by the government and briefly touches upon the question of liability of the operator and the state emanating from the scheme (A). Secondly, it examines the scope of compensation defined by the Dispute Reconciliation Committee for Nuclear Damage Compensation (Reconciliation Committee), focusing on its criteria and legal bases used to justify such scope (B).

### **A. The Organisation of the Scheme and the Liability Question**

The Fukushima compensation scheme rests on the creation of two structures: the Nuclear Damage Compensation Facilitation Corporation (1) and the Dispute Reconciliation Committee for Nuclear Damage Compensation (3). This sub-paragraph examines the function and setup of these organisations as well as the question of state liability emanating from the creation of the first entity (2).

## 1. The Nuclear Damage Compensation Facilitation Corporation

In the wake of the accident, pursuant to Article 3.1 and 4.1 of the Compensation Act, the operator TEPCO was made strictly and exclusively liable for the damage caused by the Fukushima Daiichi Nuclear Power Plant accident for an unlimited amount. Having reached 9 trillion yen (75 billion euros) in October 2019,<sup>907</sup> the compensation largely exceeded the financial security of 120 billion yen (1 billion euros), prepared by the operator before the start of plant operations.<sup>908</sup> On 10 May 2011, TEPCO officially submitted a request for financial assistance to the government based on the provision Article 16 of the Compensation Act.<sup>909</sup> In response, the government passed the Nuclear Damage Compensation Facilitation Corporation Act (the Corporation Act, hereafter)<sup>910</sup> in the Diet, which established the Nuclear Damage Compensation Facilitation Corporation (the Corporation, hereafter) as a government-authorised corporation<sup>911</sup> under the auspices of the Cabinet Office on 12 September 2011. The creation of the Corporation was indeed a realisation of the state financial aid to TEPCO for compensation payment authorised under the Compensation Act (Art. 16). In practice, it was also an institutional arrangement to save and protect the company from the procedure of legal liquidation.<sup>912</sup> Indeed, faced with pharaonic clean-up costs and compensation payments,

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<sup>907</sup> The data is as of 11 September 2020 (in Japanese only) from TEPCO website ([https://www.tepco.co.jp/fukushima\\_hq/compensation/results/](https://www.tepco.co.jp/fukushima_hq/compensation/results/)), consulted on 18 September 2020.

<sup>908</sup> Article 7 of the Compensation Act requires all nuclear plant operators to prepare financial security before the start of operations.

<sup>909</sup> Yasufumi Takahashi, 'The Financial Support by the Nuclear Damage Compensation Facilitation Corporation' in NEA/OECD (ed), *Japan's compensation system for nuclear damage: as related to the TEPCO Fukushima Daiichi nuclear accident*. (NEA/OECD 2012).

<sup>910</sup> Act No. 94 of 3 August 2011

<sup>911</sup> 認可法人 in Japanese. Government-authorised corporations are the entities established upon special laws and required to be authorised by relevant ministries. Other examples of government-authorised corporations are the Bank of Japan under the auspices of the Ministry of Finance and Japanese Red Cross Society under the Ministry of Health, Labour and Welfare.

<sup>912</sup> Ken'ichi Oshima and Masafumi Yokemoto, '福島原発事故のコストをだれが負担するのか—再稼働の動きのもとで進行する責任のあいまい化と東電救済 (Who Will Shoulder the Costs of the Fukushima Nuclear Accident? Obscuring Responsibility and Rescuing TEPCO) (Translation by the Journal)' (2014) 44 (1) 環境と公害 (Research on Environmental Disruption) 4.

TEPCO was in the state of insolvency and would go through the legal procedure if it were not for the creation of the Corporation.

The Corporation is financed 50% by the state and the other half by 12 subscribed nuclear operators including TEPCO.<sup>913</sup> Although membership to the Corporation is not compulsory, all the private nuclear operators joined the Corporation. Subscribed members pay annual contributions, depending on their capacity of electricity production and other criteria, and the Corporation accumulates them as reserve funds that will be used to support a nuclear operator in an event of grave nuclear accidents whose damage compensation would exceed the amount of financial security. In August 2014, the Corporation also integrated the function of managing and financing the decommissioning of damaged Fukushima Daiichi NPP and became the Nuclear Damage Compensation and Decommissioning Facilitation Corporation.

The objective of the Corporation was stated as ensuring ‘a Nuclear Operator’s [...] prompt and appropriate implementation of compensation for Nuclear Damage [...], the smooth management of a stable supply of electricity and other business connected with Reactor Operation, etc’.<sup>914</sup> In line with this objective, the Corporation not only assisted TEPCO for compensation payment but also injected 1 trillion yen (8 billion euros) to the company whereby it became the majority shareholder (54.74%),<sup>915</sup> thus *de facto* saving the company from legal liquidation. TEPCO has thus become the subsidiary of the Corporation and in effect under state

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<sup>913</sup> The Corporation’s capital is 14 billion yen (110 million euro). These companies are Hokkaido Electric Power Company, Tohoku Electric Power Company, Tokyo Electric Power Company, Chubu Electric Power Company, Hokuriku Electric Power Company, Kansai Electric Power Company, Chugoku Electric Power Company, Shikoku Electric Power Company, Kyushu Electric Power Company, the Japan Atomic Power Company (JAPC), Japan Nuclear Fuel Limited (JNFL) and J-Power.

<sup>914</sup> Article 1 of the Corporation Act. The English translation of the Act is available at the Ministry of Justice’s Japanese Law Translation website,

<<http://www.japaneselawtranslation.go.jp/law/detail/?ft=1&re=2&dn=1&x=17&y=22&co=01&ia=03&ja=04&ky=nuclear+damage+compensation+facilitation+corporation&page=10>> accessed 12 February 2023

<sup>915</sup> Source: TEPCO’s website (in Japanese), <https://www.tepco.co.jp/about/ir/stockinfo/breakdown.html>, consulted on 17 June 2020.

control. As a consequence, the Fukushima damage compensation was implemented under the exclusive liability of TEPCO but the money was disbursed by the state, without an obligation of reimbursement, channelled through the Corporation. This financial assistance is supposed to be recovered in the end from the reserved fund accumulated by annual contributions of subscribed operators. However, 11 years from the accident, the fund only represented 20% of the current compensation total paid by TEPCO, which means that it would take another 50 years for the Corporation to recover the money disbursed for the Fukushima TEPCO accident compensation.<sup>916</sup> Moreover, the annual contributions are in reality paid by the consumers' electricity bills of subscribed operators, which ultimately mean that the cost of Fukushima damage compensation and any future nuclear accident compensations, though they are caused by privately-owned companies, will be covered by the entire population of Japan.<sup>917</sup>

The creation of this mutual-aid system among nuclear operators nevertheless enabled the compensation payment to be made rapidly to victims in the aftermath of the Fukushima accident. However, some legal experts questioned the fairness or morality of such a measure from the viewpoint of social justice: it was contrary to any market rules, saving not only the company in debt of its own making but also its stockholders and financial institutions.<sup>918</sup> Moreover, it established a precedent indicating that any operator who causes a grave accident in the future will be protected by the state from bankruptcy and somehow be spared from paying the entire compensation. It sends a signal that the liability of nuclear operators in case of accidents is somehow limited by government intervention even though the Compensation Act clearly stipulates that the operator which caused the accident is exclusively liable for an unlimited compensation amount. By the same token, the state is not legally held accountable

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<sup>916</sup> Calculated by R. Hasegawa from the fiscal reports (2011-2022) published by the Corporation (in Japanese only) found at < [https://www.ndf.go.jp/gyomu/gyoumu\\_gaiyou/](https://www.ndf.go.jp/gyomu/gyoumu_gaiyou/)> accessed 12 February 2023.

<sup>917</sup> Oshima and Yokemoto (n 912).

<sup>918</sup> Takahashi, 'The Financial Support by the Nuclear Damage Compensation Facilitation Corporation' (n 909).

for accident damage under the current Compensation Act although it is the state who pays nearly the entire compensation. In this circumstance, who really bears liability for nuclear damage? Masafumi Yokemoto, an environmental economist, therefore described the Corporation as a two-faced system like the head and tail of a coin: enabling the state financial assistance for compensation and simultaneously, obscuring the liability of both TEPCO and the state.<sup>919</sup>

Some legal specialists argued that, considering the gravity of its liabilities, TEPCO should have gone through a legal liquidation or a corporate reorganisation and the state should have taken over the reparation and relief to victims.<sup>920</sup> On the contrary, others and the government defended the rescue measure by explaining that in case of legal liquidation of TEPCO, victims may not have been able to receive adequate compensation and their protection would have been compromised by the provision of the Electricity Business Act (Article 37-1)<sup>921</sup> which attributes a priority to corporate bonds for reinstatement, meaning that victims' right for compensation was subordinate to that of the bonds.<sup>922</sup> A Councillor of the Cabinet

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<sup>919</sup> Masafumi Yokemoto, *原発賠償を問う—曖昧な責任、翻弄される避難者 (Questioning the Nuclear Compensation: Obscured Liability and Tossed Around Evacuees)* (Iwanami Shoten 2013).

<sup>920</sup> Among others, JFBA, '福島第一原子力発電所事故による損害賠償の枠組みについての意見書 (Opinion Paper on the Framework of Fukushima Daiichi Nuclear Power Plant Accident Damage Compensation); Translation by R. Hasegawa' (JFBA 2011) <[https://www.nichibenren.or.jp/library/ja/opinion/report/data/110617\\_2.pdf](https://www.nichibenren.or.jp/library/ja/opinion/report/data/110617_2.pdf)> accessed 14 September 2020; Kojima Nobuo, '福島第一原発事故による被害とその法律問題 (Fukushima Daiichi Nuclear Accident Damage and Its Legal Issues); translation by R. Hasegawa' (2011) 1038 *Nippon Hyoron Sha* 55; Tadashi Otsuka, '福島第一原発事故による損害賠償と賠償支援機構法—不法行為法学の観点から (Fukushima Daiichi Nuclear Accident Damage Compensation and Compensation Facilitation Corporation Act - From the Perspective of Tort Law Studies); Translation by R. Hasegawa' (2011) 1433 *Jurist* 39; cited by Shigeru Takahashi, '原子力損害賠償法の法的諸問題 (Some Legal Issues Pertaining to Nuclear Damage Compensation Law); Translation by R. Hasegawa' (2014) 14 *Journal of Public Policy Studies* 86.

<sup>921</sup> Act No. 170 of 11 July 1964; At the time, Article 37(1) stipulated that 'Bondholders for a corporation acting as a General Electricity Utility (excluding, however, short-term bondholders prescribed in Article 66, item 1 of the Act on Transfer of Bonds, etc. (Act No. 75 of 2001)) shall have the right to receive payment of their claims from the corporation's property in preference to other creditors (translation by Japanese Law Translation, the internet site managed by the Ministry of Justice). But by the 2015 reform of the Act (Act No.47 of 24 June 2015), this provision was abolished which entered into effect from April 2020.

<sup>922</sup> Explanations given by the then Prime Minister Naoto Kan and the then Minister of State Banri Kaieda during the 177<sup>th</sup> House of Representatives plenary session on 8 July 2011 (the minutes No. 31); Akira Morita, '政府の援

Secretariat, Yasufumi Takahashi, further added that legal liquidation would have inevitably delayed the payment of compensation to victims until the conclusion of the procedure, which would have risked obstructing the TEPCO's response to the accident and the stable supply of electricity.<sup>923</sup>

## 2. The Question of State Liability

The government also justified such aid to TEPCO by referring to Article 2 of the Compensation Act which states, 'the State has had the *social responsibility* that comes along with promoting the nuclear energy policy' (emphasis added), without clarifying the extent of its own liability to the accident. On this point, the former nuclear regulator, the Science and Technology Agency (STA), clarified its stance in the 1962 report which explained that the state would be exempt from legal liability for nuclear damage pursuant to Article 4 of the Compensation Act (operator's exclusive liability).<sup>924</sup> However, many legal scholars disagree with this view and suggest that the exclusive liability clause does not entirely discharge the state from legal liability from two main reasons:<sup>925</sup> for one, Article 4 was originally created in order

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助の義務と電力会社のガバナンス (Government Duty for Assistance and Governance of Electricity Utility Companies)' (2011) 1433 Jurist 45; Takahashi, 'The Financial Support by the Nuclear Damage Compensation Facilitation Corporation' (n 909).

<sup>923</sup> Takahashi, 'The Financial Support by the Nuclear Damage Compensation Facilitation Corporation' (n 909).

<sup>924</sup> STA, *原子力損害賠償制度 (Nuclear Damage Compensation System)*, (Tsusho Sangyo Kenkyu-sha 1962); cited by Kenji Shimoyama, '原発事故・原子力安全規制と国家賠償責任 (Nuclear Accident, Nuclear Safety Regulation, and State Liability for Compensation)' in T Awaji, R Yoshimura and Masafumi Yokemoto (eds), *福島原発事故 賠償の研究 (Fukushima Nuclear Accident: The Compensation Study)* (Nihon Hyoron Sha 2018).; Article 4 of the Compensation Act states, '(w)here nuclear damage is covered by the preceding section, no person other than the nuclear operator who is liable for the damage pursuant to the preceding section shall be liable for the damage'. (translation offered by NEA/OECD)

<sup>925</sup> Among others, Otsuka, '福島第一原発事故による損害賠償と賠償支援機構法—不法行為法学の観点から (Fukushima Daiichi Nuclear Accident Damage Compensation and Compensation Facilitation Corporation Act - From the Perspective of Tort Law Studies)' (n 920); Kojima (n 920); JFBA, *原発事故・損害賠償マニュアル (Nuclear Accident Damage Compensation Manual)* (Nihon Kajo Shuppan 2011); Shimoyama (n 924); Takahashi, '原子力損害賠償法の法的諸問題 (Some Legal Issues Pertaining to Nuclear Damage Compensation Law)' (n 920); Takehisa Awaji, Ryoichi Yoshimura and Masafumi Yokemoto, '福島第一原発事故が損害賠償法に投げかけた問題—各章の解題をかねて (The Challenges to the Act on Compensation for Nuclear Damage Posed by the Fukushima Daiichi Nuclear Accident: A Synopsis of Respective Chapters)' in Takehisa Awaji, Ryoichi

to protect constructors, suppliers, and sub-contractors – the nuclear industry – and not specifically to protect the state, and secondly, Article 17 of the Constitution guarantees that citizens have the right to sue the state or a public entity for a wrongdoing of any public official.<sup>926</sup> Other legal experts also suggested a possibility of establishing the legal liability of the state under State Redress Act<sup>927</sup> for having failed to execute its duty as the regulator of nuclear operators and having caused harm to the population.<sup>928</sup> The question of state liability will be further examined in next Part (Part Two, Title II, Chapter 1).

### 3. The Dispute Reconciliation Committee for Nuclear Damage Compensation

To define the compensation scope and amount, the Dispute Reconciliation Committee for Nuclear Damage Compensation (Reconciliation Committee, hereafter) was swiftly established on 11 April 2011 pursuant to Article 18.2 of the Compensation Act.<sup>929</sup> The legal

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Yoshimura and Masafumi Yokemoto (eds), *福島原発事故 賠償の研究 (Fukushima Nuclear Accident: the Compensation Study)* (Nihon Hyoron Sha 2015).

<sup>926</sup> Article 17 stipulates that '(e)very person may sue for redress as provided by law from the State or a public entity, in case he has suffered damage through illegal act of any public official'.; Translation by *Kantei* (Prime Minister's Office)

<sup>927</sup> Act No. 125 of 27 October 1947; The law was created to implement Article 17 of the Constitution. It is a legislative framework to allow State relief to victims who suffered damage caused by a public official or entity without questioning whether it was intentional or negligent and beyond the scope of legally sufficient cause. Legislations enacted from the spirit of the State Redress Act include, for example, Atomic Bomb Survivors' Assistance Act (Act No. 125 of 1947) and the Immunization Act (Act No. 68 of 1948). For details, see Takahashi, '原子力損害賠償法の法的諸問題 (Some Legal Issues Pertaining to Nuclear Damage Compensation Law)' (n 920).

<sup>928</sup> Among others, Yayoi Isono, '原子力事故と国の責任—国の賠償責任について若干の考察 (Nuclear Accident and State Liability: Some Reflections on State Compensation Liability)' (2011) 41 *環境と公害 (Research on Environmental Disruption)* 36; Noboru Utatsu, '原子力損害賠償法における責任集中原則と国家補償 (The Exclusive Liability Principle and State Compensation in Nuclear Damage Compensation Law)' (2012) 74 *General Insurance Studies* 111; Takehisa Awaji, 'L'accident Nucléaire de Fukushima et La Responsabilité de l'exploitant et de l'Etat' in Mathilde Hautereau-Boutonnet (ed), *Après-Fukushima, regards juridiques franco-japonais* (Presses Universitaires d'Aix-Marseille 2014); JFBA, *原発事故・損害賠償マニュアル (Nuclear Accident Damage Compensation Manual)* (n 925); cited by Yokemoto, *原発賠償を問う—曖昧な責任、翻弄される避難者 (Questioning the Nuclear Compensation: Obscured Liability and Tossed Around Evacuees)* (n 919); Takahashi, '原子力損害賠償法の法的諸問題 (Some Legal Issues Pertaining to Nuclear Damage Compensation Law)' (n 920).

<sup>929</sup> In MEXT's official documents in English, the name of the committee is translated as "Dispute Reconciliation Committee for Nuclear Damage", thus "Reconciliation Committee" in short. But the direct translation of the Japanese term is "Dispute Examination Committee for Nuclear Damage Compensation" in which there is no aspect of "reconciliation". The word was probably inspired from the objective of the Committee, stated in Article 18 of the Compensation Act, as facilitating "reconciliation".



status of the Committee corresponds to the council which provides advice and recommendations to administrative organs of the State, prescribed under Article 8 of the National Government Organization Act<sup>930</sup>. The committee was placed under the Atomic Energy Division, Research and Development Bureau of MEXT which aims to promote research and development of the nuclear energy sector. It was initially composed of 10 members appointed by the MEXT: six legal scholars, two medical experts (including Dr Yamashita introduced earlier), and two nuclear and radiation experts from national nuclear institutions. The core mission of the Committee was two-fold: 1) mediate any disputes for reconciliation; 2) establish guidelines on the scope of the nuclear damage. As for the first task, the Centre for Alternative Dispute Resolution (ADR) was created under the Committee in August 2011 to mediate out-of-court settlements between parties in dispute. As examined in the previous chapter, the Japanese nuclear liability regime does not designate any special court or prescribe any specific litigation procedures for victims to claim damage while under the Paris and Vienna conventions, a single court would be assigned to hear all claims arising out of a nuclear accident.<sup>931</sup> Under the Fukushima scheme, victims can thus file a claim either to TEPCO directly, to the ADR, or any civil court in Japan.

The Fukushima compensation scheme was thus founded on the tripartite system among the Reconciliation Committee setting the policy, TEPCO administering the payment, and the government-authorized Corporation who owns the majority share of TEPCO financing the compensation. The problem with the structure of such a system is that all three of them are in

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<sup>930</sup> Act No. 120 of 1948; Article 8 provides that administrative organs of the State (ministries, commissions and agencies...) can establish a council system for taking charge of the study and deliberation of important matters, administrative appeals or other affairs that are considered appropriate to be processed through consultation among persons with the relevant knowledge and experience' (translation of the text by Japanese Law Translation).

<sup>931</sup> Vasquez-Maignan (n 344). According to the article, the revised version of two international conventions now has a provision to appoint a single court to process all nuclear claims in case of accidents (the 1997 Protocol to amend the Vienna Convention and the 2004 Protocol to amend Paris Convention).

one way or another the stakeholders of the accident, indirectly or directly liable for the accident, and there is no involvement of a neutral third party. The consequences of this structural flaw will be analysed in detail in the following paragraph.

## **B. The Scope of Compensation Defined by the Reconciliation Committee**

According to Article 18.2 (ii) of the Compensation Act, the Reconciliation Committee shall ‘draft guidelines establishing the scale of the nuclear damage and other general instructions to help operators reach a voluntary settlement’ with victims if a dispute arises. The guidelines are thus administrative recommendations, non-legally binding, and an interpretation guideline which does not have any authority over the court.<sup>932</sup>

The Reconciliation Committee had assembled 39 times between 2011 and 2013 and produced Preliminary, Secondary and Interim Guidelines. Among them, the Interim Guideline issued on 5 August 2011 was the most important baseline document which defined the overall scope of nuclear damage related to the Fukushima accident.<sup>933</sup> The Interim Guideline incorporated the first two guidelines (Preliminary and Secondary) and was complemented by four Supplements (see Table 11 below). The Supplements were created to adapt the Guidelines to reflect the situation on the ground as it evolved with time, notably when the government modified its policies (e.g., evacuation zones, additional house rehabilitation aid, etc) or when

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<sup>932</sup> Tadashi Otsuka and others, ‘パネルディスカッション 福島事故賠償の在り方を踏まえた原子力損害賠償制度の課題 (Panel Discussion on Issues of Nuclear Damage Compensation System Including How to Deal with Fukushima Accident Compensation)’, *原子力損害賠償の現状と課題 (Current Status and Issues on Nuclear Damage Compensation)* (Shoji Homu 2015) (see the intervention by Shigeru Takahashi).

<sup>933</sup> Dispute Reconciliation Committee for Nuclear Damage Compensation, ‘東京電力株式会社福島第一、第二原子力発電所事故による原子力損害の範囲の判定等に関する中間指針 (Interim Guideline on Determination of the Scope of Nuclear Damage resulting from the Accident at the Tokyo Electric Power Company Fukushima Daiichi and Daini Nuclear Power Plants)’.

the Committee recognised new damages after an intensive advocacy made from victims themselves.

Table 11: List of Fukushima Compensation Guidelines

Name	Date	Type of Damage
<b>Preliminary Guideline</b>	28 April 2011	Evacuation orders, navigation danger zone, and shipping restriction
<b>Secondary Guideline</b>	31 May 2011	New evacuation orders, shipping restriction, planting restriction, and so-called “harmful rumour”
- Supplement	20 June 2011	Calculation method for psychological damage
<b>Interim Guideline</b>	5 Aug 2011	Overall scope of F1NNP nuclear damage
- First Supplement	6 Dec 2011	Voluntary (out-of-zone) evacuation
- Second Supplement	16 Mar 2012	Review of evacuation zones
- Third Supplement	30 Jan 2013	“Harmful rumour” to agriculture, fishery, and food industry
- Fourth Supplement	26 Dec 2013	Protracted displacement

The Interim Guideline first recognises that the Fukushima TEPCO accident damage is unprecedented in its scale and scope since the radiation release spread far beyond the Fukushima Prefecture durably contaminating a large territory. Notwithstanding, it contends that ‘there is no reason to take the view that this will be especially different from the scope of damage in any standard claim in tort for damages’ and that non-conventional damages are recognised ‘so long as there was a legally sufficient cause between a type of damage and the accident – namely it was damage within a scope that is judged as logically and reasonably arising from the accident based upon the social convention’.<sup>934</sup> Many legal scholars, even among members of the Reconciliation Committee who drafted these guidelines, argued that this approach – defining the damage within the framework of civil (tort) law – had a limit in

<sup>934</sup> ibid 3-4 (Part 2: Concepts common to respective damage items); Translation by NEA/OECD, *Japan’s Compensation System for Nuclear Damage* (n 667).

providing adequate relief to victims and suggested to amend, reinforce or redesign the Compensation Act, or enact a special state reparation law for the Fukushima accident victims under the framework of public law.<sup>935</sup>

As analysed in the previous chapter, the nuclear damage compensation law had been enacted primarily to facilitate and develop the civil nuclear industry in Japan, like in other nuclear powers, in which the victim protection was rather treated as a relative or complementary objective. For this reason, it is not surprising that the victims' relief based on the current Compensation Act has clear shortcomings. Notably, one of the leading jurists in civil code and environmental law in Japan, Takehisa Awaji, argued that the Interim Guideline failed to or only partially dealt with new damages caused by the accident which do not fit in the framework of conventional tort regime.<sup>936</sup> According to him, there is an urgent need for a paradigm shift in recognising nuclear damage, assessing it from the infringed rights of victims as a whole so as to grasp the comprehensive picture of the tort incurred, instead of assessing it according to existing conventional tort categories, which was adopted by the Reconciliation Committee.

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<sup>935</sup> See the discussion among legal specialists including four former members of the Reconciliation Committee in Otsuka and others (n 932); For others, for example, Takahashi, '原子力損害賠償法の法的諸問題 (Some Legal Issues Pertaining to Nuclear Damage Compensation Law)' (n 920); Takehisa Awaji, '「包括的生活利益」の侵害と損害 (Violation of "Comprehensive Life Benefit" and Its Damage)' in Takehisa Awaji, Ryoichi Yoshimura and Masafumi Yokemoto (eds), *福島原発事故 賠償の研究 (Fukushima Nuclear Accident: the Compensation Study)* (Nihon Hyoron Sha 2015); Ryoichi Yoshimura, '福島第一原発事故被害の完全救済に向けて (Efforts Toward Complete Relief for Fukushima Victims)' (2014) 44 (1) *環境と公害 (Research on Environmental Disruption)* 28; Yoshio Shiomi, '原子力損害賠償の現状と課題 (The Nuclear Damage Compensation System and How It Should Be Improved)' (2020) 49 *環境と公害 (Research on Environmental Disruption)* 3; Akio Morishima, '原子力事故の被害者救済 (3) - 損害賠償と補償 (Relief for Nuclear Accident Victims (3): Damage Compensation and Reparation)' (2011) 1888 *Toki no horei* 43; cited by Yoshihiro Tanaka, '原子力損害賠償の法政策的検討 (Legal Policy Review of Nuclear Damage Compensation)' in Hitotsubashi University Environmental Law Policy Course (ed), *原子力損害賠償の現状と課題 (Current Status and Issues on Nuclear Damage Compensation)* (Shoji Homu 2015).

<sup>936</sup> Awaji, '「包括的生活利益」の侵害と損害 (Violation of "Comprehensive Life Benefit" and Its Damage)' (n 935).; According to Awaji, new damages are: 1) grave sense of fear which victims felt for their health due to radiation exposure by having to stay in highly contaminated area, 2) psychological damage which victims suffered during evacuation, 3) loss of community life benefits and psychological pain associated with loss of hometown by having to resettle elsewhere, 4) real estate damage associated with having to resettle elsewhere, and 5) environmental damage caused by the accident.; translation by R. Hasegawa

The Interim Guideline with its four Supplements recognised the following 10 categories of damage related to the Fukushima accident:

- 1) damage related to government evacuation orders
- 2) damage related to marine exclusion and no-fly zones fixed by the government
- 3) damage related to shipment restrictions on agricultural, forestry and fishery products issued by the government or a government agency
- 4) damage related to any other government instructions<sup>937</sup>
- 5) “rumour-related” damage
- 6) “indirect damage”<sup>938</sup>
- 7) damage resulting from radiation exposure
- 8) damage related to voluntary evacuation (First Supplement)
- 9) others (adjustments between various benefits and compensation for victims, property damage suffered by local government entities, etc)
- 10) damage related to decontamination operations (Second Supplement)

And these damages are recognised according to the government-designated zones: Evacuation Zones and Outside Evacuation Zones (Table 12).

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<sup>937</sup> Other instructions include restriction order over water consumption and limitation of usage of school building and ground due to radiological contamination.

<sup>938</sup> Indirect damage is the damage suffered by third parties who were in economic relationships with “primary victims” recognised by the guidelines. For example, business owners whose suppliers or customers are regionally limited, by the nature of the goods, services or business, to the area where evacuation order was issued and therefore suffered loss.

Table 12: The Scope of Nuclear Damage in Fukushima Compensation Scheme<sup>939</sup>

Evacuation Zones	Outside Evacuation Zones
1) Damage related to evacuation 2) Damage related to marine exclusion zones, no-fly zones, etc 3) Damage related to restriction of shipment of agricultural, forest, and fishery products 4) Other damages related to government’s instructions	5) Damage related to “harmful rumour” to agricultural products, tourism, and export 6) “Indirect damage” 7) Damage resulting from radiation exposure 8) Damage related to voluntary evacuation (23 designated municipalities within Fukushima prefecture) 9) Others (adjustments between various benefits and compensation for victims, property damage suffered by local government entities, etc)
10) Damage related to decontamination operations	

What can be first observed from the list is that all the compensation items identified for evacuation zones are associated with government instructions although the damage was caused by the accident of TEPCO. Secondly, the compensation targeting out-of-zone areas mainly consisted of business damages, thus legal persons, and only a few concerned natural persons (damage related to voluntary evacuation and radiation exposure). Thirdly and most curiously, the item – damage resulting from radiation exposure – only concerns out-of-zone areas.

In fact, the damage related to radiation exposure is also the least elaborated and almost invisible item in the Interim Guideline. Injuries and death related to radiation exposure appears

<sup>939</sup> Source: The table summarising the categories of Fukushima compensation according to two zones, entitled 東京電力株式会社福島第一、第二原子力発電所事故による原子力損害の範囲の判定等に関する指針について (Concerning the Guideline related to the Definition of the Scope of Nuclear Damage Resulting from TEPCO Fukushima Daiichi and Daini NPP Accidents), published by MEXT, available (in Japanese only) at <[https://www.mext.go.jp/component/a\\_menu/science/detail/\\_icsFiles/fieldfile/2014/02/04/1329116\\_1\\_1.pdf](https://www.mext.go.jp/component/a_menu/science/detail/_icsFiles/fieldfile/2014/02/04/1329116_1_1.pdf)> accessed 12 February 2023.; cited by Yokemoto and Hiraoka (n 50).

in the end of the Guidelines just before “Miscellaneous”, and the description of the damage takes only half a page which merely states:

Lost profit, medical treatment expenditure, medicine costs and psychological disorders suffered by nuclear power plant workers involved in the clean-up work of the accident, members of the self-defence force, fire fighters, police officers, or residents and others due to acute or latent radiation illness resulting from radiation exposure shall be recognised as damage warranting compensation.<sup>940</sup>

This is the only reference made to such damage in the entire Guidelines. Furthermore, in MEXT’s presentation on the scope of Fukushima compensation (based on which above Table 12 was drawn), damage related to radiation exposure was listed within the item “others” and almost unnoticeable.

This sub-paragraph elucidates the scope of Fukushima compensation scheme defined by the Reconciliation Committee along the two zones, evacuation zones (1) and out-of-zone areas (2), by identifying the peculiar characteristics of the scheme, especially the constant underestimation or unappreciation of damage related to radiation exposure by the Reconciliation Committee and the government. Also, it looks into the amount of compensation paid to each damage category with a view to decode the Fukushima compensation priorities fixed by the Japanese government (3).

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<sup>940</sup> Dispute Reconciliation Committee for Nuclear Damage Compensation, ‘東京電力株式会社福島第一、第二原子力発電所事故による原子力損害の範囲の判定等に関する中間指針 (Interim Guidelines on Determination of the Scope of Nuclear Damage resulting from the Accident at the Tokyo Electric Power Company Fukushima Daiichi and Daini Nuclear Power Plants)’ (n 933) 159 (Part 9: Damage resulting from radiation exposure). Translation by R. Hasegawa.

## 1. Evacuation Zones: Focus on Evacuation Related Damage and the Absence of Radiation Related Damage

The most important compensation paid to individuals (natural persons) in evacuation zones was the damage related to evacuation instructions. It was important not only because of the amount they received but also because it provided a vital financial means to sustain their lives in evacuation. As explained in the previous section, the compensation indeed functioned as a financial assistance provided by the state channelled through TEPCO. According to the guidelines, the damage related to evacuation was composed of following items: 1) examination expenses (medical), 2) evacuation expenses, 3) temporary access expenses, 4) homecoming expenses, 5) injury or death, 6) damage for mental anguish (psychological damage), 7) business damage, 8) damage resulting from incapacity to work, 9) examination expenses (foodstuff and other goods), 10) loss or reduction for property value, and 11) house reconstruction cost in relocation<sup>941</sup>.

The “Target Area” for these damages is defined as the zones under government evacuation/sheltering orders. At the time of drafting the Interim Guidelines, such Areas included the zone within a 20-km radius from Fukushima Daiichi (No. 1) plant (Restricted Area), the zone within a 10-km radius from Fukushima Daini (No.2) plant, the zone between a 20-30km radius from Fukushima Daiichi plant (Evacuation Preparation Area), and the area detected with more than 20 mSv/year dose of ambient radiation (Deliberate Evacuation Area). Later, these Target Areas were modified according to the reviews of government instructions.

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<sup>941</sup> It was added by the Forth Supplement to the Interim Guideline in December 2013. It notably enabled evacuees who decided not to return home to construct their new homes elsewhere. The Japanese term for this damage compensation is *Jutaku-kakuho* which literally means ‘house securing’ or ‘house guarantee’, but this thesis translated as ‘house reconstruction cost in relocation’ as it represents better the content of this compensation.



The “Eligible Persons (Evacuees, etc)” are then defined as: 1) ‘individuals who, after the accident were, of necessity, removed from the Target Area in order to evacuate or take shelter outside that area (to “evacuate”); 2) ‘individuals who were outside the Target Area at the time of the accident and who, despite having their principal residence in the Target Area (their “residence”), of necessity continue to reside temporarily outside the Target Area (to “reside temporarily outside the Target Area”); and 3) ‘individuals who, of necessity, take shelter in an In-house Evacuation Area (to “take shelter”).<sup>942</sup> The Eligible Persons thus consist of ‘evacuees under government orders’, ‘those who have “principal residence” in the Target Area’, and ‘those who sheltered indoors under government orders’. This means that, first, evacuees without government orders – out-of-zone evacuees – are excluded from this compensation. Secondly, victims need to have a “principal residence” in Target Areas in order to be eligible.

This ultimately suggests that temporary residents who were staying in Target Areas at the time of the accident for business or family reasons but had their principal residence elsewhere could be excluded from the compensation.<sup>943</sup> In other words, the residents who had their principal residence in Target Area are considered as legitimate victims no matter where they actually were at the time of the accident while those who were living in the Target Area at the time and might have been exposed to radiation could be excluded from the compensation if they had principal residence elsewhere. It means that this compensation item largely disregards

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<sup>942</sup> Dispute Reconciliation Committee for Nuclear Damage Compensation, ‘東京電力株式会社福島第一、第二原子力発電所事故による原子力損害の範囲の判定等に関する中間指針 (Interim Guideline on Determination of the Scope of Nuclear Damage resulting from the Accident at the Tokyo Electric Power Company Fukushima Daiichi and Daini Nuclear Power Plants)’; Unofficial translation by NEA/OECD, *Japan’s Compensation System for Nuclear Damage* (n 132).; In the NEA/OECD document, “Target Area” was translated as “Affected Area” and “Eligible Persons (Evacuees, etc.)” as “Evacuees”, but this thesis study uses “Target Area” and “Eligible Persons (Evacuees, etc.)” which reflect better the original terms in Japanese “対象区域” and “避難等対象者”.

<sup>943</sup> Some examples are workers on short-term assignments of a few months living in a hotel whose families and their principal residence are in other cities, unemployed persons who came back to live with their parents for a while without moving out of their own apartment in other cities, etc.

the aspect of radiation exposure and only accounts the damage related to the administrative measure – evacuation – imposed on the individual.

In fact, this point becomes even clearer by reading the explanation note of each damage item in the Guideline. For example, in the definition of the damage item “injury or death”, the Guidelines specify that it concerns only those related to the evacuation, making no reference to those resulting from radiation exposure. Also, in describing the damage related to “examination expenses (medical)”, the Reconciliation Committee explains that because radiation is hazardous, *depending on the doses*, and undetectable by human senses, it is reasonable for evacuees ‘to worry about the possibility of having been exposed to radiation and to undergo a medical exam to entirely dispel that worry’.<sup>944</sup> This expression insinuates that medical checks are only for psychological reassurance and not for verifying and monitoring possible effects from radiation exposure. The underlying message is that it is impossible for the “evacuees, etc” to have injuries or death related to radiation exposure. It is as if the Reconciliation Committee had already determined that there would be no radiation-related illness among the affected residents, which set the tone all through the Guidelines.

In contrast, the most important compensation item of the evacuation related damage is mental anguish, so-called psychological damage. It is the biggest compensation paid to individuals by TEPCO among all damages, totalling 1.1 trillion yen (9 billion euros).<sup>945</sup> This compensation, as explained in the previous Section, played a crucial role in providing financial means to evacuees from Target Areas to sustain their evacuated lives. Again, the Interim

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<sup>944</sup> Dispute Reconciliation Committee for Nuclear Damage Compensation, ‘東京電力株式会社福島第一、第二原子力発電所事故による原子力損害の範囲の判定等に関する中間指針 (Interim Guidelines on Determination of the Scope of Nuclear Damage resulting from the Accident at the Tokyo Electric Power Company Fukushima Daiichi and Daini Nuclear Power Plants)’ (MEXT 2011) 10. Translation by R. Hasegawa

<sup>945</sup> Source: TEPCO webpage ([https://www.tepco.co.jp/fukushima\\_hq/compensation/results/](https://www.tepco.co.jp/fukushima_hq/compensation/results/)), accessed 12 February 2023.

Guideline specify that this mental anguish only concerns psychological pain caused by the “disruption of a normal day-to-day life over an extended period of time” due to evacuation or shelter indoor instruction.<sup>946</sup> It does not thus include the prejudice of anxiety resulting from radiation exposure. On this point, a member of the Reconciliation Committee affirmed in an article that the prejudice of anxiety related to radiation exposure had been intentionally withdrawn from the Interim Guideline even though the possibility of recognising such a prejudice had been suggested in the earlier version of the guideline, the Secondary Guideline published on 31 May 2011.<sup>947</sup>

The retraction occurred during a Committee meeting where a non-jurist member, the then Chairman of Nuclear Regulation Authority, Shunichi Tanaka, emphasised that ‘radiation exposure levels of residents, even those from so-called high dose areas such as Deliberate Evacuation Area, are not in the levels which would cause clear health effects’.<sup>948</sup> In response, a jurist suggested that the issue of anxiety should rather be tackled by the government in creating a robust health monitoring system so that residents would not suffer from such *unnecessary* anxiety and the scope of damage would not expand *unnecessarily*.<sup>949</sup> The Fukushima compensation scheme thus represents a very unique nuclear damage reparation system in the

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<sup>946</sup> Dispute Reconciliation Committee for Nuclear Damage Compensation, ‘東京電力株式会社福島第一、第二原子力発電所事故による原子力損害の範囲の判定等に関する中間指針 (Interim Guidelines on Determination of the Scope of Nuclear Damage resulting from the Accident at the Tokyo Electric Power Company Fukushima Daiichi and Daini Nuclear Power Plants)’ (n 944) 18.

<sup>947</sup> Tadashi Otsuka, ‘福島第一原子力発電所事故による損害賠償 (Damage Compensation Related to Fukushima Daiichi Nuclear Power Plant Accident)’, *震災・原発事故と環境法 (Earthquake Disaster, Nuclear Accident and Environmental Law)* (Minjiho Kenkyukai 2013) 75; cited by Masafumi Yokemoto, ‘避難者の「ふるさとの喪失」は償われているか (Is the Evacuees’ “Loss of Hometown” Compensated?)’ in Takehisa Awaji, Ryoichi Yoshimura and Masafumi Yokemoto (eds), *福島原発事故 賠償の研究 (Fukushima Nuclear Accident: The Compensation Study)* (Nihon Hyoron Sha 2015) 189.

<sup>948</sup> The minutes of the 9<sup>th</sup> Meeting of the Dispute Reconciliation Committee for Nuclear Damage Compensation, held on 1 July 2011, available (only in Japanese) at [https://warp.ndl.go.jp/info:ndljp/pid/11293659/www.mext.go.jp/b\\_menu/shingi/chousa/kaihatu/016/gijiroku/131\\_3918.htm](https://warp.ndl.go.jp/info:ndljp/pid/11293659/www.mext.go.jp/b_menu/shingi/chousa/kaihatu/016/gijiroku/131_3918.htm), accessed 13 February 2023. Translation by R. Hasegawa; cited by Yokemoto, ‘避難者の「ふるさとの喪失」は償われているか (Is the Evacuees’ “Loss of Hometown” Compensated?)’ (n 947).

<sup>949</sup> *ibid.* See the intervention by the Committee member, Shigeru Takahashi. Emphasis added.

world, which shuns the recognition of damage related to radiation exposure in a radiological accident.

In determining the amount of psychological compensation, the Guidelines made a specific reference to solatia payments of automobile liability damage insurance (4,200 yen/35 euro per day, or 126,000 yen/1,000 euro per month) and proposed 100,000 yen (800 euros) per person per month as “a reasonable benchmark”. The choice of calculation base, the use of automobile accident compensation regime instead of pollution compensation regime, sparked many debates among legal scholars. Yoshio Shiomi, a jurist specialised in civil law, recognises a certain advantage of applying the automobile liability regime from the viewpoint of guaranteeing the objectivity, uniformity and universality, but emphasises the importance of examining whether the particularities of nuclear damage were sufficiently considered or represented under this chosen method.<sup>950</sup> Other scholars pointed out both the inappropriateness and insufficiency of using the mandatory vehicle liability insurance standard as a base for determining the benchmark amount for psychological damage compensation related to nuclear accidents.<sup>951</sup> Among them, a civil law specialist (tort law in particular), Osamu Saito, argued that nuclear damage has more similarities with pollution or drug-induced damage than with automobile accident damage in terms of the scale, extent, and inevitability as well as the latency

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<sup>950</sup> Yoshio Shiomi, ‘中島肇著「原発賠償 中間指針の考え方」を読んで (Book Review: Interim Guidelines on the Determination of the Scope of Nuclear Damage, Written by Hajime Nakajima)’ (2013) 1009 NBL 40.

<sup>951</sup> JFBA, ‘東京電力福島第一、第二原子力発電所事故による原子力損害の範囲の判定等に関する中間指針に向けての意見書 (Opinion Paper for the Interim Guideline in Assessing the Scope of Nuclear Damage from the TEPCO Fukushima Daiichi and Daini Nuclear Power Plant Accidents)’ (Japan Federation of Bar Associations 2011) 23 June 2011 <[https://www.nichibenren.or.jp/document/opinion/year/2011/110623\\_2.html](https://www.nichibenren.or.jp/document/opinion/year/2011/110623_2.html)> accessed 2 February 2023; Osamu Saito, ‘慰謝料の現代的課題 (Current Issues over Solatia Payment)’ (2012) 74 Shiho (Private Law) 324; Ryoichi Yoshimura, ‘避難者に対する慰謝料 (Solatia Payments for Evacuees)’ in Takehisa Awaji, Ryoichi Yoshimura and Masafumi Yokemoto (eds), *福島原発事故 賠償の研究 (Fukushima Nuclear Accident: The Compensation Study)* (Nihon Hyoron Sha 2015); Kunihiko Yoshida, ‘福島原発放射能問題と災害復興—福島原賠訴訟の法政策学的考察 (Fukushima Nuclear Accident Radiation Problems and Disaster Recovery: The Legal and Political Analysis of Fukushima Nuclear Damage Compensation Lawsuits)’ in Takehisa Awaji and others, *原発事故被害回復の法と政策 (Laws and Policies for Nuclear Accident Damage Reparation)* (Nihon Hyoron Sha 2018).

or continuity of the damage.<sup>952</sup> Asserting that the substance of damage is especially close to the one related to asbestos, he urged the Reconciliation Committee to come up with a specific framework adapted to the particularities of nuclear damage.

The similar argument was also made by Ryoichi Yoshimura, a legal specialist in tort and environmental pollution, who also signalled several shortcomings in the decision-making process of the Reconciliation Committee on this subject.<sup>953</sup> He notably pointed to the fact that the “benchmark” amount was determined without conducting any studies on the actual plight of evacuees or any hearings from evacuees. Moreover, the Committee did not seem to have a real discussion as to the grounds for selecting the automobile liability regime among other regimes such as pollution damage compensation. While he recognised a benefit of making the blanket decision which allowed evacuees to receive compensation rapidly from TEPCO, he urged the Reconciliation Committee to review the decision and adjust the amount as the extent of evacuees’ difficulties was brought to light at the later stage.

Despite these suggestions, the benchmark amount has never been reviewed and the compensation was terminated by 2018 for Green, Yellow, and Red Zone evacuees, as explained in the previous Section. The total amount of psychological compensation that an evacuee from Green, Yellow and Red Evacuation Zones received respectively over seven years is shown in the following table (Table 13).

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<sup>952</sup> Saito (n 951).

<sup>953</sup> Yoshimura, ‘避難者に対する慰謝料 (Solatia Payments for Evacuees)’ (n 951).

Table 13: The Amount of Psychological Compensation for Evacuation Zone Evacuees

<b>Zone</b>	<b>Total amount/person</b>	<b>Content</b>
Green Zone ( $< 20\text{mSv/year}$ )	8,400,000 yen (70,000 euros)	Monthly payment of 100,000 yen over 7 years from the day of the accident
Yellow Zone ( $20\text{-}50\text{mSv/year}$ )	8,400,000 yen (70,000 euros)	Monthly payment of 100,000 yen over 7 years from the day of the accident
Red Zone ( $>50\text{mSv/year}$ )	15,400,000 yen (128,000 euros)	Monthly payment of 100,000 yen over 7 years from the day of the accident (lumpsum payment) + 7,000,000 yen (58,000 euros) as solatium for the loss of hometown

However, the extension of compensation period was not applied to other former evacuation zones. Notably, for the evacuees from the 20-30 km radius zone (Evacuation Preparation Zone), the psychological compensation had already been terminated in September 2012 one year after the evacuation order was lifted. As regards radiation hotspots, the compensation was discontinued three months after the termination of designations. This led to the creation of a huge compensation gap among the affected residents who were often living in similar radiological situations. This will be further analysed in the following Paragraph.

## 2. Out-of-Zone Areas: Nominal Compensation for Evacuees and “Trapped” Residents

As analysed in the previous Section, many residents living in radiation-affected out-of-zone areas found themselves trapped in the contaminated environment or fled on their own. The Interim Guideline did not initially recognise any damage related to involuntary immobility and out-of-zone evacuation. But, after an intensive advocacy made by NGOs and evacuees themselves, the “damage related to voluntary evacuation, etc.” was finally acknowledged as eligible prejudice for compensation by the First Supplement to the Interim Guideline published

on 6 December 2011.<sup>954</sup> For the first time, the Reconciliation Committee organised a hearing session with evacuees and residents from out-of-zone areas and recognised the prejudice due to “fear and unease about exposure to radiation”.<sup>955</sup> The “Eligible Persons” for this compensation were then defined as those who had the principal residence in the “Area subject to Voluntary Evacuation” at the time of the accident, and this regardless of whether they have since evacuated or stayed in the Area. By this definition, the Reconciliation Committee placed the stayers and evacuees on an equal footing in appreciating their suffering, which played an important role in diffusing some of the existing tensions between them.

However, the recognition of their compensation status came at the price of important limitations in scope. First, the designation of “Area subject to Voluntary Evacuation” was restricted to 23 municipalities in Fukushima Prefecture, excluding other municipalities in the Prefecture and the affected areas in other prefectures. As shown in the previous Section, the MoE identified as many as 104 municipalities, detected with doses between 1-20 mSv/year, as the target area for its decontamination operations, which were located in eight different prefectures. The Geographic Information System (GIS) specialist, Nobuhiro Sawano, spotted 91 municipalities over 10 prefectures with ambient doses over 5 mSv/year in 2011.<sup>956</sup> The recognition of 23 municipalities in Fukushima Prefecture is thus an extremely restrictive definition of the out-of-zone affected areas, thus excluding many “trapped” stayers and evacuees from the compensation.

The second and the most problematic aspect of this compensation was the compensation amount. The First Supplement guideline identified the increased living cost,

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<sup>954</sup> Again, the Guidelines uses the term *jishu* (“voluntary” or “self” in English) to describe evacuation that occurred outside evacuation zones but in this thesis, I use the term *kuikigai* (“out-of-zone”) which is more neutral and judicious.

<sup>955</sup> Three evacuees/residents were invited: one lawyer and two representatives of local NGOs.

<sup>956</sup> Sawano (n 14).

removal expenses, and mental anguish as recognised damage for evacuees and the increased living cost and mental anguish due to fear and unease about radiation exposure for the stayers. But for the reparation, it established a one-time lump sum payment of 80,000 yen (650 euro equivalent) for an adult and 400,000 yen (3,300 euro equivalent) for a pregnant woman and a child (during the period between the accident and 31 December 2011) (see Table 14 below). As a mark of good-will, TEPCO added another 200,000 yen to the amount for pregnant women and children who evacuated on their own. These amounts were almost illusory in view of the recognised damage for these residents. This left an impression to out-of-zone residents that the compensation was only nominal, and their plight was not properly appreciated by the Reconciliation Committee nor the government.

Table 14: The Amount of Compensation for Out-of-Zone Residents

Status	Amount per person
Children and pregnant women (during the period between the accident and 31 Dec 2011)	Stayed residents: 400,000 Yen (3,300 euros)
	Evacuated residents: 600,000 Yen (4,500 euros)
Other adults	80,000 Yen (650 euros) for both stayers and evacuees

The third restriction is applied to the period of eligibility for compensation, which was fixed between the date of the accident and 31 December 2011 for children and pregnant women and “initial periods” of the accident for other adults. This means that female residents living in the “Area subject to Voluntary Evacuation” who became pregnant after December 2011 were not eligible for the compensation of 400,000 yen but only for 80,000 yen (adults). And babies born after December 2011 were not eligible for this compensation. The end of the eligible period indeed corresponded to the government’s declaration of “cold shutdown”.<sup>957</sup> However, as

<sup>957</sup> Dispute Reconciliation Committee for Nuclear Damage Compensation, ‘東京電力株式会社福島第一、第二原子力発電所事故による原子力損害の範囲の判定等に関する中間指針第二次追補（政府による避難区



mentioned earlier, the situation at the F1NPP did not conform to the IAEA's definition of the "cold shutdown", meaning that the site was not completely under control at the time. Moreover, many residents fled from out-of-zone areas not only because of the unstable situation of the nuclear power plant but also due to radiological contamination caused by the accident. So, the "cold shutdown" of the plant did not change the radiological situation in the area. In response to criticisms, the Second Supplement extended such eligibility period beyond December 2011 for those who 'have considerable fear and unease about exposure to radiation, and where it is recognised to be reasonable for an average, ordinary person to seek to evacuate voluntarily in order to avoid this risk, according to the individual case or type'.<sup>958</sup> As such, TEPCO also decided to provide additional compensation of 80,000 yen (650 euros equivalent) for children and pregnant women for the period of 2012.

### 3. Compensation Priorities: "Rumour-Related" and Decontamination Damages

The amount of compensation paid by TEPCO for different damage items could be an interesting indicator for what were considered by the Reconciliation Committee, TEPCO and ultimately the State as most legitimate and important damages to be remediated after the Fukushima accident. The following table shows the amount of compensation paid to different items by TEPCO as of February 2020 (Table 15).

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域等の見直し等に係る損害について) (Second Supplement to Interim Guidelines on Determination of the Scope of Nuclear Damage resulting from the Accident at the Tokyo Electric Power Company Fukushima Daiichi and Daini Nuclear Power Plants (concerning Damages related to Review of Evacuation Areas by Government Instructions, etc.))' (MEXT 2012).

<sup>958</sup> *ibid* 14.

Table 15: Compensation Paid by TEPCO as of February 2020<sup>959</sup>

<b>Item</b>	<b>Amount (in euros equivalent)</b>
<b>For Individuals (Total)</b>	<b>16 billion</b>
- Psychological damage (evacuation instruction)	- 9 billion
- Out-of-zone evacuation and staying	- 3 billion
- Examination costs and others	- 2 billion
- Incapacity to work	- 2 billion
<b>For Legal Persons/Business Owners (Total)</b>	<b>25 billion</b>
- Sales restriction and “rumour” damage	- 15 billion
- Business damage	- 4 billion
- Indirect damage and others	- 3 billion
- Lumpsum (business damage + “rumour” damage)	- 2 billion
<b>For Both (Individuals + Business Owners)</b>	<b>15 billion</b>
- Loss of property value	- 12 billion
- House reconstruction cost	- 3 billion
<b>For Decontamination Related Damage</b>	<b>20 billion</b>
<b>Overall Total</b>	<b>78 billion</b>

As one can see from the table above, decontamination and “rumour-related” business damage alone take nearly half of the total compensation paid by TEPCO. In fact, damage related to “harmful rumours” was often identified by the central and local government officials as the most important damage incurred to out-of-zone areas and the principal problem hampering the recovery of Fukushima Prefecture.<sup>960</sup> According to the officials, the damage is caused by the avoidance behaviour of people, especially in metropolitan areas, to keep away from consuming the products, often foodstuffs, from Fukushima Prefecture, based on the “misinformation” created by the media or unfounded fear of contamination – “rumours”. It particularly hurt the sectors of agriculture, fishery and forestry, and tourism in Fukushima Prefecture. The “rumour-

<sup>959</sup> Source: TEPCO website ([https://www.tepco.co.jp/fukushima\\_hq/compensation/results/index-j.html](https://www.tepco.co.jp/fukushima_hq/compensation/results/index-j.html)) accessed 13 February 2023. Translation and some adjustment by R. Hasegawa.

<sup>960</sup> It was often evoked by Fukushima city officials and the Reconstruction Agency (METI team) officials during the field interviews.

related” damage is one of the three business damage categories defined by the Reconciliation Committee.<sup>961</sup> The compensation for this damage, together with “sales restriction”, rose to 1.8 trillion yen (15 billion euros), occupying 60% of all business damage paid to companies and representing 20% of the total Fukushima compensation paid by TEPCO (see Table 15 above).

The Interim Guideline defines “rumour-based” damage as ‘damage resulting from the attitude of consumers and trading partners who avoid purchasing products or services due to widely reported facts by the media and concerns over possible contamination of these products with radiological substances’, though reminding that there is no established definition for the term.<sup>962</sup> Interestingly, the Guidelines cautions against certain interpretations of the damage, notably those advanced by central and local governments, suggesting that in the context of scientific uncertainties about radiation risk, such public behaviour is rather reasonable and that ‘it is desirable to avoid the expression “rumour-related” from the outset, but there is no suitable expression to replace it at present, either in the courts or in practice’. Here, one can observe an independent stance undertaken by the Reconciliation Committee from the government’s Fukushima recovery policy built on the premise that radiation risk is close to zero and under control in Fukushima.

Another significant compensation item is decontamination damage<sup>963</sup> for which TEPCO has paid a total of 2.4 trillion yen (20 billion euro in equivalent), constituting 25% of the total compensation paid by TEPCO for both evacuation zones and out-of-zone areas (see the Table 15 above). While decontamination operations themselves are paid by the MoE, this

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<sup>961</sup> The other two categories are business loss due to government restrictions and indirect damage.

<sup>962</sup> Dispute Reconciliation Committee for Nuclear Damage Compensation, ‘東京電力株式会社福島第一、第二原子力発電所事故による原子力損害の範囲の判定等に関する中間指針 (Interim Guidelines on Determination of the Scope of Nuclear Damage resulting from the Accident at the Tokyo Electric Power Company Fukushima Daiichi and Daini Nuclear Power Plants)’ (n 933) 40 (Part 7: So-called "rumour-related" damage). Translation by R. Hasegawa

<sup>963</sup> Decontamination-related damage was established by the Second Supplement to Interim Guideline published on 16 March 2012 which mainly dealt with the review of evacuation zones undertaken by the government.

compensation basically covers two items: for one, indirect damage of compensation such as the reduction in income and the loss or reduction in property values, and for the other, the cost of tests conducted by local authorities and schools to measure external exposure dose of children (e.g., dosimeters) and radioactivity in food items. The Reconciliation Committee justifies such compensation by explaining that local authorities and schools ‘have been forced’ to undertake such radiation monitoring measures in order to calm the anxiety and radiation fear among the residents and parents in out-of-zone affected areas.<sup>964</sup> This implies that local authorities conduct these tests, not from the radiological protection point of view, but rather for reassuring residents who worry “unnecessarily”, which shows again the preconceived view of the Reconciliation Committee with regard to radiation risk related to the Fukushima accident.

As for the compensation for individuals, psychological compensation for mandatory evacuees occupies more than half of all payments. The compensation paid to out-of-zone evacuees and stayers represents only 19% of all compensation made to individuals (the rest of 81% for evacuation zone residents). But if one considers the number of beneficiaries, the compensation gap between in-zone and out-of-zone residents is significant. According to the White Paper on Nuclear Evacuation compiled by an academic institute and legal NGOs,<sup>965</sup> the number of beneficiaries for evacuation zones is estimated at 151,000 while that for out-of-zone affected areas (23 municipalities along) is 1.4 million persons. In a simple calculation, the average compensation amount per person in evacuation zones is 86,000 euro while that in out-of-zone areas is 2,143 euro: the difference is 40 times. A resident in out-of-zone areas received

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<sup>964</sup> Dispute Reconciliation Committee for Nuclear Damage Compensation, ‘東京電力株式会社福島第一、第二原子力発電所事故による原子力損害の範囲の判定等に関する中間指針第二次追補（政府による避難区域等の見直し等に係る損害について）（Second Supplement to Interim Guidelines on Determination of the Scope of Nuclear Damage resulting from the Accident at the Tokyo Electric Power Company Fukushima Daiichi and Daini Nuclear Power Plants (concerning Damages related to Review of Evacuation Areas by Government Instructions, etc.)’ (n 957) 16.

<sup>965</sup> Institute of Disaster Area Revitalization (Kansai Gakuin University), JCN and SAFRAN (eds), *原発避難白書 (White Paper on Nuclear Evacuation)* (Jinbun Shoin 2015) 60–61.

only 2% of what a resident from evacuation zones received. The problem and the consequence of this compensation gap will be further analysed in the following Paragraph.

In addition to cases brought directly to TEPCO, 27,551 applications have been submitted to the Alternative Dispute Resolution (ADR) centre established under the Reconciliation Committee for out-of-court settlements as of March 2021.<sup>966</sup>

## **§2. Particularities of the Fukushima Compensation Scheme and the Fukushima Status**

In the previous Chapter, the thesis examined the Japanese legislation concerning nuclear damage liability, notably the Act on Compensation for Nuclear Damage (Compensation Act). One of its unique features is that nuclear liability law aims to protect the nuclear industry as well as victims. Article 1 of the Act indeed states that its purpose is ‘to protect persons suffering from nuclear damage and *to contribute to the sound development of the nuclear industry*’. This has not been modified after the Fukushima accident and its duality or ambiguity can be observed throughout the Fukushima compensation scheme.

This paragraph examines particularities of the established compensation scheme, focusing on certain insufficiency and inadequacy in providing relief to its victims, the cause of which could ultimately be traced back to above Article 1 of the Compensation Act. First, it sheds light on certain institutional limitations of the Reconciliation Committee as an impartial policymaking body, which shaped the scope of compensation scope (A). Secondly, it identifies the major shortcoming of the Fukushima compensation scheme in appreciating certain damage

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<sup>966</sup> Dispute Reconciliation Committee for Nuclear Damage Compensation, ‘原子力損害賠償紛争解決センター活動状況報告書—令和3年における状況について (Activity Report for Nuclear Damage ADR Centre: The Status in 2021)’ (MEXT 2022) <[https://www.mext.go.jp/a\\_menu/genshi\\_baisho/jiko\\_baisho/detail/pdf/20200318-mxt\\_san-gen02-hokoku.pdf](https://www.mext.go.jp/a_menu/genshi_baisho/jiko_baisho/detail/pdf/20200318-mxt_san-gen02-hokoku.pdf)> accessed 1 May 2020.

largely due to the political pressures (B). Thirdly, it presents an overview of all the victim categories created by the Compensation Guidelines, which largely forms “the Fukushima status” (C). The criteria and justification of respective victim categories established by the Reconciliation Committee indeed elucidates who were regarded as “legitimate”, “less legitimate” and “illegitimate” victims of the accident by the Committee as well as by the government. Finally, the Paragraph probes and illustrates the major consequences of the established Fukushima status on the affected residents and communities (D).

### **A. Limited Authority and Compromised Impartiality of the Reconciliation Committee**

As specified in Article 18.2 of the Compensation Act, the mandate of the Committee is to, *inter alia*, establish guidelines to ‘help operators reach a *voluntary settlement*’ with victims. As a result, the Committee tends to establish rather conservative baselines or minimum standards which would be easily justifiable and acceptable to all parties, particularly to TEPCO.<sup>967</sup> In order to provide a quick relief to victims, the Reconciliation Committee was thus obliged to accommodate TEPCO’s will and, furthermore, that of the State which finances the compensation. As one of the Committee members put it, the guideline had to be the document which would convince TEPCO as well as the State finance authority.<sup>968</sup> The Interim Guideline indeed mentions that the aim of the guideline was to suggest ‘categories of damage most likely to fall under nuclear damage, so as to provide victims with relief as early as possible’ and cautions that ‘it is not the Committee’s view that specific forms of damage not explicitly

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<sup>967</sup> Yoshio Shiomi, ‘損害算定の考え方 (View on Damage Assessment)’ in Takehisa Awaji and others (eds), *原発事故被害回復の法と政策 (Laws and Policies for Nuclear Accident Damage Reparation)* (Nihon Hyoron Sha 2018); Shiomi, ‘原子力損害賠償の現状と課題 (The Nuclear Damage Compensation System and How It Should Be Improved)’ (n 935); Yoshimura, ‘避難者に対する慰謝料 (Solatia Payments for Evacuees)’ (n 951); Yokemoto, *原発賠償を問う—曖昧な責任、翻弄される避難者 (Questioning the Nuclear Compensation: Obscured Liability and Tossed Around Evacuees)* (n 919).

<sup>968</sup> Otsuka and others (n 932) (see the intervention by Hajime Nakajima).

mentioned in these Interim Guideline will not be compensated’, whereby urging TEPCO to establish a fair and rapid procedure of compensation for the damages described in the Guidelines as well as those that are not specifically described.<sup>969</sup>

However, in the actual implementation, TEPCO treated the scope defined by the Reconciliation Committee as the “upper limit” of their liability and often used it as justification to refuse claims compiled by victims.<sup>970</sup> Upon the publication of the Interim Guideline, TEPCO established its own compensation policy in August 2011 by adding certain conditions that did not exist in the Guidelines, based on which it began to assess and decide on claims directly submitted by victims.<sup>971</sup> In view of the situation, JFBA published a statement criticising this arbitrary role exercised by TEPCO and recommended victims to rather submit the claim directly to the Alternative Dispute Resolution (ADR) centre set up under the Reconciliation Committee.<sup>972</sup> This problem was also picked up by the media, which exposed TEPCO to public outcry, obliging it to adjust its criteria. TEPCO’s handling of compensation was also criticised for its lengthy application procedure. TEPCO first distributed a claim form which consisted of 60 pages, accompanied by a 160-page explanatory brochure on how to complete the form.<sup>973</sup> Claimants were also asked to submit various supporting documents that were nearly impossible

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<sup>969</sup> Dispute Reconciliation Committee for Nuclear Damage Compensation, ‘東京電力株式会社福島第一、第二原子力発電所事故による原子力損害の範囲の判定等に関する中間指針 (Interim Guidelines on Determination of the Scope of Nuclear Damage resulting from the Accident at the Tokyo Electric Power Company Fukushima Daiichi and Daini Nuclear Power Plants)’ (n 933) 2; Translation made by NEA/OECD, *Japan’s Compensation System for Nuclear Damage* (n 667).

<sup>970</sup> Hiraoka and Yokemoto (n 669); Ryoichi Yoshimura, ‘原子力損害賠償紛争審査会「中間指針」の性格—審議経過から見えてくるもの (The Character of the Dispute Reconciliation Committee for Nuclear Damage Compensation’s “Interim Guideline” - What We Can Observe from the Meeting Proceedings)’ (2014) 86 *Horitsu Jiho* 134.

<sup>971</sup> Yokemoto, *原発賠償を問う—曖昧な責任、翻弄される避難者 (Questioning the Nuclear Compensation: Obscured Liability and Tossed Around Evacuees)* (n 919).

<sup>972</sup> JFBA, ‘東京電力株式会社が行う原発事故被害者への損害賠償手続に関する会長声明 (President’s Statement Regarding the Damage Compensation Procedure for Nuclear Accident Victims Fixed by TEPCO)’ (Japan Federation of Bar Associations 2011) 16 September 2011 <<https://www.nichibenren.or.jp/document/statement/year/2011/110916.html>> accessed 13 February 2023.

<sup>973</sup> *ibid.*

to obtain as their homes were severely damaged by the tsunami or humidity due to a long-term evacuation. After facing criticisms not only from the victims but also from the government, TEPCO reviewed the procedure in the end.

After the termination of all evacuation orders except Red Zones, TEPCO also began to refuse settlements mediated by the Committee's ADR centre. As a justification for such refusal, TEPCO pointed out that the content of the settlements exceeded the scope of the Interim Guideline.<sup>974</sup> Given the situation, MEXT, the supervising ministry of the Reconciliation Committee, requested TEPCO on several occasions to rectify these decisions and the issue was even raised at the National Diet, but it did not bring about drastic changes to TEPCO's behaviour. This shows that without the power to impose sanctions, the Reconciliation Committee's authority was extremely limited in mediating disputes and facilitating voluntary settlements between victims and TEPCO.

What was more concerning, as Shiomi pointed out, is that this "lowest-common-denominator" compensation standard ended up playing a decisive role in influencing the decisions of the judges at courts.<sup>975</sup> Although some court decisions clearly stated that the Interim Guideline did not constitute a judicial norm, its influence can be particularly observed in the assessment of compensation amount and the definition of damage categories in many of the decisions rendered. Shiomi was especially alarmed that by referring to the guidelines which were essentially designed as a public policy to settle disputes between operators and victims, court judges risked bypassing an independent examination of the damage from the viewpoint

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<sup>974</sup> Tokyo Shimbun, '原発ADR、打ち切り急増 東電の和解拒否で昨年から (The Cancellation of Nuclear Accident ADR Settlements Increases Since Last Year Due to TEPCO's Refusal)' *Tokyo Shimbun* (Tokyo, 12 August 2019) <<https://www.tokyo-np.co.jp/article/15269>> accessed 26 April 2023.

<sup>975</sup> Shiomi, '原子力損害賠償の現状と課題 (The Nuclear Damage Compensation System and How It Should Be Improved)' (n 935).



of civil code.<sup>976</sup> This could ultimately amount to a situation where victims would not have a completely independent appraisal or legal recourse on their claim. This point will be further developed in the next Part where the thesis will examine civil lawsuits against TEPCO and the state filed by victims who were not satisfied by the compensation paid according to the standard fixed by the Reconciliation Committee (Part Two, Title II, Chapter 1).

In policymaking, the Committee's independence was also undermined by the direct intervention of TEPCO and its guardian ministry, METI.<sup>977</sup> In July 2012, METI which is not part of the Reconciliation Committee nor in charge of damage compensation produced a document entitled, 'The Concept of Compensation Standards following the Reorganisation of Evacuation Zones', defining the amount, the period and the calculation of compensations for respective zones.<sup>978</sup> Subsequently, TEPCO published a document entitled, 'On the Implementation of Compensation following the Reorganisation of Evacuation Zones', providing details for the implementation of METI's concept paper.<sup>979</sup> METI and TEPCO then participated in the Reconciliation Committee meeting, held in August 2012, and presented their policy documents to the Committee members by explaining that the documents represented the fruit of arbitration between the needs of affected municipalities and residents and the constraints of TEPCO. During the meeting, some members of the Committee questioned the appropriateness of METI's intervention in establishing compensation standards in the place of the Committee and asked for a clarification on the role its policy document plays in relation to

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<sup>976</sup> *ibid.*

<sup>977</sup> Yokemoto, *原発賠償を問う—曖昧な責任、翻弄される避難者 (Questioning the Nuclear Compensation: Obscured Liability and Tossed Around Evacuees)* (n 919).

<sup>978</sup> METI, '避難指示区域の見直しに伴う賠償基準の考え方について (The Concept of Compensation Standards Following the Reorganisation of Evacuation Zones)' (Japan Ministry of Economy, Trade and Industry 2012) 19 April 2011 <[https://www.mext.go.jp/b\\_menu/shingi/chousa/kaihatu/016/shiryo/\\_icsFiles/afieldfile/2012/08/03/1324302\\_7\\_1\\_2.pdf](https://www.mext.go.jp/b_menu/shingi/chousa/kaihatu/016/shiryo/_icsFiles/afieldfile/2012/08/03/1324302_7_1_2.pdf)> accessed 13 February 2023. Translation of the title by R. Hasegawa

<sup>979</sup> TEPCO's Press Release dated 24 July 2012 available (in Japanese only) at <[https://www.tepco.co.jp/cc/press/2012/1206810\\_1834.html](https://www.tepco.co.jp/cc/press/2012/1206810_1834.html)> accessed 13 February 2023. Translation of the title, 避難指示区域の見直しに伴う賠償の実施について (避難指示区域内) , by R. Hasegawa,

the Committee guidelines.<sup>980</sup> But METI or TEPCO did not provide any clear answer to the question. From this meeting onward, the authority of the Reconciliation Committee had been somewhat weakened and the policymaking had been under the influence of the very entity liable for compensation, TEPCO, with the support of METI.<sup>981</sup>

The impartiality of Committee members also became the topic of public scrutiny when Asahi Shimbun reported that three out of nine members in fact belonged to Japan Energy Law Institute, which is almost entirely financed by the Central Research Institute of Electric Power Industry (CRIEPI) and had been receiving monthly remuneration.<sup>982</sup> In addition, two other members were from national nuclear regulation and radiation science institutes (NRA and NIRS). This makes five out of nine Committee members had some link to either the nuclear industry-funded institution or government regulators, which seriously questions the integrity and impartiality of the Reconciliation Committee vis-à-vis the nuclear authority and industry.

## **B. Missing Nuclear Damage and Politically Sensitive Committee**

Damage caused by the Fukushima nuclear accident can be grouped into three categories: 1) damage resulting from radiation exposure, 2) damage related to evacuation, and 3) damage from losing the land to live and the destruction of communities.<sup>983</sup> Among them, the first and the third categories are the damages most overlooked by the Reconciliation

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<sup>980</sup> The minutes of the 27<sup>th</sup> Meeting of the Dispute Reconciliation Committee for Nuclear Damage Compensation, held 3 August 2012, available (in Japanese only) at [https://warp.ndl.go.jp/info:ndljp/pid/11293659/www.mext.go.jp/b\\_menu/shingi/chousa/kaihatu/016/gijiroku/1324790.htm](https://warp.ndl.go.jp/info:ndljp/pid/11293659/www.mext.go.jp/b_menu/shingi/chousa/kaihatu/016/gijiroku/1324790.htm) accessed 13 February 2023.

<sup>981</sup> Yokemoto, 原発賠償を問う—曖昧な責任、翻弄される避難者 (*Questioning the Nuclear Compensation: Obscured Liability and Tossed Around Evacuees*) (n 919).

<sup>982</sup> Asahi Shimbun, ‘紛争審2委員、電力系研究所から報酬 原発事故賠償 (Nuclear Accident Damage Compensation: Two Members of the Reconciliation Committee Receiving Remuneration from Electricity-Industry Related Research Institute)’ *Asahi Shimbun* (Tokyo, 23 September 2011) <<https://www.asahi.com/special/10005/TKY201109220748.html>> accessed 28 February 2023.; CRIEPI is a research institute financed by electricity companies.

<sup>983</sup> The categorisation made by Awaji, Yoshimura and Yokemoto (n 925)., based on the presentation made by Tsutomu Yonekura, the Secretary-General of Fukushima Nuclear Damage Defence Council (<https://www.kanzen-baisho.com/>), in the symposium “Nuclear Energy and Human Rights” held between 7-8 April 2012 in Fukushima.

Committee. Indeed, the Interim Guidelines do not directly “face up” the damage related to radiation exposure.<sup>984</sup> As pointed out earlier, damage recognised by the Reconciliation Committee for Evacuation Zone residents does not include injuries, deaths, or mental anguish related to radiation exposure. The last item was even retracted intentionally from the Guidelines upon the opposition expressed by the then Chairman of the NRA during one of the Reconciliation Committee meetings. As such, the Fukushima compensation policy represents one of the rare nuclear liability schemes, established after one of the worst radiological disasters in history, which shies away from addressing the radiation-related damage.

The other missing category of damage is the damage related to, what Yokemoto calls, “loss of homeland”.<sup>985</sup> According to him, the “loss of homeland” means being uprooted from the place one calls “home”, losing social relationships built through years, community associations, local businesses, local culture and traditions which had been maintained through religious events and historic festivals, the landscape, and the surrounding ecosystem, which all sustain life of a person in the community. Other scholars simply defined the damage as losing the entire life of a person.<sup>986</sup> In legal terms, Yokemoto argues that it constitutes a violation of “the right to peaceful existence in fully enjoying the benefit of life”<sup>987</sup>, the notion proposed by Takehisa Awaji, a jurist in environmental law, where a person loses his/her whole existence

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<sup>984</sup> Yoshida, ‘福島原発放射能問題と災害復興—福島原賠訴訟の法政策学的考察 (Fukushima Nuclear Accident Radiation Problems and Disaster Recovery: The Legal and Political Analysis of Fukushima Nuclear Damage Compensation Lawsuits)’ (n 951) 296.

<sup>985</sup> The solatium payment for “loss of homeland” was recognised for the first time in a civil group lawsuit against TEPCO and the State by the judge of Chiba District Court in September 2017.

<sup>986</sup> Yamashita, Ichimura and Sato (n 787).

<sup>987</sup> 包括的生活利益としての平穩生活権 in Japanese, translated by R. Hasegawa.

rooted in the community as well as his/her peaceful “normal” life (family life, life in a community, professional life, etc).<sup>988</sup>

Awaji clarifies the notion by elaborating that such right implicates the right to life, the right to personal life (both physical and mental)<sup>989</sup>, and the right to property, which all contribute to the enjoyment of life in peace and harmony. According to him, the Fukushima accident caused the following five categories of damage as a result of violating the above right: 1) fear and anxiety related to radiation exposure, 2) psychological damage from being constrained to an evacuated life, 3) damage related to resettlement, restitution and reconstruction of their lives, 4) loss or destruction of communities, and 5) damage to the entire ecosystem (ecological damage). Among them, the first, fourth, and fifth damage are largely disregarded or only partially addressed by the Fukushima compensation scheme established by the Reconciliation Committee, which will be analysed in detail in the following Part (Part Two, Title II, Chapter 1).

These shortcomings of the Fukushima compensation policy can be attributed to the status of the Reconciliation Committee itself. Ultimately, it is an advisory body established and supervised by the State who is a stakeholder (financer) of the TEPCO compensation as well as a defendant in numerous civil lawsuits filed by accident victims, accused of its failings as the regulator to prevent the accident.<sup>990</sup> In fact, METI had organised a series of closed-door meetings with MEXT, the Compensation Corporation, the Reconciliation Committee, and

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<sup>988</sup> Awaji, ‘「包括的生活利益」の侵害と損害 (Violation of “Comprehensive Life Benefit” and Its Damage)’ (n 935); cited by Masafumi Yokemoto, ‘「ふるさとの喪失」被害とその回復措置 (The Damage Related to “Loss of Hometown” and Its Remedy Measures)’ in Takehisa Awaji and others, *原発事故被害回復の法と政策 (Laws and Policies for Nuclear Accident Damage Reparation)* (Nihon Hyoron Sha 2018).

<sup>989</sup> It is called 人格権 (*jinkaku-ken*) in Japanese and is the right to life benefits indispensable to person’s existence in society and personal life and to be protected from infringement of the right to life, body, liberty, reputation, privacy...etc. The concept was derived from Article 13 of the Japanese Constitution which guarantees the right to life, liberty, and the pursuit of happiness.

<sup>990</sup> Yoshimura, ‘避難者に対する慰謝料 (Solatia Payments for Evacuees)’ (n 951). As shown below (Part Two), the state was indeed judged liable for the accident by a number of court decisions.

TEPCO entitled, ‘Nuclear Damage Compensation Facilitation Meeting’, since December 2011 for the purpose of information sharing on the issue of compensation.<sup>991</sup> These meetings indeed constituted a parallel structure to the Reconciliation Committee, determining and influencing the scope of damage compensation in the backdoor of the Committee. In the minutes of a meeting obtained through the public information access procedure,<sup>992</sup> the then Vice Minister of METI, Mitsuyoshi Yanagisawa, clearly pronounced that ‘TEPCO or the State is not a cash cow who has endless financial resources. This (compensation) will ultimately become the burden of all citizens either via electricity bill or taxes. So, we need to create a guideline to draw the line’.<sup>993</sup> This line of thinking thus shaped the decisions of the Reconciliation Committee. In this context, the Fukushima compensation scheme ultimately resembles a system in which the tortfeasor gets to define the scope and the amount of compensation for the damage of his making.<sup>994</sup>

In view of this, several scholars argue that the Interim Guidelines have both features of public policy and state reparation, which resulted in circumscribing the compensation scope and amount.<sup>995</sup> Indeed, the Guidelines embrace post-accident policies and priorities set by the government – notably, the 20 mSv/year benchmark, the promotion of return, and the termination

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<sup>991</sup> Source: Level 7 News, the investigative news website on the F1NPP accident, managed by seven independent journalists. See the database uploaded on 20 February 2019 by Ryuichi Kino, available (in Japanese only) at <https://level7online.jp/2019/enkatsukakaigi/> accessed 13 February 2023.

<sup>992</sup> Based on the Act on Access to Information Held by Administrative Organs (Act No. 42 of 14 May 1999), the public can request the disclosure of administrative documents from administrative organs.

<sup>993</sup> From the minutes of the 4<sup>th</sup> Meeting held on 23 March 2012 (p.17), available at <<https://level7online.jp/wp-content/uploads/2019/06/%E7%AC%AC%EF%BC%94%E5%9B%9E%E8%AD%B0%E4%BA%8B%E9%8C%B2%E7%AD%89-17.47.51.pdf>> accessed 13 February 2023.

<sup>994</sup> Yoshimura, ‘避難者に対する慰謝料 (Solatia Payments for Evacuees)’ (n 951).

<sup>995</sup> Satoshi Watanabe, ‘Genshiryokusongaibaisho to Keizaigaku - Ho to Keizaigaku No Kantan Kara (Nuclear Damage Compensation and Economics: From the Perspective of Law and Economics)’ (2015) 150 NBL 38; Yoshio Shiomi, ‘Fukushimagenpatsubaisho Ni Kansuru Chukanshishinto Wo Fumaeta Songaibaishohouru No Kouchiku (Construction of Damage Compensation Legal Principles Incorporating the Interim Guideline and Others Related to Fukushima Nuclear Damage Compensation)’ in Takehisa Awaji, Ryoichi Yoshimura and Masafumi Yokemoto (eds), *Fukushima genpatsu jiko: baisho no kenkyu (Fukushima Nuclear Accident: Research on Compensation)* (Nihon Hyoron Sha 2015); Yoshimura, ‘Hinansha Ni Taisuru Isharyo (Solatia Payments for Evacuees)’ (n 421).

of evacuation measures – in determining what constitutes reasonable damage. This led to the underestimation of certain damage, typically those related to out-of-zone evacuation and involuntary stay. Moreover, this policy-compatible Guidelines tend to be lured into restraining the global compensation amount by placing the Fukushima compensation in the overall context of national policy, especially regarding the future of the nuclear energy programme which the government is determined to safeguard in spite of the accident.<sup>996</sup> In view of this, some mayors of the affected municipalities who attended one of the Committee meetings requested the creation of a third-party entity, independent from the government, replacing the role of the Reconciliation Committee in formulating compensation guidelines, but to no avail until today.<sup>997</sup>

### **C. Nine Categories of the Fukushima Status -**

As mentioned earlier, the Fukushima compensation scheme established by the Reconciliation Committee followed key government emergency and recovery policies including the 20 mSv/year dose reference, the promotion of evacuees' return and the reclaiming of contaminated territories by decontamination. This had a significant impact on the way affected populations were compensated by TEPCO. In this scheme, everything depended on the geographical location of one's house (of principal residence) instead of one's estimated exposure doses. The contours of evacuation zones ultimately determined the type and amount of compensation payable to each individual.<sup>998</sup> Consequently, the scheme has created nine categories of victims according to different zones with varying degrees of entitlements. The

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<sup>996</sup> Watanabe (n 995).

<sup>997</sup> From the minutes of the 21<sup>st</sup> Reconciliation Meeting, held on 27 January 2012, available at [https://warp.ndl.go.jp/info:ndljp/pid/11293659/www.mext.go.jp/b\\_menu/shingi/chousa/kaihatu/016/gijiroku/1316066.htm](https://warp.ndl.go.jp/info:ndljp/pid/11293659/www.mext.go.jp/b_menu/shingi/chousa/kaihatu/016/gijiroku/1316066.htm) accessed 14 February 2023; cited by Yoshimura, '避難者に対する慰謝料 (Solatia Payments for Evacuees)' (n 951).

<sup>998</sup> Fassert (n 494); Fassert and Hasegawa (n 42); Hiraoka and Yokemoto (n 669); Institute of Disaster Area Revitalization (Kansai Gakuin University), JCN and SAFRAN (n 965).

table below (Table 16) lists these categories with the corresponding indicative amount of compensation that a family of four (two adults and two children) received in total from TEPCO and the respective number of eligible persons.<sup>999</sup>

Table 16: The Fukushima Compensation Amounts and Nine Categories of Victims<sup>1000</sup>

	Category	Amount (Family of 4) (euros)	Number of Eligible Persons
1	<b>Red (Difficult-to-Return) Zone</b> External dose more than 50 mSv/year	920,000	25,000
2	<b>Yellow Zone</b> External dose between 20-50 mSv/year	680,000	23,000
3	<b>Green Zone</b> External dose less than 20 mSv/year	630,000	33,000
4	<b>Hotspot (260 houses)</b> External dose more than 20mSv/year (Outside EZ)	70,000- 140,000	282 families
5	<b>Evacuation Prepared Area</b> 20-30 km radius zone (Former EZ until Sep 2011)	60,000	59,000
6	<b>Other Temporary Shelter/Evacuation Area</b> A part of Iwaki city and a part of Minamisoma city (Former EZ until 22 Apr 2011)	20,000	11,000
7	<b>“Voluntary” Evacuation Areas</b> 23 towns in Fukushima Prefecture, recognised by the Reconciliation Committee	10,000- 14,000	1.4 million
8	<b>Semi-“Voluntary” Evacuation Areas</b>	4,600	166,000

<sup>999</sup> The indicative amount is shown per family, not per individual, in order to give the comprehensive picture of compensation to which each status is entitled. This is due to the fact that some compensation items are payable only per household such as damage related to loss or reduction of property values.

<sup>1000</sup> Source: Institute of Disaster Area Revitalization (Kansai Gakuin University), JCN and SAFRAN (n 965) 60–61. Also, the MEXT’s supporting document entitled ‘原子力損害賠償の世帯当たり賠償額の試算について (The Estimation of Nuclear Damage Compensation Amount per Household)’ submitted to the 39<sup>th</sup> Reconciliation Committee Meeting, held on 26 December 2013, available at <[http://www.mext.go.jp/b\\_menu/shingi/chousa/kaihatu/016/shiryo/\\_icsFiles/afieldfile/2013/12/26/1342848\\_3\\_1.pdf](http://www.mext.go.jp/b_menu/shingi/chousa/kaihatu/016/shiryo/_icsFiles/afieldfile/2013/12/26/1342848_3_1.pdf)> accessed 14 February 2023. Adjustment and arrangement were made by R. Hasegawa.

	10 other towns in Fukushima and Miyazaki prefectures, recognised by TEPCO		
9	<b>Towns designated as Intensive Contamination Survey Areas by MoE but excluded from “Voluntary” Evacuation Areas (71 towns)</b> External dose between 1-20 mSv/year	0	A few million

Category 1 to 3 represent the victims from the main evacuation zones for which the psychological compensation related to evacuation was paid during seven years. In view of the compensation amount (630,000-920,000 euros), the evacuees from these three zones were treated by the government as the most legitimate victims of the accident. Category 4 to 6 are the victims also from evacuation zones but the duration of evacuation order was much shorter. They are still considered as legitimate victims by the authorities but less so compared to the first three categories (1-3). For example, Category 4 – radiation hotspot designation – lasted between two-and-a-half to three-and-a-half years while Category 5 – Evacuation Preparation Zone – existed only for six months and Category 6 evacuation/sheltering zone lasted only one month. The compensation amount for these Categories ranges from 20,000 to 140,000 euros. The termination of these zones (Cat.4-6) was decided and announced by the government without consulting the residents.

Categories 7 and 8 comprise the victims from the out-of-zone contaminated areas recognised by the Reconciliation Committee or TEPCO as eligible for some compensation. Strictly speaking, they are not regarded as legitimate victims of the accident by the government and were only added to the compensation scheme due to societal pressures, which can be seen from the amount accorded to these categories of victims (between 4,600 – 14,000 euros). Category 7 represents the 23 municipalities of Fukushima Prefecture recognised by the Reconciliation Committee as “Area subject to Voluntary Evacuation” while Category 8 was



created by TEPCO as “Semi-Voluntary Evacuation Areas” after a plea made by concerned municipalities and victims. As the title indicates, these Cat.8 victims are provided with a half of the compensation paid to Cat.7 victims only for children and pregnant women.<sup>1001</sup> Lastly, Category 9 represents the victims whose environment was affected by radiation doses between 1-20 mSv/year and designated as target area for decontamination (Intensive Contamination Survey Areas) by the Ministry of Environment. However, they were excluded from the scope of compensation defined by the Reconciliation Committee and thus received no compensation.

What one first notices from the table is a huge compensation gap in amount between the three evacuation zones (Green, Yellow and Red Zones) and the rest. The problem is that these gaps derived uniquely from government orders and did not necessarily correspond to the radiological situations on the ground or individual exposure doses.<sup>1002</sup> For example, a family living at radiation hotspots ( $\geq 20$  mSv/year) (Cat.4) and a family living in Yellow Zone (20-50 mSv/year) (Cat.2) evacuated from a similar radiological environment but the latter was provided with 680,000 euros (in equivalent) in total compensation while the former received only between 70,000-140,000 euros: the difference is five to ten-fold. The disparity becomes even greater when we compare the compensation amount between the Green Zone (Cat. 3) family and the “Voluntary” Evacuation Areas family (Cat.7). The radiation doses detected in both areas are similar: less than 20 mSv/year. But a family who evacuated on its own or stayed in the “Voluntary” Evacuation Areas and exposed to radiation doses reaching 20 mSv/year in some cases, received only 14,000 euros in total compensation while a family evacuated from Green Zone was entitled to 630,000 euros: 45 times more (!). Moreover, the residents whose environment was affected by radiation doses between 1-20 mSv/year but their municipalities

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<sup>1001</sup> Later, TEPCO decided to pay an additional compensation of 40,000 yen (320 euro in equivalent) to everyone in this semi-voluntary evacuation area, so other adults also received 40,000 yen.

<sup>1002</sup> Yokemoto and Hiraoka (n 50); Fassert and Hasegawa (n 42).

were not included in the “Voluntary” Evacuation Area defined by the Reconciliation Committee or TEPCO did not receive any compensation (Cat.9) while the Green Zone (i.e. the same 1-20 mSv/year) residents received 630,000 euros.

In addition to the amount gap, the number of victims eligible for each compensation category has a significant disparity as well. The number of beneficiaries for the Category 1-3 compensation (Red, Yellow and Green Evacuation Zones) (81,000) whose amount was relatively comprehensive, represented only 5% of all victims who received some form of compensation (1.7 million). The majority of Fukushima victims received between 10,000-60,000 euros per family (not individual).

What stems from the above Fukushima status is the “decontaminated” notion of nuclear damage, which only accounts for the damage caused by administrative decisions of the State, corresponding to the level of liability that the government owes to victims by its protective actions. The compensation amount thus represents the degree of stringency or limits that respective government orders imposed on individuals rather than the level of radiation exposures that individuals received. As such, it effectively diminishes the “nuclearity” of Fukushima accident damage, disregarding the existence itself of radiation contamination or the possibility of radiation effects by focusing on the “harmful rumours”, “evacuation orders”, “tests to dispel *unnecessary* radiation fears”, etc.

Essentially, the Fukushima compensation scheme looks more like a state liability scheme for its post-disaster decisions and actions rather than the TEPCO liability scheme for nuclear damage caused by its accident. This explains in part why the most typical nuclear damage from a nuclear disaster – health effects and the prejudice of anxiety from radiation exposure – is so lightly dealt with or nearly nonexistent in the Fukushima compensation. Also,

it provides an explanation as to why such compensation gaps exist among different categories of victims who are in similar situations. The Fukushima status ultimately represents what the government considers or is willing to accept as damage caused by its own actions rather than reflecting nuclear damage incurred to individuals from the radiological accident. Consequently, the Fukushima compensation status became something partial, unfair, and arbitrary which does not necessarily correspond to the actual damage or suffering of the affected population.

#### **D. Consequences of the Imbalanced Compensation System: Fukushima Group Lawsuits**

This public-policy compensation scheme thus led to amplifying, rather than mitigating, the feeling of injustice, despair, jealousy, and indignation among the affected residents, which had already been triggered by the Fukushima recovery policies established by the government for inside and outside evacuation zones.

The Fukushima compensation status indeed enlarged the gap between the reality of post-accident life on the ground for many and the solutions and reparations proposed by the authorities. For example, the contour of different compensation categories (zones) often does not reflect the reality of damage on the ground. A demonstrative example is found in Tomioka town where the Difficult-To-Return (Red) Zone is demarcated from the Yellow Zone only by a small residential street (see the photo below at Figure 11). In the photo, houses on the right side of the street with fences are in the Red Zone where the inhabitants were told not to return due to high radiation doses while houses on the left side of the same street are in the Yellow Zone whose evacuation order was lifted in April 2017 and the inhabitants were called to return. For residents who know very well the reality and the whereabouts of contamination, these boundaries seemed extremely artificial and unfair.

Figure 11: Image of a Red Zone Border in Tomioka Town<sup>1003</sup>



Another quintessential example of the Fukushima compensation status enlarging the disparity is found in Minamisoma city, located 10-40 km north of the F1NPP (see the map above at Figure 8&9). In fact, the city has been designated to five different zones/categories of compensation: Red, Yellow, and Green Zones, radiation hotspots, and “Voluntary” Evacuation Areas. In addition, there was an out-of-zone area which was not included in the Fukushima compensation status. As a result, the residents of Minamisoma city, though living in the same city, received five different amounts of compensation or no compensation at all while radiation levels across these zones were sometimes not so different. As mentioned earlier, the compensation gap between Green Zone and “Voluntary” Evacuation Areas, both of which were basically detected with doses less than 20 mSv/year, reaches 45 times.

Consequently, the Fukushima compensation status ended up dividing affected communities to its disintegration, breaking up social relations and the mutual help system that had been installed in these hamlets over generations. The feeling of injustice, jealousy, anger and exasperation fumed inside, outside, and in-between different zones or different categories of compensation. The distrust and indignation toward the government and TEPCO reigned all

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<sup>1003</sup> Tomioka town©Takuya Tsujiuchi (Professor in Medical Anthropology at Waseda University).

over affected territories. In the field interviews, many residents expressed their despair, feeling neglected or abandoned by the state, where their plight and suffering were not properly appreciated or addressed by the Fukushima recovery programme and compensation. This was translated into a surge of both individual and group lawsuits. Since 2014, more than 30 civil group actions have been filed against TEPCO and the state involving 12,000 plaintiffs all over Japan, who demanded a total of 114 billion yen (1 billion euros) as compensation for various forms of damage.<sup>1004</sup> Half of the plaintiffs are the residents from former evacuation zones while the other half are out-of-zone residents and evacuees.

Among these actions, there are two lawsuits specifically brought against the 20 mSv/year government policy. The first one is the Group Action for “Revocation of the 20 mSv/year Criteria” filed by the residents of Minamisoma city in April 2015 at the Tokyo District Court.<sup>1005</sup> The suit demanded the cancellation of the government’s decision to terminate the hotspot designation, using the 20 mSv/year reference dose. The group specifically contests the validity of such a reference level and claims financial assistance to continue evacuation. Another case is the Group Action “Against Radiation Exposure of Children” filed at the Fukushima District Court by the residents living in Fukushima Prefecture in August 2014 against the state, the Fukushima Prefecture, and seven municipalities located in the affected out-of-zone areas. In the complaint, the plaintiff alleged that the defendants had failed to ensure the right of children to receive education in a safe environment free of radiation exposure. To justify such claim, the group challenges the legality of applying the reference dose of 20 mSv/year to children in view of the country’s radiation regulation related to public exposure dose limit (1 mSv/year) as well as the Radiation Controlled Area (5 mSv/year).<sup>1006</sup>

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<sup>1004</sup> Tsuchie (n 52).

<sup>1005</sup> “Revocation of the 20 mSv/year Criteria” Group Action website <<http://minamisouma.blogspot.fr/>>

<sup>1006</sup> Group Action “Against Radiation Exposure of Children” website <<http://fukushima-sokaisaiban.blogspot.fr/>>

These civil lawsuits thus not only question the adequacy of government protection measures and compensations for the victims but also challenges the validity of the dose standards adopted by the Japanese authorities in conformity with international radiation protection norms. The content of these claims and court decisions will be further studied in the next Part (Part Two, Title II, Chapter 1).

## Conclusion of Chapter 2:

Having long denied any possibility of severe accidents on its territory, Japan had not developed any legislation or plan on post-accident recovery and protection. Consequently, it had to be invented from scratch following the accident, the responsibility of which was conferred to METI, the very ministry responsible for the country's nuclear energy policy, regulation, and promotion.

In the Fukushima recovery phase, the affected residents asked for two things: to be protected from radiation exposure and to be assisted in rebuilding their lives anywhere they feel safe and suitable. Neither of these requests was adequately fulfilled by the post-accident recovery programme installed by the Japanese authorities led by METI. Instead, the programme was first and foremost geared toward ensuring the economic and territorial survival of the Fukushima Prefecture and affected municipalities. The “protective” actions for the affected residents were then oriented and designed to achieve this priority: the decontamination, the retention of the 20 mSv/year reference dose, and the reconstruction to regain the contaminated territories, promote the return and staying of residents in the Prefecture, and “normalise” the life with radiological contamination.

In this design, the voice of the affected was scarcely reflected, if not ignored completely. To achieve the objective, the authorities employed a carrot and stick tactic where those who “obeyed” government decisions (i.e. returnees) were generously assisted and compensated while those who “rebelled” (i.e. voluntary evacuees and resettlers) were sort of “penalised” with meagre support and compensation. In addition, an intensive “risk communication” campaign was organised by mobilising the radiation experts from state-affiliated institutions to “dispel unwarranted radiation fear” among the affected population by

downplaying the risk related to low-dose radiation. The “accident-free myth” perpetrated by the nuclear industry and regulators prior to the Fukushima accident was replaced by the “radiation-safety myth” according to which radiation doses below 100 mSv have almost no health effects.<sup>1007</sup>

Ultimately, the Fukushima recovery operation looked more like an all-out national reconstruction project after a major war than a recovery operation from an industrial accident, mobilising all the core state actors and resources. As such, politics significantly intervened in all the post-accident protective actions, even in deviation from some national legislative acts. Moreover, the Fukushima compensation scheme, the other pillar of post-accident protection system, corroborated and reinforced instead of redressed these biased protection policies, resulting in creating multiple compensation status with huge compensation gaps between different categories of victims. This nuclear damage compensation system finally blurred the responsibility of TEPCO and the state, creating a peculiar situation where the party liable for damage does not actually pay the compensation and who actually pays decides what to compensate. As Sezin Topçu argued, the notion of “responsibility” in the nuclear domain operates foremost as a discursive regime, a way to organise responsibility as much as irresponsibility.<sup>1008</sup>

Against this situation, the international nuclear and radiation institutions remained completely silent according to their principle of non-intervention in matters related to nuclear safety. Under the circumstance, the only and last option that accident victims had in seeking redress for their suffered damage was to take legal actions at national courts and recourse at the international human rights instances. The Fukushima case especially showed that in a major

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<sup>1007</sup> Yamashita (n 824); Shimazono (n 629).

<sup>1008</sup> Topçu, ‘Organiser l’irresponsabilité? La Gestion (Inter)Nationale Des Dégâts d’un Accident Nucléaire Comme Régime Discursif’ (n 315).



nuclear accident, the large majority of disaster victims are left with meagre assistance and redress from the state or the operator and are often left to themselves to rebuild their lives.



## Conclusion of Title II

The Fukushima accident case study illustrated that the current nuclear disaster response and recovery model provides only partial or relative protection to persons affected by a nuclear accident. There are two main contributing factors to that effect. First, as Kate Brown asserted in her book “Manual for Survival”, the scale of damage caused by a large nuclear disaster is simply beyond the capacity of any state.<sup>1009</sup> The case of Japan, world’s third economy with advanced technology, demonstrated well this reality. According to Brown, no organization on the national or international level is sophisticated enough to properly deal with a major nuclear emergency. Secondly, as the history of Japanese nuclear energy development showed, the nuclear energy sector is so ingrained in the state structure and national interests that the protection of the population tends to be compromised for the sake of safeguarding the former. This case study showed that the post-accident management was implemented in a way to ensure the territorial integrity and survival of the affected Prefecture and municipalities and minimise the burden of compensation on the State budget. The main objective was thus not necessarily to protect and rebuild the lives of affected individuals but, first and foremost, to safeguard the territorial integrity and national interests.

However, this is not at all surprising in view of international nuclear and radiation protection norms analysed in the previous Title. The Japanese emergency and recovery actions after the Fukushima accident were finally not so deviated from the norms established by the nuclear regime. For proof, the IAEA even validated the Japanese post-accident policies including the choice of 20 mSv/year reference dose in its mission report.

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<sup>1009</sup> Kate Brown, *Manual for Survival: A Chernobyl Guide to the Future* (Allen Lane 2019).

Meanwhile, strong criticisms of these policies were made by Japanese legal expert associations such as Japan Federation of Bar Association (JFBA), Human Rights Now, and Save Fukushima Children Lawyers' Network (SAFLAN)<sup>1010</sup> as well as scientists and scholars from academic institutions. These civil society organisations notably argued that some of the post-Fukushima policies were in non-conformity with Japanese legislation and the Constitution as well as international legal obligations under human rights conventions. Indeed, the latter critique was confirmed by the UN human rights institutions. In contrast to the muted response from international nuclear institutions, the UN Special Rapporteurs on human rights to health and on toxics made scathing reports on the handling of the Fukushima accident by the Japanese government. All these incidents indicate that the nuclear disaster response norms collide with or possibly infringe the norms of international human rights and environmental laws.

In view of these criticisms, the next Part will examine in detail international legal and normative frameworks and national laws which would challenge the validity of nuclear disaster protection norms established by the international nuclear regime.

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<sup>1010</sup> Established in July 2011 following the Fukushima accident by 35 lawyers, SAFLAN is a network of lawyers which supports the stayers, evacuees, and returnees in the out-of-zone affected areas. Source: SAFLAN website (<http://www.saflan.jp/>)

## Part Two: Proposal of New Protection Norms

As the Fukushima case study demonstrated, major nuclear accidents cause catastrophic long-term effects to people and the environment, where the radiation release contaminates a vast territory threatening the lives and wellbeing of the inhabitants over decades, even generations, and haunting the affected with constant anxiety over future radiation effects on their health and that of children. They are in effect human-made environmental disasters which not only uproot tens of thousands but also confine many more in the contaminated environment. People lose not only home, communities and hometowns but also their life-long social relationships, trust, safety net, and even family ties, putting them in a refugee-like situation. Often, the contamination affects not just one territory but also neighbouring countries and far beyond. In the words of nuclear law experts, the scale of damage is ‘almost limitless’ and ‘comparable to that of armed conflicts’.<sup>1011</sup> In effect, ICRP also uses this analogy to war consequences in one of its publications, suggesting that in large accidents, nations can ‘lose a part of their territory’.<sup>1012</sup>

Nuclear disasters thus implicate not only the nuclear law but also other international laws, notably the domains of disaster displacement, human rights, and environment. Despite these known effects of nuclear accidents, the current nuclear normative regime does not refer to, or largely ignores, the above three legal and normative regimes.

The Fukushima disaster response which was largely aligned to the international nuclear protection norms therefore provided only partial relief to the affected population. As

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<sup>1011</sup> Schwartz (n 340) 38; Pelzer, ‘The Present State of Research Carried Out by the English-Speaking Section of the Centre for Studies and Research’ (n 17) 270, respectively.

<sup>1012</sup> ICRP, ‘Application of the Commission’s Recommendations to the Protection of People Living in Long-Term Contaminated Areas after a Nuclear Accident or a Radiation Emergency. ICRP Publication 111.’ (n 18) 30.

examined in the previous Part, under the nuclear regime, the protection of persons is conditioned upon meeting certain criteria and thus often compromised in the face of national interests on economy, industry, defence, energy, and territorial integrity. The Fukushima case study amply demonstrated this grave inadequacy and partiality of the nuclear disaster protection model.

Following the accident, Japanese legal expert organisations, environmental law scholars and UN human rights institutions expressed serious concerns on the handling of the Fukushima nuclear accident by the Japanese government, recalling its legal obligations under national and international laws. Indeed, the nuclear framework collides with international legal and normative regimes on displacement, human rights, and environment. The Fukushima model of protection was also called into question vis-à-vis the national precedents of protection established in past disasters such as the Chernobyl accident and the Hiroshima and Nagasaki A-bomb disaster.

This second Part of the thesis therefore explores these legal challenges posed to the current nuclear disaster response norms, and proposes alternative protection principles and norms which would fill the protection gaps created by the former. To do this, it first examines international legal and normative frameworks which directly and indirectly collide with the nuclear normative framework: namely, humanitarian/forced migration, human rights, and environmental law regimes (Title I). After these probes, the thesis investigates national laws and jurisprudence established in major nuclear disasters, namely the Hiroshima/Nagasaki atomic bombing, the Chernobyl accident, and the Fukushima accident, and proposes a new protection model for nuclear disasters in accordance with the international law principles and national precedents analysed above (Title II). The ultimate objective of this Part is to suggest a paradigm shift in looking at the human protection aspect of nuclear disasters: detaching the

subject from the nuclear regulation framework and bringing it in the humanitarian and human rights framework, thereby “denuclearising” and realigning the protection issues to the rights-based framework which is today recognised as the norm in managing disasters.





## **Title I: International Legal and Normative Challenges to Nuclear Regulation Framework**

The legitimacy or adequacy of the nuclear regime in protecting persons in the event of the nuclear accidents could be in effect contested by other international normative regimes. To protect people in times of disasters, the international community has developed over the years an authoritative legal and normative framework under the auspices of the UN or other international organisations based on humanitarian and human rights laws. The refugee and forced migration regime, so-called humanitarian regime, was initially developed to protect displaced persons in times of wars but has evolved over the years to expand its coverage, or under discussions for an extension, to other types of disasters such as natural disasters, development projects, industrial accidents, and more recently, climate change. In effect, nuclear accidents were specifically referred to as one of the applicable disasters for the Guiding Principles on Internal Displacement, the key normative document of the regime.<sup>1013</sup>

Despite this supposed applicability, the humanitarian and human rights community remained largely silent at the 1986 Chernobyl nuclear accident. This trend began to change with the 2011 Fukushima nuclear accident. In contrast to the time of Chernobyl accident, dissenting opinions were expressed within the UN system, notably from the UN human rights bodies, and several scholars in forced migration, environmental law, and international relations. They expressed serious concerns with the handling of victims by the Japanese government and international nuclear institutions. Most notably, the UN Special Rapporteur on the rights to health, commissioned by the UN Human Rights Council, directly criticised the nuclear normative principles to be applied in victim protection due to their discordance with human

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<sup>1013</sup> See the postscript article on the Guiding Principles of Internal Displacement written by Cohen (n 91).

rights principles.<sup>1014</sup> As such, the human rights regime directly calls into question the validity of the nuclear regime which gives priority to collective interests including those of the state and nuclear industry over the rights of individuals. Today there is *a conflict of legitimacy* between the two normative regimes – nuclear vs. humanitarian and human rights - concerning the protection of persons affected and displaced by nuclear disasters.<sup>1015</sup>

Meanwhile, many environmental law scholars reacted following the Chernobyl and Fukushima nuclear accidents, pointing out the irregularities of the nuclear regime with international environmental principles. Nuclear disasters particularly implicate one of these principles which is at the intersection with human rights, the right to a safe and healthy environment.

This first Title of Part Two thus explores international legal and normative regimes which would challenge the validity and adequacy of the nuclear regime in protecting persons in nuclear disasters. First, it looks into the international normative framework designed to protect displaced persons in disasters – humanitarian and forced migration regime (Chapter 1). This chapter investigates how in disaster the displaced are currently protected under the international normative regime and how it could be applied to the case of nuclear disaster evacuees. The following chapter then dives into other legal regimes which voiced their serious concerns and questioned the adequacy of the nuclear normative framework in dealing with disasters after the Fukushima accident: human rights and environmental law regimes (Chapter 2). This analysis will notably feed into the normative reflection for the protection of nuclear accident victims, which the thesis aims to propose in the following final Title.

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<sup>1014</sup> UNHRC, 'Report of the Special Rapporteur on the Right of Everyone to the Enjoyment of the Highest Attainable Standard of Physical and Mental Health, Anand Grover' (n 59).

<sup>1015</sup> Fassert and Hasegawa (n 42).

## Chapter 1: Challenge from Humanitarian and Forced Migration Regime

Humanitarian or forced migration regime is a general term used to describe the international normative, operational and institutional system formed by the UN and other international humanitarian agencies with a view to assist and protect individuals who are displaced by conflicts and disasters.<sup>1016</sup> The international system of protection for the displaced had long been concentrated on refugees. They are those whose lives were threatened by violence and other human rights violations and who fled across the borders to seek protection elsewhere. But since the end of the Cold War, the number of internally displaced persons has grown rapidly around the globe and quickly surpassed that of refugees. Today people flee home for reasons not recognised by the international refugee regime, and many of them remain or are often trapped within their own country of origin.<sup>1017</sup> This led to the creation of forced migration regime, to which the refugee regime is often attached as a special sub-group.

Anchored on three branches of international law, namely international humanitarian law, refugee law, and human rights law, the forced migration regime aims to address the plight of refugees and internally displaced persons (IDPs). The last category of persons is those who fled home due to armed conflicts and generalised violence as well as natural disasters and other human-made disasters but remain, either unwillingly or voluntarily, within their national

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<sup>1016</sup> An international law scholar B.S. Chimni points to the fact that refugee and forced migration regimes have also been constructed to serve the interests and strategies of Western states at different geopolitical era. For example, during the Cold War, it was used to discredit the communist regime by accepting refugees from the East bloc and in the post-Cold War era, it also functioned to contain the movement of people from the south to the north by emphasising the state responsibility of protecting internally displaced persons (IDPs) within their borders. For details, see Chimni, 'The Geopolitics of Refugee Studies' (n 87); Chimni, 'The Birth of a Discipline' (n 87).

<sup>1017</sup> Stephen Castles, 'Confronting the Realities of Forced Migration' [2004] Migration Information Source <<https://www.migrationpolicy.org/article/confronting-realities-forced-migration>> accessed 11 November 2021.

borders. Today there are 55 million IDPs around the globe, of which 48 million are conflict-induced, while the number of refugees is 20 million.<sup>1018</sup>

Although refugees and IDPs are put under the same protection umbrella, the normative regime which covers their protection is distinctly separated. While refugees are protected by a binding instrument – the Refugee Convention – and accorded international protection, IDPs are provided with a non-binding instrument - the Guiding Principles on Internal Displacement (GPID hereafter)<sup>1019</sup> – and under the responsibility of national governments.

According to the definition of IDPs by the GPID, nuclear displacees can indeed be identified as IDPs and therefore be protected by the GPID. But as proposed earlier, a nuclear accident is a human-made environmental disaster which displaces as well as traps people in a contaminated environment. Those displaced by environmental disaster have some specific needs which are not entirely addressed by the GPID. One of them is the question of risk threshold, what environmental migration scholars call a “tipping point”. At what degree of contamination, the movement of individuals is considered as “forced” and thus not voluntary? Secondly, there is the problem of forced immobility, the so-called trapped population. In environmental disasters, people are often compelled to remain in the contaminated areas due to the dose criteria (or reference dose) fixed by the authorities for assistance. People are assisted only when the contamination level exceeds these official criteria. They often represent the forgotten and neglected victims of environmental disasters. To address these protection gaps, international norm-making for the protection of environmentally displaced persons has gained

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<sup>1018</sup> Source: IDMC website for the number of IDPs < <https://www.internal-displacement.org/database/displacement-data> > accessed 20 November 2021; UNHCR website for the number of refugees < <https://www.unhcr.org/figures-at-a-glance.html> > accessed 20 November 2021

<sup>1019</sup> UNCHR, ‘Report of the Representative of the Secretary-General, Mr. Francis M. Deng, Submitted Pursuant to Commission Resolution 1997/39 Addendum: Guiding Principles on Internal Displacement’ (n 88).

momentum during the last 10 years, particularly under the pressure to address climate-induced displacement.

This chapter thus closely examines the two normative frameworks designed to protect people in disaster displacement, which are applicable to nuclear disasters: one is the existing IDP framework (Section 1), and the other is the emerging normative framework for environmental displacement (Section 2). In fact, the protection framework for environmentally displaced persons has not yet been fully established but its policymaking process provides many valuable insights for the protection of nuclear victims. These two frameworks are complementary in addressing the protection gaps created by the nuclear framework.

### **Section 1: IDP Protection Regime**

Despite having many common traits with IDPs and environmentally displaced/trapped persons, nuclear disaster displacement (and immobility) has rarely been addressed by the humanitarian and forced migration community or environmental displacement platform. Instead, it has been entirely handled by international nuclear authorities such as IAEA and ICRP and national nuclear regulators who only adhere to the nuclear regulation framework in protecting and assisting victims. Human protection in nuclear disasters thus operates in parallel to, and in total isolation from, the rest of international normative frameworks which generally apply in case of human-made and natural disasters.

The Fukushima nuclear disaster did not dramatically change this scenery, but in contrast to the time of the Chernobyl accident, there were strong calls from the UN and non-governmental human rights organisations and forced migration scholars to apply the IDP framework in the disaster response. They all urged for a regime change, moving away from the nuclear framework and adhering to the forced migration and rights-based framework in

assisting and protecting nuclear disaster victims. For example, both Hasegawa and Mosneaga examined the case of Fukushima evacuees from the forced migration framework and identified them as IDPs who should be protected in accordance with the Guiding Principles.<sup>1020</sup> The same conclusion was also drawn by some legal scholars.<sup>1021</sup> From the civil society, the Japan Federation of Bar Associations (JFBA) and legal expert NGOs such as Human Rights Now also advocated for paradigm shift in the government's policy toward the affected population by referring specifically to the Guiding Principles.<sup>1022</sup>

But who are exactly IDPs? What is the distinction between them and refugees? How are they currently protected under international law? This section examines in detail the normative and institutional set-up (§1) and the protection norms and principles of the IDP framework (§2).

## **§1: The Normative and Institutional Framework**

The analysis of the normative and institutional structure of IDPs protection sets off by tracing the historic evolution of the forced migration normative framework, originating from refugee protection at the beginning of the 20<sup>th</sup> century and expanded to IDPs protection during the 1990s (A). After elucidating the distinction between refugees and IDPs, it explores the

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<sup>1020</sup> Hasegawa, 'Disaster Evacuation from Japan's 2011 Tsunami Disaster and the Fukushima Nuclear Accident' (n 42); Hasegawa, 'Returning Home after Fukushima: Displacement from a Nuclear Disaster and International Guidelines for Internally Displaced Persons.' (n 42); Ana Mosneaga, 'Restoring Livelihoods after Disasters: The Case of Fukushima's Nuclear Evacuees' (United Nations University 2015) Policy Brief No 2; Mosneaga (n 854).

<sup>1021</sup> Toshiya Ueki, '東日本大震災と福島原発事故をめぐる国際法上の問題点 (International Law Issues Concerning the Great East Japan Earthquake and the Fukushima Nuclear Power Plant Accident)' (2011) 1427 *Jurist* 108; Abe (n 299).

<sup>1022</sup> JFBA, '福島復興再生と福島原発事故被害者の援護のための特別立法制定に関する意見書 (Opinion Paper Concerning the Enactment of Special Acts on Fukushima Reconstruction and Revitalization and Nuclear Accident Victims' Support)' (Japan Federation of Bar Associations 2012) 16 February 2012 <<https://www.nichibenren.or.jp/document/opinion/year/2012/120216.html>> accessed 16 February 2023; HRN, '東日本大震災の被災者(避難所・自宅居住)の方々の権利保障のために当面配慮し、実現されるべきこと (Recommendations For the Protection of Rights of Persons Affected by the Great East Japan Disaster (Evacuees and Stayers))' (Human Rights Now 2011) 24 April 2011 <[http://hrn.or.jp/activity2/shinsai\\_02.pdf](http://hrn.or.jp/activity2/shinsai_02.pdf)> accessed 16 February 2023.

definition of IDPs and the current normative status of the GPID and other documents (B), followed by the analysis of the current institutional arrangement for international protection of IDPs and its limits (C). Lastly, it presents a cartography of existing (and emerging) international instruments in the field of forced migration, categorised by scope, thus clarifying the position and the role of the IDP protection framework in the larger regime of forced migration (D).

### **A. Historic Evolution of the Forced Migration Regime**

The international concern for the displaced originates from refugees. Refugees have always existed in the world. Wars and different forms of human rights abuses led people to flee home seeking safety in other parts of the country or abroad since antiquity. But international efforts to protect the displaced had long been focused on refugees since they cross borders and enter the jurisdiction of another state.<sup>1023</sup> This first sub-paragraph briefly explores the origin of the forced migration regime and the development of international refugee protection regime (1) and examines how the regime became a model to develop another regime for the displaced – IDPs protection (2). In the end, it clarifies the similarities and differences between refugee protection and IDPs protection (3).

#### **1. Refugee Protection Regime**

The global refugee protection regime was first instituted during the 20th century after two world wars under the auspices of the UN. Notably, the World War II gave birth to the current refugee regime anchored in the 1951 Convention relating to the Status of Refugees<sup>1024</sup> and its

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<sup>1023</sup> The first international treaty on asylum even dates back to the thirteenth century BCE (the Treaty of Kadesh) according to Cathryn Costello, Michelle Foster and Jane McAdam, 'Introducing International Refugee Law as a Scholarly Field' in Cathryn Costello, Michelle Foster and Jane McAdam (eds), *The Oxford Handbook of International Refugee Law* (Oxford University Press 2021).

<sup>1024</sup> Convention Relating to the Status of Refugees (adopted 28 July 1951, entered into force 22 April 1954) 189 UNTS 137 (Refugee Convention)

1967 Protocol<sup>1025</sup> (Refugee Convention, hereafter), modelled on the Convention relating to the International Status of Refugees of 28 October 1933<sup>1026</sup>.

The Nazi persecution of its own nationals also prompted the international community to adopt international human rights instruments, mainly comprised of the Universal Declaration of Human Rights<sup>1027</sup> and two human rights conventions<sup>1028</sup> – International Covenant on Civil and Political Rights (ICCPR) and International Covenant on Economic, Social and Cultural Rights (ICESCR). Human rights law has significantly influenced the evolution of refugee law from traditional duty-based approach to more rights-based approach, thus broadening the scope of protection. According to the Refugee Convention (art 1, A(2)), refugee is someone who:

owing to well founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country

In addition to this definition, the 1969 Organization of African Unity (OAU) Convention<sup>1029</sup> and the 1984 Cartagena Declaration<sup>1030</sup> of Latin American countries provide complementary definitions by adding “external aggression”, “generalized violence”, “internal conflicts”, “massive violation of human rights”, and “events seriously disturbing public order”

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<sup>1025</sup> Protocol Relating to the Status of Refugees (adopted 31 January 1967, entered into force 4 October 1967) 606 UNTS 267 (Protocol)

<sup>1026</sup> League of Nations, Treaty Series Vol. CLIX No. 3663; The Convention was ratified only by nine States including France and the UK and its protection was limited to Russian, Armenian, Assyrian, Assyro-Chaldean, Syrian, Kurd and Turk refugees. See Gilbert Jaeger, ‘On the History of the International Protection of Refugees’ (2001) 83 (843) *International Review of the Red Cross* 727.

<sup>1027</sup> UNGA, ‘Universal Declaration of Human Rights’ (n 84).

<sup>1028</sup> International Covenant on Civil and Political Rights (adopted 16 December 1966, entered into force 23 March 1976) 999 UNTS 171 (ICCPR); International Covenant on Economic, Social and Cultural Rights (adopted 16 December 1966, entered into force 3 January 1976) 993 UNTS 3 (ICESCR)

<sup>1029</sup> OAU Convention governing the specific aspects of refugee problems in Africa (adopted 10 September 1969, entered into force 20 June 1974) 1001 UNTS 45

<sup>1030</sup> Cartagena Declaration on Refugees (1984), adopted by the Colloquium on the International Protection of Refugees in Central America, Mexico and Panama: Legal and Humanitarian Problems on 22 November 1984, reprinted in *Annual Report of the Inter-American Commission on Human Rights*, OAS Doc OEA/Ser.L/V/II.66/doc.10, rev. 1, at 190-93 (1984-85), 17 April 1998



as reasons for their flight. Refugee law is also complemented by other bodies of laws, notably international humanitarian law (IHL) and human rights law (HRL).<sup>1031</sup> Also called “the law of war”, the IHL is based on the 1949 Geneva Conventions and the 1977 Additional Protocols which regulate the conduct of armed conflicts and protect civilians and non-combatants during armed conflicts.

The “guardian” of the Refugee Convention is the United Nations High Commissioner for Refugees (UNHCR) which was created by the UN General Assembly in 1950 with a mission to provide international protection to refugees. But over the years, the mandate of the Agency has been expanded by the UN General Assembly and the Economic and Social Committee (ECOSOC) to include other groups of persons who were not originally covered by the Statute<sup>1032</sup> with a view to respond to emerging protection gaps at different geopolitical era. This expansion concerned returnees, stateless persons, and IDPs. In addition, human rights law has strongly influenced the evolution of the Refugee Law towards a more inclusive and rights-based approach from the original State-centric and categorised approach, thus enlarging the scope of protection.<sup>1033</sup> The HRL in effect offered a complementary protection and significantly influenced the development of refugee jurisprudence.<sup>1034</sup>

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<sup>1031</sup> UNHCR, ‘Refugee Protection: A Guide to International Refugee Law (Handbook for Parliamentarians)’ (UN High Commissioner for Refugees and the Inter-Parliamentary Union 2017).

<sup>1032</sup> UNGA, ‘Res 428 (V) Statute of the Office of the United Nations High Commissioner for Refugees’ (UN General Assembly 1950) UN Doc A/RES/428(V) (14 December 1950).

<sup>1033</sup> Vincent Chetail, ‘Moving Towards an Integrated Approach of Refugee Law and Human Rights Law’ in Cathryn Costello, Michelle Foster and Jane McAdam (eds), *The Oxford Handbook of International Refugee Law* (Oxford University Press 2021); Reuven (Ruvi) Ziegler, ‘International Humanitarian Law and Refugee Protection’ in Cathryn Costello, Michelle Foster and Jane McAdam (eds), *The Oxford Handbook of International Refugee Law* (Oxford University Press 2021); Theodor Meron, ‘The Humanization of Humanitarian Law’ (2000) 94 (2) *The American Journal of International Law* 239.

<sup>1034</sup> Jane McAdam, ‘Human Rights and Forced Migration’, *The Oxford Handbook of Refugee and Forced Migration Studies* (Oxford University Press 2014).

## 2. Birth of IDP Framework: The Guiding Principles on International Displacement

Concern for IDPs emerged at the end of the Cold War when the dissipation of East-West tension led to a breakout of ferocious civil wars, notably in former Yugoslavia and Rwanda, and the international protection of individuals within a sovereign state, which had long been considered states' domestic affairs, became the major agenda of the UN.<sup>1035</sup> Furthermore, the number of IDPs saw exponential growth during the 1990s, doubling the number of refugees by the turn of the 21<sup>st</sup> century.<sup>1036</sup> Increasingly, the refugee regime based on the 1951 Convention, its narrowly defined status of "refugee" in particular, was questioned for its adequacy in addressing the issue of displacement in the post-Cold War era.<sup>1037</sup> Against this backdrop, the then UN Human Rights Commission (predecessor of the Human Rights Council) created the mandate of the Representative of the UN Secretary-General (RSG) on Internally Displaced Persons in 1992.<sup>1038</sup> The Representative Francis M. Deng first conducted a preparatory study on existing international norms pertaining to IDPs and concluded that their protection is in principle covered by human rights law and, in times of armed conflict, by international humanitarian law.<sup>1039</sup> However, there remained certain gaps and grey areas in the existing laws

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<sup>1035</sup> The traditional notion of nation-state based on the principles of sovereignty and non-intervention as a basis for maintaining international peace was increasingly questioned by scholars and practitioners. See for example, Francis M Deng and others, *Sovereignty as Responsibility: Conflict Management in Africa* (Brookings Institute Press 1996). These reflections notably led to a proposal of new concepts such as human security, sovereignty as responsibility, and responsibility to protect (R2P) under the flagship of the then Secretary-General Kofi Annan.

<sup>1036</sup> In 2006, it was reported that the number of refugees was about 10 million while that of IDPs, generated by conflicts alone, was 24 million and many millions more by development projects and natural disasters. Source: UNHCR, *2006 Global Trends: Refugees, Asylum-seekers, Returnees, Internally Displaced, and Stateless Persons* (UNHCR 2006); Francis M Deng and Walter Kälin, 'Introduction' [2006] *Forced Migration Review* (Special Issue in commemoration of the work of Roberta Cohen) 3.

<sup>1037</sup> Martin Jones, 'The Governance Question: The UNHCR, the Refugee Convention and the International Refugee Regime' in James C Simeon (ed), *The UNHCR and the Supervision of International Refugee Law* (Cambridge University Press 2013); Tom Clark and James C Simeon, 'UNHCR International Protection Policies 2000–2013: From Cross-Road to Gaps and Responses' (2014) 33 *Refugee Survey Quarterly* 1; Chimni, 'The Birth of a Discipline' (n 87).

<sup>1038</sup> Walter Kälin, 'Internal Displacement' in Elena Fiddian-Qasimiyeh and others (eds), *The Oxford Handbook of Refugee and Forced Migration Studies* (Oxford University Press 2014).

<sup>1039</sup> It is generally considered that IHL applies in times of armed conflict and HRL in peacetime. But the applicability of human rights in time of conflict has now been well recognised by court decisions, notably ICJ

to address the specific needs of IDPs and thus the Deng's study recommended the establishment of a new normative document to ensure their protection.<sup>1040</sup>

Subsequently, Representative Deng and the Senior Advisor to the RSG, Roberta Cohen, developed the Guiding Principles on Internal Displacement (GPID), the first international protection standards for IDPs in 1998.<sup>1041</sup> The GPID was unanimously endorsed at the 2005 UN World Summit as an 'important international framework for the protection of internally displaced persons' and is regarded today as the main global IDP instrument.<sup>1042</sup>

Despite this recognition, the Guiding Principles is a soft-law instrument without any binding effect under international law. Its authority derives from the fact that the Principles are based upon, reflect, or restate obligations already prescribed under existing laws that are binding on States.<sup>1043</sup> Indeed, every principle in the text has 'a solid foundation in provisions enshrined in human rights instruments or international humanitarian law'.<sup>1044</sup> By contrast, the reference to refugee law was made minimal and only mentioned "by analogy".<sup>1045</sup> The drafters of the Principles thereby made a clear distinction between refugees and IDPs.

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Advisory Opinion on the use of nuclear weapons (1996) and the construction of a wall in the Palestinian territory (2004), state practices, and the practices of international organisations, human rights bodies, and NGOs. See Vera Gowlland-Debbas and Gloria Gaggioli, 'The Relationship between International Human Rights and Humanitarian Law: An Overview' in Robert Kolb and Gloria Gaggioli (eds), *Research Handbook on Human Rights and Humanitarian Law* (Edward Elgar Publishing Limited 2013).

<sup>1040</sup> UNCHR, 'Internally Displaced Persons: Compilation and Analysis of Legal Norms: Report of the Representative of the Secretary-General, Francis M. Deng, Submitted Pursuant to Commission on Human Rights Resolution 1995/57' (UN Commission on Human Rights 1995) UN Doc E/CN.4/1996/52/Add.2 (5 December 1995).

<sup>1041</sup> UNCHR, 'Report of the Representative of the Secretary-General, Mr. Francis M. Deng, Submitted Pursuant to Commission Resolution 1997/39 Addendum: Guiding Principles on Internal Displacement' (n 88).

<sup>1042</sup> UNGA, 'Res 60/1 2005 World Summit Outcome' (UN General Assembly 2005) UN Doc A/RES/60/1 (16 September 2005).

<sup>1043</sup> Kälin, 'The Future of the Guiding Principles on Internal Displacement' (n 89).

<sup>1044</sup> Kälin, 'Internal Displacement' (n 1038) 170.

<sup>1045</sup> UNCHR, 'Internally Displaced Persons: Compilation and Analysis of Legal Norms: Report of the Representative of the Secretary-General, Francis M. Deng, Submitted Pursuant to Commission on Human Rights Resolution 1995/57' (n 1040); See also Walter Kälin, *Guiding Principles on Internal Displacement: Annotations* (The American Society of International Law 2008).

### 3. Distinction between Refugees and IDPs

The plights of refugees and IDPs, though, have many commonalities. Both are forced to flee home, leaving behind their family members, social capital, property, livelihood, and communities, and are in highly precarious situations, often exposed to violence, abuse, or stigmatisation. Like refugees, some IDPs are also subject to persecution on political or ethnic grounds and struggle to find safety within their own countries. However, strictly legally speaking, refugees and IDPs are fundamentally different and treated in that way.<sup>1046</sup> First, unlike refugees, IDPs have not left their own country and thus their protection is first and foremost under the responsibility of their governments: the international community has only a subsidiary role by virtue of the principle of state sovereignty.<sup>1047</sup> But there are many instances where governments are unable or unwilling to provide protection; or worse, they are the ones who caused their displacement in the first place. In these cases, the involvement of the international community is ad hoc and often limited.

Secondly, refugee is a legal status granted after an examination by the competent authorities of the receiving country and has specific criteria to meet while IDPs is a general term to describe persons in the situation of forced or involuntary migration within their own countries due to a wide range of causes not limited to conflicts and human rights violations. Refugee protection regime is thus something selective, conditional and temporal, which includes some and excludes others, while the IDPs protection regime is universal and inclusive.

Notwithstanding, there is one point of conversion between refugee and IDP regimes, which could become a pathway to a global binding instrument or a rule of customary

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<sup>1046</sup> Kälén, 'Internal Displacement' (n 1038).

<sup>1047</sup> *ibid.*

international law for IDP protection: the issue of return.<sup>1048</sup> Indeed, the principle of voluntary, safe, and dignified return (GPID Principle 28 (1)) evokes the notion of voluntary repatriation promoted as part of durable solutions for refugees.<sup>1049</sup> Also, protection of IDPs against forcible return to ‘any place where their life, safety, liberty or health would be at risk’ (principle 15 (d)) derives from the refugee law principle of *non-refoulement*, an established international customary law.<sup>1050</sup> These conversions with refugee law will be further analysed in the following sub-paragraph (B).

## **B. Definition of IDPs and the Normative Structure**

The GPID defines IDPs as:

persons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognised state border<sup>1051</sup>

As mentioned earlier, Roberta Cohen specifically cited, *inter alia*, ‘nuclear plant eruptions’ as part of the “natural or human-made disasters” in the above definition.<sup>1052</sup> Moreover, “nuclear disasters” are also listed as one of the typical disasters which cause “forced migration” in the definition established by the International Association for the Study of Forced Migration (IASFM).<sup>1053</sup>

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<sup>1048</sup> David James Cantor, “‘The IDP in International Law’? Developments, Debates, Prospects’ (2018) 30 *International Journal of Refugee Law* 191.

<sup>1049</sup> UNHCR, ‘Handbook: Voluntary Repatriation: International Protection’ (UN High Commissioner for Refugees 1996).

<sup>1050</sup> Kälin, *Guiding Principles on Internal Displacement: Annotations* (n 1045).

<sup>1051</sup> GPID, Introduction 2.

<sup>1052</sup> Cohen (n 91) 466.

<sup>1053</sup> Aninia Nadig, ‘Forced Migration and Global Processes - Report of the Eighth Conference of the International Association for the Study of Forced Migration, Chiang Mai, Thailand, 5-9 January 2003 Report’ (2003) 16 *Journal of Refugee Studies* 361; cited by Chimni, ‘The Birth of a Discipline’ (n 87).

The above GPID definition of IDPs was also adopted by the first legally binding IDP instrument created in Africa, the 2009 AU Convention for the Protection and Assistance of Internally Displaced Persons in Africa<sup>1054</sup> (Kampala Convention, hereafter) and the 2006 Protocol on the Protection and Assistance to Internally Displaced Persons<sup>1055</sup> (Great Lakes IDP Protocol, hereafter). Despite its limited number of ratifications<sup>1056</sup> and geographical scope, these regional instruments mark an important milestone in “hardening” the IDP regime,<sup>1057</sup> creating legal obligations on states to protect and assist IDPs according to human rights principles. Also, the Kampala Convention officially added climate change (article 5(4)) and development projects (article 10) as causes for internal displacement, thus enlarging the scope of IDP protection. At the national level, 14 countries have adopted specific laws and 35 countries have established specific national policies on the protection of IDP.<sup>1058</sup> But the implementation of these laws and policies remains rather sporadic and the number of court decisions which consider the Principles as part of international law is still limited.<sup>1059</sup> As such, in the opinion of Walter Kälin, the former Representative of the UN Secretary-General on the

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<sup>1054</sup> African Union Convention for the Protection and Assistance of Internally Displaced Persons in Africa (adopted 22 October 2009, entered into force 6 December 2012) (Kampala Convention), available at < <http://au.int/en/content/african-union-convention-protection-and-assistance-internally-displaced-persons-africa> > accessed 6 December 2021.

<sup>1055</sup> The Protocol on the Protection and Assistance to Internally Displaced Persons (2006), adopted by the International Conference on the Great Lakes Region (ICGLR) on 30 November 2006 as one of ten protocols to its Pact on Security, Stability and Development, available at < <https://www.refworld.org/pdfid/52384fe44.pdf> > accessed 6 December 2021

<sup>1056</sup> As in June 2020, the Convention had been ratified by 31 of 55 Member States of the AU. Source: African Union, ‘List of Countries Which Have signed, Ratified/Acceded to the African Union Convention for the Protection and Assistance of Internally Displaced Persons in Africa (Kampala Convention)’ (18 June 2020) < <https://au.int/en/treaties/african-union-convention-protection-and-assistance-internally-displaced-persons-africa> > accessed 14 November 2021; cited by Walter Kälin, ‘Internal Displacement’ in Cathryn Costello, Michelle Foster and Jane McAdam (eds), *The Oxford Handbook of International Refugee Law* (Oxford University Press 2021).

<sup>1057</sup> Cantor (n 1048); cited by Kälin, ‘Internal Displacement’ (n 1056).

<sup>1058</sup> Source: Global Protection Cluster, ‘Global Database on IDP Laws and Policies’ < <https://www.globalprotectioncluster.org/global-database-on-idp-laws-and-policies/> > accessed 14 November 2021

<sup>1059</sup> Phil Orchard, *Protecting the Internally Displaced: Rhetoric and Reality* (Routledge 2018); cited by Kälin, ‘Internal Displacement’ (n 1056).

Human Rights of IDPs, the Principles had not yet reached the stage of becoming international customary law.<sup>1060</sup>

In addition to the Guiding Principles, complementary guidelines have been established by the Inter-Agency Standing Committee (IASC)<sup>1061</sup>, the Brookings-Bern Project on Internal Displacement<sup>1062</sup>, and the OCHA<sup>1063</sup>. Some of the prominent publications include ‘IASC Framework on Durable Solutions for Internally Displaced Persons’<sup>1064</sup>, ‘IASC Operational Guidelines on the Protection of Persons in Situations of Natural Disasters’<sup>1065</sup>, ‘Protecting Internally Displaced Persons: A Manual for Law and Policymakers’<sup>1066</sup>, and ‘Handbook for the Protection of Internally Displaced Persons’<sup>1067</sup>.

All these normative documents headed by the GPID constitute the normative framework of the IDP protection.

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<sup>1060</sup> Kälin, ‘Internal Displacement’ (n 1038).

<sup>1061</sup> IASC was established by the same UNGA resolution (46/182) which created the post of the Emergency Relief Coordinator (ERC) and established OCHA in 1991. It is headed by the ERC and composed of 18 UN and non-UN humanitarian organisations (e.g., ICRC, IFRC, and NGOs). It is an inter-agency forum for coordination, policy development and decision-making for humanitarian operations.

<sup>1062</sup> The Brookings-Bern Project is the successor of the Brookings Institution Project on Internal Displacement which was founded in 1994 by Francis Deng, the RSG on IDPs, and Roberta Cohen. It is a joint research and policy project between the UN and the Brookings Institution on the issues related to IDP protection. In 2004, it became the collaborative project between the Brookings Institution and University of Bern (Switzerland), co-chaired by Walter Kälin, the RSG on the Human Rights of IDPs, and Elizabeth Ferris. The Brookings Institution is a public policy thinktank based in Washington, D.C.

<sup>1063</sup> OCHA (former Department of Humanitarian Affairs – DHA) was established by UNGA resolution (46/182) in 1991 with an aim to assist the ERC in fulfilling the role of leading, coordinating and facilitating humanitarian operations in human-made and natural disasters. Its coordination role is mainly executed through the IASC.

<sup>1064</sup> IASC, ‘IASC Framework on Durable Solutions for Internally Displaced Persons’ (n 90); The original text was submitted by the RSG on the Human Rights of IDPs, Walter Kälin, to the Human Rights Council. See UNHRC, ‘Report of the Representative of the Secretary-General on the Human Rights of Internally Displaced Persons, Walter Kälin, Addendum: Framework on Durable Solutions for Internally Displaced Persons’ (n 545).

<sup>1065</sup> IASC, ‘IASC Operational Guidelines on the Protection of Persons in Situations of Natural Disasters’ (n 542).

<sup>1066</sup> Brookings-Bern Project on Internal Displacement, ‘Protecting Internally Displaced Persons: A Manual for Law and Policymakers’ (Brookings Institute 2008).

<sup>1067</sup> Global Protection Cluster Working Group, ‘Handbook for the Protection of Internally Displaced Persons’ (IASC/UNHCR 2010).

### C. Institutional Structure and its Limits

The institutional arrangement for the IDP regime looks quite different from that of the refugee regime. This is largely because the regime is essentially based on soft-law instruments. There is currently no “guardian” agency of the Guiding Principles or an international organisation dedicated to the protection of IDPs within the UN system.<sup>1068</sup> In comparison, refugee protection is founded on a binding convention – the Refugee Convention – and under the clear mandate of the UNHCR. Likewise, the protection of war victims is prescribed in the Geneva Convention and under the responsibility of the ICRC. During the 1990s, there were some proposals within the UN system to create a new agency for IDPs protection or assign such a task to the UNHCR, which had already been involved in assisting them since the 1970s.<sup>1069</sup> But finally the international community chose a collaborative approach among relevant agencies mainly due to lack of support from the UN Member States for such an agency as well as the UNHCR declining to take up the role.<sup>1070</sup> The UN appointed the UN Emergency Relief Coordinator (ERC)<sup>1071</sup>, who also heads the Office for the Coordination of Humanitarian Affairs (OCHA), to be responsible for the overall coordination of humanitarian assistance and protection activities for IDPs. However, the role of OCHA for the IDPs protection is limited to coordination, which is neither operational nor exclusive.

In 2005, the UN introduced the Inter-Agency Cluster Approach to improve the coordination of emergency operations among the UN and non-UN humanitarian agencies and

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<sup>1068</sup> Though not an organisation, there is a Special Rapporteur on the human rights of internally displaced persons appointed by the UN Human Rights Council.

<sup>1069</sup> Orchard (n 1059).

<sup>1070</sup> Erin D Mooney, ‘Towards a Protection Regime for Internationally Displaced Persons’ in Edward Newman and Joanne van Selms (eds), *Refugees and forced displacement: International security, human vulnerability, and the state* (United Nations University Press 2002).

<sup>1071</sup> The post of ERC was created by UNGA resolution (46/182) in 1991 as the Under-Secretary-General of Humanitarian Affairs, who reports directly to the SG. ERC heads both OCHA and IASC and has a mandate to lead, coordinate, and facilitate humanitarian operations of the UN.



to ‘provide much-needed predictability and accountability for the collaborative response to IDPs’.<sup>1072</sup> UNHCR is a key agency in this Cluster Approach since it is the lead agency for three out of 11 clusters: protection, shelter, and camp management. This effectively makes UNHCR the lead operational agency for IDPs protection though such role is limited to conflict situations and the IDPs are one of the “persons of concern” to the agency. Hence, the IDPs protection does not have a clear lead agency within the UN system. As for NGOs, there is currently one NGO whose work is dedicated to IDPs – the Internal Displacement Monitoring Centre (IDMC) – but it is not an operational agency and its main role is to collect and provide data and information on the situation of IDPs to the UN and governments. As such, the international IDP protection regime has a clear institutional gap and is often subject to problems arising from “regime complexity”.<sup>1073</sup>

The fact that there is no international agency with a clear mandate to protect and advocate for IDPs contributes to the non-systematic application of the GPID in the situation of internal displacement around the globe. This is particularly the case when disaster displacement occurs in industrialised wealthy nations. In fact, the issue of IDPs is largely regarded as the problem of the South and the GPID as the instrument which applies mainly in developing countries.<sup>1074</sup> Indeed, among the above 39 countries which have adopted IDP laws and policies, none of them are from high-income economies<sup>1075</sup> except Croatia.

Roberta Cohen made a very interesting analysis of the US government’s double-standard toward the issue of internal displacement. In the 2005 Hurricane Katrina disaster, the

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<sup>1072</sup> Tim Morris, ‘UNHCR, IDPs and Clusters’ (2006) 25 *Forced Migration Review* 54, 54.

<sup>1073</sup> “Regime complexity” is defined as ‘the presence of nested, partially over-lapping, and parallel international regimes that are not hierarchically ordered’ according to Karen J. Alter and Sophie Meunier, ‘The Politics of International Regime Complexity’ (2009) 7 (1) *Perspectives on Politics* 13

<sup>1074</sup> Chimni, ‘The Birth of a Discipline’ (n 87).

<sup>1075</sup> ‘High-income economies’ according to the World Bank criteria. Source: The World Bank website <https://data.worldbank.org/country/XD> accessed 15 November 2021

US government did not use the term IDPs to describe Louisiana residents uprooted by the disaster while it uses the term regularly to promote their protection internationally.<sup>1076</sup> According to Cohen, this was because the government did not want to admit that the chaos and civil unrest which usually take place in developing countries were also happening on the US soil, and wanted to avoid having to apply the international standards – GPID – to their nationals. Meanwhile, the US Agency for International Development (USAID) issued a specific policy paper on IDPs protection in 2004, one year before the disaster, to guide its aid operations and the US delegation voted for the 2005 UN World Summit Outcome Document which specifically adopted the Guiding Principles as ‘important international framework for the protection of internally displaced persons’.<sup>1077</sup>

It was the same situation in Japan during the Great East Japan Triple Disaster (earthquake, tsunami and the Fukushima nuclear accident) in 2011. The evacuees from the Fukushima nuclear accident were handled by the Japanese authorities without making any reference to the existing international normative framework for IDPs, let alone recognising them as such.<sup>1078</sup> The lack of recognition as IDPs led to the situation where the protection standards fixed by the GPID and other human rights instruments were rarely applied in dealing with nuclear evacuees, especially on the question of their repatriation. As the above US case illustrated by Cohen, the Japanese government also voted for the 2005 World Summit Outcome Document as well as translated the Guiding Principles into Japanese and lists them, both the

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<sup>1076</sup> Roberta Cohen, ‘Human Rights at Home’, Statement at the Harvard University’s Kennedy School of Government (1 November 2006) <<http://www.brookings.edu/research/speeches/2006/11/01humanrights-cohen>> accessed 15 November 2021.

<sup>1077</sup> UNGA, ‘Res 60/1 2005 World Summit Outcome’ (n 1042).

<sup>1078</sup> Hasegawa, ‘Returning Home after Fukushima: Displacement from a Nuclear Disaster and International Guidelines for Internally Displaced Persons.’ (n 42).

original in English and the Japanese versions, as “core international guidelines” related to humanitarian aid on the website of the Ministry of Foreign Affairs.<sup>1079</sup>

Both examples clearly demonstrate the limit of a soft-law instrument in influencing the practice of rich and powerful states. It finally confirms Kälin’s assertion made in 2014 that without the incorporation of the norms into a domestic legal framework, ‘it is not possible for countries to live up to their responsibility to protect and assist IDPs’ in general.<sup>1080</sup>

#### **D. Mapping within the Forced Migration Framework**

The IDPs protection is part of a larger normative framework called forced migration regime. “Forced migration” is defined by the IASFM as:

a general term that refers to the movements of refugees and internally displaced people (people displaced by conflicts) as well as people displaced by natural or environmental disasters, chemical or nuclear disasters, famine, or development projects<sup>1081</sup>

The forced migration normative framework is currently divided by internal or external movement, and conflict or disaster displacement (see Table 17 below). Under the regime, “disaster” often means natural disasters and other human-made disasters such as industrial accidents, as distinct from armed conflicts and generalised violence.

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<sup>1079</sup> MOFA website <[https://www.mofa.go.jp/mofaj/gaiko/jindo/jindoushien1\\_1.html](https://www.mofa.go.jp/mofaj/gaiko/jindo/jindoushien1_1.html)> accessed 15 November 2021. MOFA’s version of translation can be consulted at <<https://www.mofa.go.jp/mofaj/files/000536758.pdf>> accessed 15 November 2021

<sup>1080</sup> Kälin, ‘Internal Displacement’ (n 1038) 171; NRC, IDMC and Brookings-LSE, ‘National Instruments on Internal Displacement: A Guide to Their Development’ (Internal Displacement Monitoring Centre/Norwegian Refugee Council 2013).

<sup>1081</sup> Nadig (n 1053) 361.

Table 17: Mapping of Forced Migration Normative Framework

	<b>Conflict</b>	<b>Disaster</b>
<b>Cross-Border</b>	Refugee Convention	None (Nansen Initiative)
<b>Internal</b>	GPID (+HR law)	GPID (+ HR law)
<b>Non-Displacement</b>	Geneva Conventions (IHL)	None (ILC's Draft Articles)

As shown in the above table, persons displaced by conflicts are protected under the Refugee Convention once they fled across borders. If they fled within their national borders, they are covered by the IDP regime and human rights law. Persons displaced by disasters within their national borders are also protected under the IDP regime and human rights law. However, if they flee across borders in the context of disasters, no international legal or soft-law instrument currently exists for their protection. This cross-border disaster displacement is today considered as a major “protection gap” particularly under the context of increasing effects of climate change. To fill this gap, the Nansen Initiative was launched by Walter Kälin in 2012 to start the process of international norm-making (the Initiative will be thoroughly examined in the following section).

Meanwhile, victims of conflicts, both non-displaced and internally displaced, are protected by international humanitarian law while victims of disasters are not currently covered by any normative instrument. However, the International Law Commission (ILC) of the UN recently proposed ‘Draft Articles on the Protection of Persons in the Event of Disasters’<sup>1082</sup> which accelerated the international norm-making for the protection of persons in disasters regardless of their status on displacement (the ILC’s Draft proposal will also be studied in detail in the next chapter). To put in simple terms, refugee law, the GPID, human rights law, and

<sup>1082</sup> ILC, ‘Draft Articles on the Protection of Persons in the Event of Disasters’ (2016) (A/71/10) Report of the International Law Commission: Sixty-eighth session para 48.

international humanitarian law are applicable for protection in times of conflicts. In the event of disasters, the Guiding Principles and human rights law are the main normative instruments to apply for victims' protection.

## **§2: Protection Norms and Principles**

The “protection” of IDPs under the humanitarian/forced migration framework is defined as:

all activities aimed at obtaining full respect for the rights of the individual in accordance with the letter and spirit of the relevant bodies of law, namely human rights law, international humanitarian law and refugee law<sup>1083</sup>

As analysed in the previous Title, the above notion of protection, namely ‘full respect for the rights of individual’ and ‘human rights law, international humanitarian law and refugee law’, is completely absent in the “protective actions” of nuclear disasters defined by the nuclear and radioprotection regime. Although the nuclear regime uses the same word, radiological “protection”, the concept and content of this “protection” is significantly different from the one employed in the forced migration regime. The Guiding Principles embodies and codifies the principles of this protection, which is composed of 30 principles grouped in four sections.

The first section (Principle 1-4), entitled General Principles, notably sets the basic principle of state responsibility over the protection of IDPs by stating that ‘national authorities have the primary duty and responsibility to provide protection and humanitarian assistance’ to IDPs within their jurisdiction (Principle 3). Principle 5 also suggests a possibility that

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<sup>1083</sup> The definition was developed by ICRC, which was adopted by the IASC in 1999. See IASC, ‘Policy Paper: Protection of Internally Displaced Persons’ (Inter-Agency Standing Committee 1999).

international actors may step in to fulfil the duty in situations where national authorities are unable to do so due to lack of capacity or “failed state” circumstances.<sup>1084</sup>

The second section – protection from displacement – (Principles 5-9), mostly derives from the humanitarian law principle which prohibits arbitrary displacement. Forced displacement in situations of internal armed conflicts also amounts to a crime against humanity as well as a war crime in the Rome Statute of 1998.<sup>1085</sup> This protection is also implicitly guaranteed by the human rights instrument, Article 12 of the ICCPR Article 12 on the right to liberty of movement and freedom to choose one’s residence. This right ‘shall not be subject to any restrictions except those which are provided by law, are necessary to protect national security, public order (*ordre public*), public health or morals or the rights and freedoms of others’ (para 3). The prohibition of arbitrary displacement is now part of international customary law.<sup>1086</sup>

However, there are exceptions. In the case of armed conflicts, forced movement of people is allowed only if the security of the population is at stake or imperative military reasons so demand (Paragraph 2 (b) of Principle 6).<sup>1087</sup> In the case of natural or human-made disasters, evacuation can be implemented by the authorities to ensure the safety and health of the affected persons. This corresponds to the court decision of ECtHR regarding *Öneryildiz v. Turkey* (2004)<sup>1088</sup>, which notably affirmed that states had a positive obligation, inherent in the rights to life, ‘to take appropriate steps to safeguard the lives of those within their jurisdiction’ in industrial disasters. Under this obligation, states may be required to order evacuation in order

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<sup>1084</sup> Kälin, *Guiding Principles on Internal Displacement: Annotations* (n 1045).

<sup>1085</sup> Rome Statute of the International Criminal Court (adopted 17 July 1998, entered into force 1 July 2002) 2187 UNTS 3 (Rome Statute), art 7(1)(d) (crime against humanity) and art 8(2)(a)(vii) and art 8(2)(e)(viii) (war crimes). See Kälin, ‘Internal Displacement’ (n 1056).

<sup>1086</sup> Kälin, *Guiding Principles on Internal Displacement: Annotations* (n 1045).

<sup>1087</sup> This rule restates the provision Article 49 of Geneva Convention IV.

<sup>1088</sup> *Öneryildiz v. Turkey*, App no 48939/99 (ECtHR, 30 November 2004) para 65, 71, 90

to protect life. This was what the Japanese government implemented in the wake of the Fukushima accident. However, the adequacy of such a measure, especially the dose criterion applied to trigger the action, could be subject to discussions.

The third section (Principles 10-23), protection during displacement, addresses the rights and specific needs pertained to IDPs by readapting the provisions of international human rights instruments, the ICCPR, ICESCR, and the Convention on the Rights of the Child (CRC)<sup>1089</sup> in particular. Principles that are particularly relevant to the case of nuclear evacuees include the right to seek safety in another part of the country and the rights to be protected against forceful return (Principle 15(a) and (d)), the right to respect of his or her family life (Principle 17), and the right to an adequate standard of living (Principle 18).

As the Fukushima case study has shown, evacuees from out-of-zone affected areas were not fully recognised as legitimate victims of the accident by the authorities and received little to no support. Such practice indeed constitutes interfering with the individual's enjoyment of 'the right to seek safety in another part of the country' prescribed in Principle 15(a). As a result, many of these evacuees did not have a choice but to separate their family unit where mothers and children evacuated or resettled in other parts of the country in order to avoid radiation exposure, leaving the husbands behind in Fukushima to earn a living. This also implicates 'the right to respect of his or her family life' (Principle 17) and the right to an adequate standard of living (Principle 18) of these residents.

Principle 15 (d) on the prohibition of forcible return is particularly important in the case of nuclear disaster IDPs. It provides that IDPs shall not be forcibly returned or resettled to any place where their life, safety, liberty and/or health would be at risk. The UN/IASC

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<sup>1089</sup> Convention on the Rights of the Child (adopted 20 November 1989, entry into force 2 September 1990) 1577 UNTS 3 (CRC)

Framework on Durable Solutions for IDPs also reiterates that ‘under no circumstances should IDPs be encouraged or compelled to return or relocate to areas where their life, safety, liberty or health would be at risk’.<sup>1090</sup> Fukushima evacuees from both evacuation zones and out-of-zone areas were precisely put under such circumstance in the accident recovery phase. Though the Japanese authorities did not literally force them to return against their will, they created certain conditions so that it was more difficult for evacuees to continue evacuation or resettle elsewhere. They included financial incentives for returnees through compensations, job creation, generous social service, infrastructure projects in former evacuation zones and the termination of shelter assistance for evacuees. It finally created a situation where IDPs did not have much choice financially but to return to a place where they did not feel safe. The promotion of return undertaken by the Japanese government following the accident thus constitutes a contravention of Principle 15(d) of the GPID.

In fact, the principle of prohibition of forcible return is the counterpart to the principle of ‘voluntary, safe, and dignified return’ (Principle 28) and represents an adapted version of the well-established refugee protection principle, *non-refoulement*, and human rights law related to torture and the deportation or extradition of aliens.<sup>1091</sup> As stated earlier, this principle, together with Principle 28, constitutes an intersection between refugee and IDPs protections.

The fourth section (Principle 24-27) is related to humanitarian assistance. It reiterates the principle of national responsibility and duty for the provision of assistance and the rights of international actors to offer their service in situations where authorities are unable or unwilling to provide the needed assistance (Principle 25). In the latter circumstance, international offers

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<sup>1090</sup> IASC, ‘IASC Framework on Durable Solutions for Internally Displaced Persons’ (n 90) 12; UNHRC, ‘Report of the Representative of the Secretary-General on the Human Rights of Internally Displaced Persons, Walter Kälin, Addendum: Framework on Durable Solutions for Internally Displaced Persons’ (n 545) para 21(f).

<sup>1091</sup> Kälin, *Guiding Principles on Internal Displacement: Annotations* (n 1045).



for help shall not be arbitrarily withheld by national authorities (para 2). This principle also recalls the basic notion of sovereignty in which international organisations can intervene only upon the consent or request from the concerned government.

The final section (Principles 28-30) deals with the issue of return and resettlement. They are called durable solutions, one of the key concepts in refugee protection. Under the refugee regime, the refugee status will cease when a refugee finds a durable solution to his/her plight related to displacement through voluntary repatriation, resettlement, or local integration. Local integration means that a refugee settles in the country of his/her refuge by obtaining the nationality of the host country while resettlement is when a refugee is resettled in a third country, most often in North America and Europe, through UNHCR resettlement programme. For IDPs, since they are in their own countries, durable solutions consist of only return and resettlement. According to the IASC Framework on Durable Solutions for IDPs, durable solutions are ‘achieved when former IDPs no longer have specific assistance and protection needs that are linked to their displacement and such persons can enjoy their human rights without discrimination resulting from their displacement’.<sup>1092</sup> This situation can be attained by either ‘return voluntarily, in safety and with dignity, to their homes or places of habitual residence’, or ‘resettle voluntarily in another part of the country’ (Principle 28).

One of the key requirements for durable solutions is that it is based on free and informed decisions by IDPs. The notion – voluntariness of choice – parallels the concept of voluntary repatriation for refugees and relates to the rights to liberty of movement and the freedom of choice over one’s own residence guaranteed under the ICCPR (Article 12). As the Framework on Durable Solutions emphasises, ‘the rights, needs and legitimate interests of IDPs should be the primary considerations guiding all policies and decisions related to internal

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<sup>1092</sup> IASC, ‘IASC Framework on Durable Solutions for Internally Displaced Persons’ (n 90) 5.

displacement and durable solutions'.<sup>1093</sup> Notwithstanding, durable solutions for IDPs are distinct from those of refugees for one point: the duty of national authorities. Principle 28 indeed spells out that: 1) national authorities have the primal responsibility and duty for the IDP's attainment of durable solutions, not IDPs themselves nor the international community, and 2) national authorities are required to 'establish conditions, as well as provide the means' to facilitate such attainment (para 1). Once IDPs return or resettle, competent authorities also have a duty to assist their reintegration and recovery (Principle 28 and 29).

These provisions have particularly important implications for Fukushima evacuees and future nuclear disaster victims. As seen in the Fukushima case, nuclear regulation authorities prioritised the return of evacuees instead of the resettlement. For this, recovery assistance was concentrated on returned IDPs while shelter assistance for relocated IDPs was discontinued. The authorities lifted evacuation orders when the majority of evacuees still expressed the reluctance and opposition to return home due to radiological contamination. These actions of Japanese authorities run completely counter to the above protection principles set by the GPID.

According to refugee law specialist David J. Cantor, Principle 28(1) – the State's obligation to ensure voluntary, safe and dignified return of IDPs – may be in the process of developing into customary international law, at least in conflict situations.<sup>1094</sup> The GPID, especially Principle 28(1), has been repeatedly cited by the UN Human Rights Treaty Body, the Human Rights Committee (HRC), as well as regional human rights courts such as the ECtHR and the Inter-American Court of Human Rights.<sup>1095</sup> In the judgement of *Dogan and others v Turkey* (2004)<sup>1096</sup>, the ECtHR explicitly referred to Principles 18 and 28 of GPID and stressed

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<sup>1093</sup> *ibid* 11.

<sup>1094</sup> Cantor (n 1048).

<sup>1095</sup> *ibid*; Kälin, 'Internal Displacement' (n 1056).

<sup>1096</sup> *Dogan and others v Turkey* App nos 8803-8811/02, 8813/02 and 8815-8819/02 (ECtHR, 29 June 2004) para 154

that ‘the authorities have the primary duty and responsibility to establish conditions, as well as provide the means, which allow the applicants to return voluntarily, in safety and with dignity, to their homes or places of habitual residence, or to resettle voluntarily in another part of the country’ (para 154). While the former Representative Kälin has reservations as to the effectiveness of a binding IDP treaty,<sup>1097</sup> the development of the GPID into a hard law remains to be seen.

## **Section 2: Environmental Forced Migration and Immobility Regime**

As mentioned earlier, nuclear evacuees can be categorised as IDPs as well as environmentally displaced persons who were obliged to flee radioactive contamination caused by an industrial accident. Nuclear displacement (and forced immobility) cannot therefore be sufficiently addressed by the Guiding Principles or the IDP protection regime alone. Notably, the question of risk, especially the role of scientists in determining such risk, and the notion of “trapped” persons are missing in the GPID protection standards. These issues are on-going scholarly debates among environmental migration experts. Indeed, the question of threshold, or “tipping point” in the environmental migration jargon, lies at the heart of such debates, especially in the context of slow-onset events (e.g., sea-level rise, erosion, and desertification). From which degree of degradation or which threshold of contamination, is a movement of individuals considered displacement, no longer voluntary, thus in need of protection? Things get even more complex when there are scientific controversies on the risk assessment as in the case of low-dose radiation effect.

As the Fukushima case illustrated, protective actions (e.g., evacuation measures) were implemented only when the contamination level exceeded the threshold dose fixed by the

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<sup>1097</sup> Kälin, ‘The Future of the Guiding Principles on Internal Displacement’ (n 89).

authorities, the threshold which was contested by independent scientists and academic scholars. The residents who fled from the areas where contamination was under the threshold level were thus considered illegitimate evacuees and thus poorly assisted by the authorities. As a result, many residents were “trapped” in the contaminated areas in the absence of government aid for evacuation or relocation. It is estimated that up to 1.6 million people found themselves in the situation of forced immobility after the Fukushima accident, 10 times the number of evacuees. Chernobyl produced the same situation. According to Grandazzi and Lemarchand, it was ‘not an event or accident but rather a new human condition where millions of survivors are condemned to live in durably contaminated territories’.<sup>1098</sup>

This section therefore examines the emerging norms and ongoing scholarly debates for the protection of environmentally displaced and trapped persons. First, it analyses the current status of international policymaking on the issue of environmental displacement (§1). The second half of the section presents two major normative proposals made by Walter Kälin, the former Representative of the Secretary-General (RSG) on the human rights of IDPs, and a group of environmental law specialists from the University of Limoges in France. The result of this analysis will notably feed into the final chapter’s reflection on the alternative protection norms for nuclear accident victims.

## **§1: The Status of Norm-Making**

Since the definition of “environmental refugee”<sup>1099</sup> was officially proposed by Essam El-Hinnawi in the 1985 United Nations Environment Programme (UNEP) report, scholarly debates and international policymaking on human displacement due to climate change and

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<sup>1098</sup> Grandazzi and Lemarchand (n 11) 7.

<sup>1099</sup> The term was initially coined by Lester Brown, the founder of Worldwatch Institute, an environmental think-tank based in Washington, D.C., in 1920s. See Richard Black, ‘Environmental Refugees: Myth or Reality?’ (UNHCR 2001) Working Paper 34.

environmental degradation have intensified and particularly gained momentum during the last decade as the effects of climate change have been increasingly felt across the globe and international climate negotiations have evolved. In the year 2020 alone, there were 30 million new internal displacements associated with disasters (natural and other human-made disasters) while the conflict-induced internal displacement was 10 million.<sup>1100</sup>

The term ‘climate change induced displacement, migration and planned relocation’ entered into the 2010 UNFCCC Outcome Document at the COP16 in Cancun (para 14(f))<sup>1101</sup> for the first time, marking ‘a new era for policymaking on the climate change and migration nexus’.<sup>1102</sup> Since then, various terms connecting “climate change”, “environmental degradation”, “disaster”, “migration”, and “displacement” entered in a number of international instruments and adopted documents.<sup>1103</sup> They include the Sendai Framework for Disaster Risk Reduction 2015-2030,<sup>1104</sup> the 2015 Paris Agreement (UNFCCC COP21),<sup>1105</sup> the 2030 Agenda for Sustainable Development,<sup>1106</sup> the 2016 World Humanitarian Summit report<sup>1107</sup>, and the 2018 Global Compact for Safe, Orderly and Regular Migration<sup>1108</sup>. In the “Agenda for

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<sup>1100</sup> Source: IDMC website <<https://www.internal-displacement.org/database/displacement-data>> accessed 20 November 2021

<sup>1101</sup> UNFCCC, ‘Report of the Conference of the Parties on Its Sixteenth Session, Held in Cancun from 29 November to 10 December 2010 (The Cancun Agreements)’ (UN Framework Convention on Climate Change 2011) UN Doc FCCC/CP/2010/7/Add.1 (15 March 2011).

<sup>1102</sup> Sarah L Nash, ‘From Cancun to Paris: An Era of Policy Making on Climate Change and Migration’ (2018) 9 Global Policy 53.

<sup>1103</sup> Jane McAdam, ‘Displacement in the Context of Climate Change and Disasters’ in Cathryn Costello, Michelle Foster and Jane McAdam (eds), *The Oxford Handbook of International Refugee Law* (Oxford University Press 2021).

<sup>1104</sup> UNGA, ‘Res 69/283 Sendai Framework for Disaster Risk Reduction 2015–2030’ (UN General Assembly 2015) UN Doc A/RES/69/283 (23 June 2015).

<sup>1105</sup> UNFCCC, ‘Report of the Conference of the Parties on Its Twenty-First Session, Held in Paris from 30 November to 13 December 2015 (The Paris Agreement)’ (UN Framework Convention on Climate Change 2016) UN Doc FCCC/CP/2015/10/Add.1 (29 January 2016).

<sup>1106</sup> UNGA, ‘Res 70/1 Transforming Our World: The 2030 Agenda for Sustainable Development’ (UN General Assembly 2015) UN Doc A/RES/70/1 (25 September 2015).

<sup>1107</sup> UNGA, ‘One Humanity: Shared Responsibility: Report of the Secretary-General for the World Humanitarian Summit (Agenda for Humanity)’ (UN General Assembly 2016) UN Doc A/70/709 (2 February 2016).

<sup>1108</sup> UNGA, ‘Res 73/195 Global Compact for Safe, Orderly, and Regular Migration’ (UN General Assembly 2019) UN Doc A/RES/73/195 (11 January 2019).

Humanity” annexed to the UN Secretary-General’s report for the 2016 World Humanitarian Summit, notably recommends Member States to ‘[a]dopt an appropriate international framework, national legislation and regional cooperation frameworks by 2025 to ensure that countries in disaster-prone regions are prepared to receive and protect those displaced across borders without refugee status’.<sup>1109</sup> As part of provisions in the 2015 Paris Agreement, a legally binding document, a Task Force on Displacement was created under the UNFCCC to ‘develop recommendations for integrated approaches to avert, minimize and address displacement related to the adverse impacts of climate change’.<sup>1110</sup>

As one can observe from the above, the norm-making stage for the protection of environmentally displaced persons is set under the platform of UNFCCC, the environmental policymaking forum, rather than the UNHCR, the traditional forced migration policymaking forum.<sup>1111</sup>

The international policymaking process on environmental displacement, though it is currently focused on climate change and natural disasters, suggests a new way to look at nuclear disasters and provides an inspiring pathway to build a more appropriate protection framework for nuclear victims. This paragraph thus examines the current status of international debates and norm-making on environmental forced migration by first diving into the endemic problem of defining and conceptualising environmental displacement (A). Secondly, it presents some ingenious counter proposals made in an attempt to resolve such definitional problems (B). Then, the thesis tackles the most forgotten and neglected aspect of environmental displacement –

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<sup>1109</sup> UNGA, ‘One Humanity: Shared Responsibility: Report of the Secretary-General for the World Humanitarian Summit (Agenda for Humanity)’ (n 1107) 55.

<sup>1110</sup> UNFCCC (n 1105) para 49.

<sup>1111</sup> Francois Gemenne, ‘How They Became the Human Face of Climate Change. Research and Policy Interactions in the Birth of the “environmental Migration” Concept’ in Etienne Piguet, Antoine Pécoud and Paul de Guchteneire (eds), *Migration and Climate Change* (UNESCO Publishing/Cambridge University Press 2011); Nash (n 1102).

involuntary immobility or ‘displacement in place’<sup>1112</sup>–, examining the current debates among environmental migration scholars (C). Finally, the paragraph addresses the challenges of the current institutional set-up for environmental migration norm-making (D).

### **A. Problem of Definition and Conceptual Immaturity**

The entry point for any policymaking is the definition of the term. The major debate on environmental and climate change migration has thus been around defining the victims of environmental displacement:<sup>1113</sup> who are so-called ‘environmental refugees’, ‘environmental migrants’, or ‘environmentally displaced persons’? In the 1985 UNEP report, El-Hinnawi defined ‘environmental refugee’ as:

those people who have been forced to leave their traditional habitat, temporarily or permanently, because of a marked environmental disruption (natural and/or triggered by people) that jeopardized their existence and/or seriously affected the quality of their life. By ‘environmental disruption’ in this definition is meant any physical, chemical, and /or biological changes in the ecosystem (or resource base) that render it, temporarily or permanently, unsuitable to support human life.<sup>1114</sup>

According to this definition, displaced persons from nuclear disasters can be indeed categorised as “environmental refugees”. Some scholars also categorised industrial accidents as one of the causes of environmental displacement. For example, Steve Lonergan, geography scholar,

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<sup>1112</sup> Lubkemann (n 45).

<sup>1113</sup> For example, see Astri Suhrke, ‘Pressure Points: Environmental Degradation, Migration and Conflict’, *Environmental Change and Acute Conflict project* (American Academy of Arts & Science 1993); Graeme Hugo, ‘Environmental Concerns and International Migration’ (1996) 30 *The International Migration Review* 105; James Morrissey, ‘Rethinking the “Debate on Environmental Refugees”’: From “maximalists and Minimalists” to “Proponents and Critics”’ (2012) 19 *Journal of Political Ecology* 36; Olivia Dun and Francois Gemenne, ‘Defining “Environmental Migration”’ (2008) 31 *Forced Migration Review*; Maria Stavropoulou, ‘Drowned in Definitions?’ (2008) 31 *Forced Migration Review* 11; Chloé Anne Vlassopoulos, ‘Defining Environmental Migration in the Climate Change Era: Problem, Consequence or Solution?’ in Thomas Faist and Jeanette Schade (eds), *Disentangling Migration and Climate Change: Methodologies, Political Discourses and Human Rights* (Springer 2013).

<sup>1114</sup> Essam El-Hinnawi, ‘Environmental Refugees’ (UN Environment Programme 1985) 4; cited from Diane C Bates, ‘Environmental Refugees? Classifying Human Migrations Caused by Environmental Change’ (2002) 23 *Population and Environment* 465, 466.

categorised five environmental stresses which would lead to environmental migration:<sup>1115</sup> 1) natural disasters, 2) cumulative/slow-onset changes, 3) industrial accidents, 4) development projects, and 5) environmental damage/change induced by conflicts. The first two stressors are natural causes (though increasingly anthropogenic) which are the current focus of the debate among forced/environmental migration scholars but the other three, human-made environmental disturbance, are as important if not more as the first two in inducing environmental (forced) migration.

While the UNEP's definition brought the issue of environmental displacement on the international agenda, it sparked heated scholarly debates and criticisms. One of the main criticisms was on the use of the term "refugee". While the report was received with great interest in the field of environmental studies, it attracted harsh criticism from the field of refugee studies.<sup>1116</sup> Many refugee law scholars indeed expressed uneasiness and often argued against the use of the term fearing it would stretch out or compromise current protection mechanisms and resources set up for "traditional" refugees. Another criticism was directed at the vagueness of the definition. For some scholars, it is devoid of both a conceptual and a legal basis, extending so much of its scope 'as to render the concept virtually meaningless'.<sup>1117</sup> Despite these intensive discussions, the problem of terminology has not yet been resolved to this date and there is no legal definition or globally accepted definition of environmentally displaced persons today.

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<sup>1115</sup> S Lonergan, 'The Role of Environmental Degradation in Population Displacement' [1998] Environmental Change and Security Project Report 5; cited by Etienne Piguet, 'Climate Change and Forced Migration' (UNHCR 2008) Research Paper No. 153.

<sup>1116</sup> Gemenne (n 1111).

<sup>1117</sup> Astri Suhrke and Annamaria Visentin, 'The Environmental Refugee: A New Approach' (1991) 2 *Ecodecision* 73; JoAnn McGregor, 'Refugees and the Environment' in Richard Black and Vaughan Robinson (eds), *Geography of Refugees: Patterns and Processes of Change* (Belhaven Press 1993); cited by Gemenne (n 1111); Others include Gaim Kibreab, 'Environmental Causes and Impact of Refugee Movements: A Critique of the Current Debate' (1997) 21 *Disasters* 20; Black (n 1099).



The contentious issues in defining environmental displacement are three-fold: 1) whether it is internal or cross-border movement, 2) forced or voluntary, and 3) whether environmental factors are the primary cause or not (and how to evaluate them). The answer to these questions will have decisive policy consequences and legal implications. As asserted by a number of environmental migration scholars, framing the phenomenon and defining the term constitute a significant step forward in finding appropriate responses and ultimately establishing protection norms.<sup>1118</sup>

While the first question is relatively easy to define, the other two are much trickier. The second question is particularly important in the case of nuclear disaster displacement. This is, as mentioned earlier, the recurring issue of “tipping point”: How much risk is risky enough? At what point the movement of an individuals is considered coerced, no more voluntary, thus becoming environmental displacement instead of voluntary migration?<sup>1119</sup> In fact, the focus on the onset motive and the compulsiveness of individual’s decision to move shows a strong parallel with the notion of “well-founded fear” in refugee status determination. To be granted refugee status, asylum-seekers must establish that the primal cause of their flight was based on the well-founded fear of persecution. In the case of environmental displacement, this well-founded-fear test is often at the hands of scientists (often public experts). As Ulrich Beck argued, environmental risks such as radioactivity, which completely evades human perceptive

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<sup>1118</sup> Dun and Gemenne (n 1113); Stavropoulou (n 1113); Vlassopoulos (n 1113); Jane McAdam, ‘Climate Change Displacement and International Law: Complementary Protection Standards’ (UNHCR 2011) Legal and Protection Policy Research Series; Eike Albrecht and Paul Malte, ‘International Recognition of Environmental Refugees’ (2015) 45 Environmental Policy and Law 78.

<sup>1119</sup> Walter Kälin, ‘Displacement Caused by the Effects of Climate Change: Who Will Be Affected and What Are the Gaps in the Normative Framework for Their Protection?’ (Brookings 2008) Background Paper submitted to IASC informal working group on 15 September 2008 <<https://www.brookings.edu/research/displacement-caused-by-the-effects-of-climate-change-who-will-be-affected-and-what-are-the-gaps-in-the-normative-framework-for-their-protection/>> accessed 22 October 2018; Roberta Cohen and Megan Bradley, ‘Disasters and Displacement: Gaps in Protection’ (2010) 1 Journal of International Humanitarian Legal Studies 95; Megan Bradley and Roberta Cohen, ‘Disasters, Displacement and Protection: Challenges, Shortcomings and Ways Forward’ in Thomas Faist and Jeanette Schade (eds), *Disentangling Migration and Climate Change: Methodologies, Political Discourses and Human Rights* (Springer Netherlands 2013).

capabilities, exist only to the extent understood by science or knowledge available at the time.<sup>1120</sup> In this respect, the interpretation of risks can change over time and could also be minimised or magnified within the knowledge, thus ‘open to social definition and construction’.<sup>1121</sup> Precisely, in the wake of Fukushima accident, the reference dose was raised from 1 mSv/year to 20 mSv/year by the Japanese government on the basis of a particular interpretation of low-dose risk – threshold theory – in contradiction to the linear non threshold (LNT) theory adopted by the ICRP and other nuclear regulators.

## **B. Conceptual Counterpoint Proposals**

There are two interesting counterpoint proposals made by two legal experts to overcome the above definitional problem, especially the ‘well-founded fear’ test. The first came from Jane McAdam, refugee law professor at New South Wales University, who argued for applying the precautionary principle in defining environmental displacement.<sup>1122</sup> The principle is one of the core environmental law principles enshrined in Article 15 of the Rio Declaration on Environment and Development which states:

Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.<sup>1123</sup>

Under the principle, displaced persons do not have to provide a definitive proof of harm; the existence of a potentially ‘serious or irreversible damage’ is sufficient to justify their flight and their need for protection. The concept of precautionary principle and its possible utility in identifying and protecting nuclear victims, both displaced and non-displaced persons, will be

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<sup>1120</sup> Beck (n 563).

<sup>1121</sup> *ibid* 23.

<sup>1122</sup> McAdam, ‘Displacement in the Context of Climate Change and Disasters’ (n 1103).

<sup>1123</sup> UNGA, ‘Report of the United Nations Conference on Environment and Development: Annex I Rio Declaration on Environment and Development’ (n 108) Article 15.

further explored in the following chapter (Chapter 2) and further in the next title (Title II) of this thesis.

The second counterpoint proposal was introduced by Walter Kälin, the former RSG on the human rights of IDPs. He famously launched the Nansen Initiative in 2012, the first international platform of reflection and policymaking for the protection of cross-border forced migrants in the context of disasters and climate change. Convinced that the Guiding Principles sufficiently addressed internal environmental displacement, Kälin focused on what he considered to be a normative gap in the current legal framework: international environmental displacement.<sup>1124</sup> The Initiative was created by a pledge from Norwegian and Swiss governments, independently and in parallel to the UNHCR platform.<sup>1125</sup> Though the Initiative was not designed to create a new normative instrument due to certain scepticisms expressed by the UNHCR and its Member States, the process itself played an extremely important role in knowledge creation, policy reflection, and consensus-building among States as well as putting the issue of environmental migration/displacement on the international agenda.

Though the Initiative was essentially concerned with cross-border movement, its reflection in identifying and defining environmentally displaced persons has a major implication for the protection of individuals in the situation of both internal and cross-border displacement caused by disasters and climate change. Kälin, in his preparatory work for the Initiative, proposed a quite innovative approach to define these victims. While most scholars revolved around the onset motive and the compulsiveness of an individual's flight (the well-founded fear test), he urged to shift the focus onto the question of return, a sort of "returnability"

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<sup>1124</sup> Kälin, 'Displacement Caused by the Effects of Climate Change' (n 1119); Walter Kälin and Nina Schrepfer, 'Protecting People Crossing Borders in the Context of Climate Change: Normative Gaps and Possible Approaches' (UNHCR 2012) UNHCR Legal and Protection Policy Research Series, PPLA/2021/01.

<sup>1125</sup> Lucile Maertens, *Le Haut Commissariat Des Nations Unies Pour Les Réfugiés (HCR) Face Aux Catastrophes Naturelles: Ce Que Le Tsunami de 2004 a Changé* (L'Harmattan 2012). The background to the creation of the Initiative will be further explained in the following paragraph (§2: Proposed Protection Norms and Principles).

test based on three criteria: permissibility, possibility and reasonableness. Kälin indeed argued that if the answer to one of these questions: *Is return permissible? Is return possible? Can return reasonably be required?* is “no”, then individuals concerned should be regarded as the victims of forced displacement in need of specific protection and assistance either within their own country or in another state.<sup>1126</sup>

By introducing this new approach, Kälin effectively unblocked the debate fixed on the subjective motive, or the notion of risk, of individuals and succeeded in focusing more on the particular circumstances and vulnerabilities of individuals on the move. Although the concept was essentially developed to protect persons displaced by natural disasters and climate change across borders, it is extremely useful for the protection of those displaced by nuclear disaster – “radiologically” displaced persons - and will be thoroughly analysed in the final chapter of this thesis (the proposal of new nuclear disaster protection norms) in next title (Title II).

### **C. Forced Immobility – “Displacement in Place”**

While much attention is fixed on displacement, some scholars raise another, often forgotten, aspect of mobility: forced or involuntary immobility. The focus on the binary question – migration (voluntary) vs. displacement (involuntary) – in determining who warrants protection tends to overlook ‘an entire category of people who suffer a form of “displacement in place” through involuntary immobilisation’.<sup>1127</sup> They are the ‘people who not only aspire but also need to move for their own protection but who nevertheless lack the ability’ to do so,<sup>1128</sup> and are often equally if not more vulnerable than the people who are able to leave risk zones.<sup>1129</sup> Notwithstanding, the plight of these “trapped” people has been rarely treated by legal scholars

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<sup>1126</sup> Kälin, ‘Displacement Caused by the Effects of Climate Change’ (n 1119).

<sup>1127</sup> Lubkemann (n 45).

<sup>1128</sup> Black and Collyer (n 785).

<sup>1129</sup> Caroline Zickgraf, ‘Immobility’, In: R. McLeman and F. Gemenne (eds.), *Routledge Handbook of Environmental Displacement and Migration* (Routledge 2018); Foresight (n 785).

and policymakers, let alone being addressed in any of the existing international normative documents.

One of the reasons for this lack of recognition is that the notion of forced immobility is relatively new, and both empirical and conceptual studies on the subject are still limited. Initial works on immobility have been mostly led by scholars in the field of development, forced migration, and migration studies, and not from environmental studies.<sup>1130</sup> The report which attracted international attention (mostly environmental scholars) on the subject was the 2011 Foresight report commissioned by the UK government.<sup>1131</sup> Officially called the ‘Foresight Migration and Global Environmental Change’ report, it was the first study to identify and popularise the term “trapped populations”. The report notably found that the impoverished population, both in terms of wealth and social capital, tend to be “trapped” not only in places where they are vulnerable to environmental risks as well as in situations where they are unable to move away from such risks. As a solution, authors of the report propose a planned and well-managed relocation to be organised by competent authorities. The chair of the lead expert group who led the Foresight report, Richard Black, a geography scholar, also proposed three criteria to identify “trapped population”: ability, desire and need to move. In order to “qualify” for “trapped population”, individuals must ‘not only lack the ability to move but also want or need to move’.<sup>1132</sup> Nevertheless, the authors admit that distinguishing those who wish to move (or

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<sup>1130</sup> See, for example, Piers Blaikie and others, *At Risk: Natural Hazards, People Vulnerability and Disasters* (2nd edition, Routledge 2003); Tomas Hammar and others (eds), *International Migration, Immobility and Development: Multidisciplinary Perspectives* (Routledge 1997); Jorgen Carling, ‘Migration in the Age of Involuntary Immobility: Theoretical Reflections and Cape Verdean Experiences’ (2002) 28 *Journal of Ethnic and Migration Studies* 5; Lubkemann (n 45); cited by Zickgraf (n 785); Sonja Ayeb-Karlsson, Christopher D Smith and Dominic Kniveton, ‘A Discursive Review of the Textual Use of “Trapped” in Environmental Migration Studies: The Conceptual Birth and Troubled Teenage Years of Trapped Populations’ (2018) 47 *Ambio* 557.

<sup>1131</sup> Foresight (n 785).

<sup>1132</sup> Richard Black, ‘Populations “trapped” at Times of Crisis’ (2014) 45 *Forced Migration Review* 52.

need to move) but remain in situ - “trapped” - from those who do not wish to move - “immobile” - is extremely difficult.

The forced migration regime has traditionally focused on the particular vulnerability and protection needs of the displaced and considered immobility, both voluntary and forced, as essentially unproblematic.<sup>1133</sup> Moreover, governments’ increasing efforts to prevent and avoid environmental displacement by promoting the concept of local empowerment and adaptation in situ would inevitably worsen the problem of involuntary immobility.<sup>1134</sup> As such, Black raised concern that in environmental disasters, ‘(t)he greatest risks will be borne by those who are unable or unwilling to relocate, and may be exacerbated by maladaptive policies designed to prevent migration’.<sup>1135</sup>

Typically, this is what happened following the Fukushima nuclear disaster. The accident induced two opposite but equally vulnerable mobility situations: the displaced and the trapped. Many residents living in areas affected by radiological contamination outside evacuation zones were constrained to remain in situ despite their desire (or need) to move because of the government’s restrictive evacuation policy. They were mainly families with small children, who wanted (or needed) to flee in order to protect the children from radiation exposure. As the Fukushima city resident survey showed, 34 per cent of the respondents still wished to evacuate from the city one year after the accident.<sup>1136</sup> However, the plight of these trapped residents, together with “voluntary” evacuees from these areas, was largely ignored by the authorities. Indeed, they represent the least assisted and compensated group among all the

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<sup>1133</sup> Black and others (n 126).

<sup>1134</sup> Zickgraf (n 785).

<sup>1135</sup> Richard Black and others, ‘Migration as Adaptation’ (2011) 478 *Nature* 447, 447.

<sup>1136</sup> Asahi Shimbun, ‘「今でも避難したい」福島市民の34% 市調査」(34% of Residents in Fukushima City Still Wish to Evacuate, the City’s Survey Found)’ *Asahi Shimbun* (17 September 2012) <<https://www.asahi.com/special/10005/intro/TKY201209140690.html>> accessed 26 April 2023.

victim categories of the Fukushima damage compensation. The data speaks volumes about this phenomenon. While there were 160,000 displaced persons, it is estimated that about 1.6 million or a few million persons found themselves in the situation of voluntary and involuntary immobility following the Fukushima accident.<sup>1137</sup> In the Chernobyl accident, the number of such cases rose to 8-9 million when the number of resettled populations was 350,000.<sup>1138</sup> Forced immobility thus constitutes a major consequence of large nuclear accidents.

To address the problem, some Japanese legal experts proposed and advocated for the concept of “the right to evacuation”.<sup>1139</sup> While Principle 15(a) of the Guiding Principles guarantees the right of IDPs to seek safety in another part of the country, they argued that the right to evacuation is not simply the right to freedom of movement but also the right to receive assistance necessary to realise that choice under the threat to life or health.<sup>1140</sup> For its legal basis, they referred specifically to the notion of the precautionary principle in environmental law, Article 13 and 25 of the Japanese Constitution,<sup>1141</sup> the Convention on the Rights of the Child (CRC), and the International Covenant on Economic, Social, and Cultural Rights (ICESCR). This mirrors the suggestion put forward by some migration scholars who argued not only for the protection of those in the situation of forced immobility but also for their “right to move” as part of the solution.<sup>1142</sup>

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<sup>1137</sup> Sawano (n 14) 126; Institute of Disaster Area Revitalization (Kansai Gakuin University), JCN and SAFRAN (n 965) 60–61.

<sup>1138</sup> UNDP and UNICEF (n 10); Grandazzi and Lemarchand (n 11).

<sup>1139</sup> See, for example, Kenji Fukuda, ‘おわりに 改めて避難する権利を考える (Epilogue: Reflecting on the Right to Evacuation)’ in Kenichiro Kawasaki and others (eds), *避難の権利、それぞれの選択 (The Right to Evacuation, Respective Choices)* (Iwanami Booklet No 839, Iwanami-Shoten 2012); Kenichiro Kawasaki and others (eds), *避難の権利、それぞれの選択 (The Right to Evacuation, Respective Choices)* (Iwanami Booklet No 839, Iwanami-Shoten 2012).

<sup>1140</sup> Fukuda (n 1139).

<sup>1141</sup> Article 13 reads, ‘(people’s) right to life, liberty, and the pursuit of happiness shall, to the extent that it does not interfere with the public welfare, be the supreme consideration in legislation and in other governmental affairs’. Article 25 states that ‘(a)ll people shall have the right to maintain the minimum standards of wholesome and cultured living’.

<sup>1142</sup> Black and others (n 126) S39.

Currently, there exist no international legal or soft-law instruments which specifically address the plight of persons in situations of involuntary immobility. To address the specific needs of trapped persons, certain adaptation of the existing forced migration framework would be necessary, evolving from the traditional concept of the right *not to be arbitrarily displaced* (humanitarian law) and *non-refoulement* (refugee law) to a seemingly opposite concept of the right to evacuation and relocation, in other words, *the right to displacement*. To start the process, the conceptualisation of forced immobility or trapped population needs to be further developed.

#### **D. Institutional Framework**

In addition to definitional ambiguity, environmental displacement also suffers from unclarity in institutional arrangement.<sup>1143</sup> As mentioned above, the UNFCCC is currently the dominant policymaking platform for environmental displacement. As such, the norm-setting is set in the environmental (more precisely, climate change) framework and not the forced migration framework. But the UNFCCC is neither an operational agency nor an organisation which has protection expertise such as UNHCR. In fact, UNHCR was initially motivated to take on a lead role in protecting disaster-induced IDPs in addition to the conflict-induced IDPs. Predicting that climate change-induced displacement would become the biggest driver of displacement, the then High Commissioner, Antonio Guterres, declared in 2009 that assuming the protection lead in natural disasters is ‘a logical extension of our responsibilities’.<sup>1144</sup> For cross-border environmental displacement, he suggested that ‘there may be a need for new legal instruments and we could explore the idea of temporary protection schemes’.<sup>1145</sup> After the

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<sup>1143</sup> Bradley and Cohen (n 1119).

<sup>1144</sup> Antonio Guterres, ‘Opening Statement by Mr. António Guterres, United Nations High Commissioner for Refugees, at the 60th Session of the Executive Committee of the High Commissioner’s Programme (ExCom)’ (UNHCR, Geneva, 28 September 2009).

<sup>1145</sup> UNHCR, ‘Climate change could become the biggest driver of displacement: UNHCR Chief’, Website News < <https://www.unhcr.org/news/latest/2009/12/4b2910239/climate-change-become-biggest-driver-displacement-unhcr-chief.html> > accessed 21 November 2021



adoption of Paragraph 14(f)<sup>1146</sup> in the 2010 UNFCCC Cancun Agreement, UNHCR convened experts to reflect on possible models of its engagement.<sup>1147</sup> However, these initiatives came to a stalemate when Member States finally endorsed neither the extension of its roles for natural disasters nor the proposal to develop a “global guiding framework” for displacement related to disasters and climate change.<sup>1148</sup> According to Kälin, ‘this was no accident but rather the expression of a lack of willingness by a majority of governments, whether from reasons of sovereignty, competing priorities or the lead role of UNHCR in the process’.<sup>1149</sup> McAdam puts it bluntly: when states, especially the western states, increasingly shy away from legal obligations prescribed under the Refugee Convention, why would they be willing to commit to people displaced by disasters?<sup>1150</sup> This led to the creation of the Nansen Initiative as a state-owned bottom-up consultative process, independently from the UNHCR which is the traditional forced migration platform.

Another logical venue for the environmental migration focal point is the International Organisation for Migration (IOM).<sup>1151</sup> Indeed, its work on the issue of environmental migration had started as early as the 1990s.<sup>1152</sup> Like UNHCR, IOM launched initiatives to take on a greater role in the field of environmental migration following the adoption of the 2010 Cancun

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<sup>1146</sup> It encourages states to undertake measures to ‘enhance understanding, coordination and cooperation with regard to climate change induced displacement, migration and planned relocation, where appropriate, at the national, regional and international levels’.

<sup>1147</sup> UNHCR, ‘Summary of Deliberations on Climate Change and Displacement’ (UN High Commissioner for Refugees 2011) <<https://www.unhcr.org/4da2b5e19.pdf>> accessed 21 November 2021.

<sup>1148</sup> Jane McAdam, ‘Creating New Norms on Climate Change, Natural Disasters and Displacement: International Developments 2010–2013’ (2013) 29 *Refugee* 11.

<sup>1149</sup> Walter Kälin, ‘From the Nansen Principles to the Nansen Initiative.’ [2012] *Forced migration review* 41 48; cited by Nash (n 1102).

<sup>1150</sup> Jane McAdam, ‘Swimming against the Tide: Why a Climate Change Displacement Treaty Is Not the Answer’ (2011) 23 *International Journal of Refugee Law* 2, 16.

<sup>1151</sup> The IOM was first created in 1951 as the Provisional Intergovernmental Committee for the Movement of Migrants from Europe (PICMME) to support European governments to resettle 11 million refugees induced by the Second World War. Renamed to IOM in 1989, it is the focal-point agency for international migration assisting both migrants and forced migrations, and promotes the humane and orderly management of migration. In 2016, it became a related agency of the UN. (Source: IOM website)

<sup>1152</sup> IOM, ‘IOM Outlook on Migration, Environment and Climate Change’ (International Organization for Migration 2014); cited by Nash (n 1102).

Agreement. In 2015, it created a new division ‘Migration, Environment and Climate Change (MECC)’ within the organisation to dedicate its work on the issue. Unlike UNHCR, IOM garnered support from its Member States for its greater engagement on the issue of environmental migration/displacement. Its work traditionally covering all types of migration both voluntary and involuntary, IOM’s increased engagement on environmental displacement may seem a more natural evolution in the eyes of the Member States. Meanwhile, IOM is an operational agency with little protection expertise. Its programme document on environmental disasters indeed makes little reference to the aspects of human rights protection.<sup>1153</sup> This particular skill set of the organisation may have also been behind the unfettered states’ support for its expanded role.

Accordingly, there is still a lack of clarity today as to how international organisations will share responsibility and coordinate their actions for the protection of those uprooted and trapped by environmental hazards.

## **§2: Proposed Protection Norms and Principles**

Protection norms for environmentally displaced persons are being developed by mobilising several branches of international law: namely, international environmental law, international humanitarian law, international refugee law, international human rights law and international disaster law.<sup>1154</sup> Interestingly but not surprisingly, legal reflections on the definition and status of environmental displacees have been mainly led by environmental law scholars, rather than by refugee law or forced migration scholars.<sup>1155</sup> Various scholars and actors have proposed ways to fill the “protection gap” for cross-border climate and

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<sup>1153</sup> Bradley and Cohen (n 1119).

<sup>1154</sup> Christel Cournil, ‘The Protection of “environmental Refugees” in International Law’ in Etienne Piguet, Antoine Pécoud and Paul de Guchteneire (eds), *Migration and Climate Change* (UNESCO Publishing/Cambridge University Press 2011).

<sup>1155</sup> Gemenne (n 1111); Nash (n 1102).

environmental displacement.<sup>1156</sup> The method varied from adapting or extending existing norms and instruments (extension model), to proposing new binding treaties or soft-law instruments (new model).

The extension-model initiatives mainly consist of adding a protocol to either the Refugee Convention or the UNFCCC. Jessie Cooper, an American lawyer, proposed in her 1998 article to amend the legal definition of refugees prescribed in the Refugee Convention (Article 1A) by adding degraded environmental conditions that endanger life, health, livelihoods and the use of natural resources as part of reasons for persecution.<sup>1157</sup> Proposals to extend the refugee definition in the Convention to include “climate refugees” were also submitted by countries such as the Maldives and Bangladesh.<sup>1158</sup> Biermann and Boas, on the other hand, proposed the creation of a specific protocol on climate refugee protection under the 1992 UNFCCC.<sup>1159</sup> The proposed ‘Protocol on the Recognition, Protection, and Resettlement of Climate Refugees’ is based on five core principles: planned relocation and resettlement; resettlement instead of temporary asylum; collective rights for local population; international assistance for domestic measures; and international burden-sharing. Interestingly, these protection principles are quite different from those of traditional refugee/forced migration norms which are anchored in international human rights and humanitarian laws.

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<sup>1156</sup> Christel Cournil, human rights and refugee law scholar, made quite an exhaustive inventory of these proposals in her 2011 article. See Cournil (n 1154).

<sup>1157</sup> Jessica B Cooper, ‘Environmental Refugees. Meeting the Requirements of the Refugee Definition’ (1998) 6(2) *New York University Environmental Law Journal* 480; cited by Cournil (n 1154).

<sup>1158</sup> McAdam, ‘Swimming against the Tide’ (n 1150).

<sup>1159</sup> Frank Biermann and Ingrid Boas, ‘Preparing for a Warmer World: Towards a Global Governance System to Protect Climate Refugees’ (2010) 10 *Global Environmental Politics* 60.

Notwithstanding, many forced migration scholars remain very sceptical about amending the Refugee Convention.<sup>1160</sup> UNHCR was particularly nervous about such initiatives since modifying the refugee definition, in its view, would risk a renegotiation of the Convention, which ‘could result in a lowering of protection standards for refugees and even undermine the international refugee protection regime all together’ under the current political environment.<sup>1161</sup> Indeed, under today’s climate where many governments, especially in the West, are all trying to restrict the implementation of the Refugee Convention, expanding it seems an unrealistic option.

As for new model initiatives, Véronique Magniny made the first concrete proposal of an international convention for “environmental refugees” as part of her 1999 doctoral thesis in law.<sup>1162</sup> She proposed a specific legal status for environmental refugees and a system of international protection, modelled on the refugee protection regime. Convinced that the refugee law was not adapted to address the issue of environmental displacement, Gregory S. McCue, on the other hand, proposed a convention based on environmental law principles in 1993.<sup>1163</sup> His proposal thus incorporates the states’ duty to prevent, notify and provide information, develop contingency plans<sup>1164</sup>, and shared duty for compensation. Dana Zartner Falstrom, on the other hand, proposed the Convention on the Protection of Environmentally Displaced

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<sup>1160</sup> Kälin and Schrepfer (n 1124); McAdam, ‘Swimming against the Tide’ (n 1150); Cournil (n 1154); Roger Zetter, ‘The Role of Legal and Normative Frameworks for the Protection of Environmentally Displaced Persons.’ in Frank Laczko and Christine Aghazarm (eds), *Migration, Environment, and Climate Change: Assessing the Evidence* (IOM 2009); UNHCR, ‘Summary of Deliberations on Climate Change and Displacement’ (n 1147).

<sup>1161</sup> UNHCR, ‘Climate Change, Natural Disasters and Human Displacement: A UNHCR Perspective’ (UN High Commissioner for Refugees 2009) 9.

<sup>1162</sup> Véronique Magniny, ‘Les Réfugiés de l’environnement. Hypothèse Juridique à Propos d’une Menace Écologique.’ (Doctoral thesis, Public Law, University Paris I Panthéon-Sorbonne 1999).

<sup>1163</sup> Gregory S McCue, ‘Environmental Refugees: Applying International Environmental Law to Involuntary Migration Note’ (1993) 6 *Georgetown International Environmental Law Review* 151.

<sup>1164</sup> The extension of the customary international environmental law which usually applies only for marine disasters. For McCue, the contingency plans in the context of cross-border environmental refugees involve the extension of the principle of *non-refoulement*.

Persons in 2002 following the structure of the 1984 Convention Against Torture.<sup>1165</sup> The proposed Convention would prescribe state obligations to provide temporary protection to those who fled environmental degradation<sup>1166</sup> as well as preventing the occurrence of such degradation by regulating hazardous activities. In this Convention proposal, nuclear accidents are identified as “environmental problems” which cause displacement.

This paragraph examines the two most influential or comprehensive initiatives among all the initiatives made so far: the 2011 Nansen Initiative led by the former RSG Walter Kälin (A) and the 2008 Draft Convention on the International Status of Environmentally Displaced Persons put forward by a team of environmental law specialists from University of Limoges in France (B). Although the first initiative is not, strictly speaking, a normative proposal, its legal and conceptual reflection process provides valuable insights for the identification of the victims of environmental forced migration including nuclear disaster displacement. Ultimately, these two initiatives show important pathways to complement the current forced migration framework in addressing the issue of environmentally-induced displacement.

### **A. The Nansen Initiative (2012-2015)**

The Nansen Initiative on Disaster-Induced Cross-Border Displacement was thus born in 2012 as a ‘state-led, bottom-up consultative process’, the alternative format from the original plan (i.e., on the UNHCR platform), led by the former RSG on the Human Rights of IDPs Walter Kälin. The Initiative is also a partial response to the proposal made by the UNHCR to formulate “a global guiding framework” on displacement relating to climate change and natural

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<sup>1165</sup> Dana Zartner Falstrom, ‘Stemming the Flow of Environmental Displacement: Creating a Convention to Protect Persons and Preserve the Environment Perspective’ (2002) 13 *Colorado Journal of International Environmental Law and Policy* 1.

<sup>1166</sup> Her proposed provision for this purpose would read: ‘[n]o State Party shall expel, return or extradite an environmentally displaced person to any State where there are substantial grounds for believing that he or she would be in danger due to one of the environmental problems listed in this Convention’ (p.22).

disasters. When UNHCR's proposal was rebuffed at the UNHCR Ministerial Meeting in 2011,<sup>1167</sup> the governments of Norway and Switzerland stepped up and pledged to create a platform with an aim to build consensus among interested states on how to best assist and protect those displaced by disasters and climate change. Its Steering Group is composed of nine states<sup>1168</sup> with UNHCR and IOM as standing invitees. One of its innovative approaches was to organise a series of sub-regional consultation meetings inviting governments, academics, civil society and international organisations in the regions most exposed to natural disasters and the effects of climate change. These consultations consolidated knowledge across different regions on disaster-induced movements and effective practices implemented at national levels.

This three-year "bottom-up" process gave an outcome document, the Agenda for the Protection of Cross-Border Displaced Persons in the Context of Disasters and Climate Change (the Protection Agenda hereafter),<sup>1169</sup> in October 2015, which was endorsed by 109 states. It is a non-binding, non-standard-setting document which provides a toolbox of effective practices from around the globe and defines priorities for future actions.<sup>1170</sup> Unlike the Guiding Principles which was a UN-led legal process restating existing international legal obligations of states, the Nansen Initiative represents a political and pragmatic process led by motivated countries, which could lead to creating a new global framework.<sup>1171</sup> As such, the Protection Agenda provides neither legal nor conceptual definitions of "environmentally displaced persons" or "disaster-induced forced migrant", other than general definitions of terms such as "disaster",

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<sup>1167</sup> The UNHCR Ministerial Meeting was organised in December 2011, attended by the representatives of 155 states, to commemorate the 60<sup>th</sup> anniversary of the Refugee Convention and the 50<sup>th</sup> anniversary of the Statelessness Convention.

<sup>1168</sup> Australia, Bangladesh, Costa Rica, Germany, Kenya, Mexico, Norway, the Philippines, and Switzerland.

<sup>1169</sup> The Nansen Initiative, 'Agenda for the Protection of Cross-Border Displaced Persons in the Context of Disasters and Climate Change' (The Nansen Initiative 2015).

<sup>1170</sup> Jane McAdam, 'From the Nansen Initiative to the Platform on Disaster Displacement: Shaping International Approaches to Climate Change, Disaster and Displacement' (2016) 39(4) UNSW Law Journal 1518.

<sup>1171</sup> François Gemenne and Pauline Brücker, 'From the Guiding Principles on Internal Displacement to the Nansen Initiative: What the Governance of Environmental Migration Can Learn from the Governance of Internal Displacement' (2015) 27 International Journal of Refugee Law 245.

“disaster displacement”, “humanitarian protection measures”, and so on. It is described as a ‘pre-soft law initiative, which seeks to build political consensus and open the way to greater legal achievements’.<sup>1172</sup> Despite the “pre-soft law” nature, the Nansen Initiative has made the first concrete step toward the creation of a global framework for the cross-border displacement in the context of natural disasters and climate change, which ‘may also apply *mutatis mutandis* to disasters triggered by human-made factors such as large-scale industrial accidents’.<sup>1173</sup>

However, the Initiative’s most significant contribution for the purpose of this doctoral thesis is, as briefly introduced earlier, the preparatory legal work done by the Envoy of the Chairmanship of the Initiative, Walter Kälin, which laid the groundwork for the Initiative. Namely, it proposed an ingenious way to identify “environmentally displaced persons” in need of protection: the “returnability” test. Although Kälin’s reflection was focused on cross-border movement, his conceptualization of the victims of forced displacement in the context of climate change can well be applied to the situations of other environmental disasters including nuclear accidents.

As mentioned earlier, one of the conceptual difficulties is to define the criteria, the famous “tipping point”, for distinguishing between people who voluntarily leave their homes and those who are forced to leave in the context of environmental hazards. When most scholars focused on the subjective onset motives of individuals for their flight or the forced nature of departure, Kälin proposed the opposite: the conditionality of their return.<sup>1174</sup> By using the

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<sup>1172</sup> *ibid* 259.

<sup>1173</sup> The Nansen Initiative, ‘Agenda for the Protection of Cross-Border Displaced Persons in the Context of Disasters and Climate Change: Volume I’ (The Nansen Initiative 2015) 52 (endnote 12).; In the context of the Nansen Initiative, “disaster” is defined as ‘disruptions triggered by or linked to hydro-meteorological and climatological natural hazards, including hazards linked to anthropogenic global warming, as well as geophysical hazards’ (‘Agenda for the Protection’ 16).

<sup>1174</sup> Walter Kälin, ‘Conceptualising Climate-Induced Displacement’ in Jane McAdam (ed), *Climate Change and Displacement: Multidisciplinary Perspectives* (Hart Publishing 2010); Kälin, ‘Displacement Caused by the Effects of Climate Change’ (n 1119).

analogy with refugee definition and status determination, Kälin suggests replacing the “well-founded fear” test with the “returnability” test in determining the protection status of displaced persons in the context of environmental disasters. This returnability test uses, like the one to determine refugee status, the prognosis to assess whether it would be safe for the individual concerned to return. In this prognosis, the “persecution” is replaced by “serious threats to life, limb and health”.<sup>1175</sup> According to him, the point of departure should be ‘whether, in light of the prevailing circumstances and the particular vulnerabilities of those concerned, it would be unreasonable, and thus inappropriate, to require them to return to their country of origin’.<sup>1176</sup> This “returnability” test has three criteria: permissibility, feasibility (factual possibility) and reasonableness.

The first criterion, *permissibility*, is related to legal provisions. Under human rights law and the refugee law, state authorities shall not return someone to a situation where their life or limb would be in danger. This principle draws from the decisions of the ECtHR and the UN Human Rights Committee, based on Article 3 of the ECHR and Article 7 of ICCPR on the prohibition of torture, cruel and inhuman treatment respectively, as well as the principle of *non-refoulement* derived from Article 33 of the 1951 Convention.<sup>1177</sup> Moreover, it is also based on the prohibition of collective return of people without assessing individual situations. According to Kälin, this prohibition is implicit in Article 13 of ICCPR and explicit in the American Convention on Human Rights and other regional human rights instruments.<sup>1178</sup>

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<sup>1175</sup> Kälin, ‘Conceptualising Climate-Induced Displacement’ (n 1174) 96.

<sup>1176</sup> *ibid* 97.

<sup>1177</sup> *ibid* 98. The article cites *Soering v. United Kingdom* (1989) 11 EHRR 439, para 91 and *Chahal v United Kingdom* (1996) 23 EHRR 413, para 74, as case examples. The principle of non-refoulement is today recognised as international customary law. Article 33 of the Convention states that ‘[n]o Contracting State shall expel or return (“refouler”) a refugee in any manner whatsoever to the frontiers of territories where his life or freedom would be threatened on account of his race, religion, nationality, membership of a particular social group or political opinion’.

<sup>1178</sup> For example, Protocol No 4 to the ECHR (adopted 16 September 1963, entered into force 2 May 1968) ETS No 46, Art 4.



The second criterion, *feasibility*, relates to factual impediment. Return may not be simply possible due to temporary physical, infrastructural, or administrative conditions. For example, people's houses are destroyed so that they have no home to return to, or physical access (roads and bridges) is cut off or non-existent. Local authorities may prohibit entry to returnees due to some emergency situations which could concern public safety.

The last criterion of *reasonableness* is a judgement based on humanitarian grounds. Even where return is lawfully and physically possible, people should not be expected, let alone compelled, to go back home if the competent authorities do not provide any assistance or protection, or if the assistance provided is far from adequate compared to international standards. This reasonability test also goes to the durable solutions provided by the authorities, which would allow the displaced to reconstruct their lives and resume normal lives elsewhere 'especially where areas of land have become uninhabitable'.<sup>1179</sup>

So, if the answer to one of these questions – is return permissible? Is it feasible? Can it reasonably be required? – is “no”, then individuals concerned should be regarded as victims of environmental or disaster forced displacement in need of either national protection (internal displacement) or international protection (external displacement). By proposing these three criteria, Kälin effectively moved the burden of proof from the individuals (the subjective motive of departure) to the competent authorities (the objective assessment of the circumstance taking into account their responsibilities). This conceptualisation or identification of environmentally displaced persons in need of protection is extremely instructive for the case of nuclear displacees, especially those who fled areas outside official evacuation zones.

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<sup>1179</sup> Kälin, 'Conceptualising Climate-Induced Displacement' (n 1174) 99.

From the criteria of both permissibility and reasonableness, nuclear displaces from out-of-zone areas are in need of, if not more, equal protection from the government as those who fled from official evacuation zones. In effect, the Japanese post-accident policy to promote the return of evacuees to the areas affected by radiological contamination could amount to returning someone to a situation where her/his life, limb and health will be at risk, and may be contradictory to the principle *non-refoulement* according to the permissibility criteria. This point will be further elaborated in the next Title of the thesis.

## **B. Draft Convention on the International Status of Environmentally Displaced Persons**

The initiative of a new convention put forward by the team of environmental law specialists headed by Professor Michel Prieur at the University of Limoges in 2008 is hailed by some legal scholars as ‘the most complete protection proposal package’.<sup>1180</sup> The Draft Convention on the Status of Environmentally Displaced Person<sup>1181</sup> combines elements of protection, assistance and responsibility, drawing from essential legal principles of environmental and human rights laws. Differences with other proposals is that the Draft Convention has the form of a real convention with preamble, chapters, articles, and reference to additional protocols, as well as proposes the institutional set-up and the operational procedure for granting the status of “environmentally displaced persons”. According to Article 2(2) of the Draft Convention, “environmentally displaced persons” are defined as:

individuals, families, groups and populations confronted with a sudden or gradual environmental disaster that inexorably impacts their living conditions and results in

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<sup>1180</sup> Cournil (n 1154) 375.

<sup>1181</sup> Michel Prieur and others, ‘Draft Convention on the International Status of Environmentally- Displaced Persons’ (2008) 12 *Revue Européenne de Droit de l’Environnement* 395, 397.

their forced displacement, at the outset or throughout, from their habitual residence and requires their relocation and resettlement<sup>1182</sup>

The scope of the Draft Convention encompasses both cross-border and internal displacement, sudden and slow-onset disasters of natural and/or anthropogenic origin, and temporary and permanent displacement. In the explanatory note written by Prieur, displacement induced by nuclear accident (e.g., Chernobyl) as well as chemical accident (e.g., Bhopal) was specifically cited as those covered by the Draft Convention.<sup>1183</sup> Under the Draft Convention, nuclear accident displacees are thus recognised as environmentally displaced persons.

Chapter 2-4 of the Draft Convention prescribe protection principles and the guaranteed rights for displaced persons (and those threatened to be). The protection principles consist of solidarity, common but differentiated responsibilities<sup>1184</sup>, effective protection, non-discrimination, and non-refoulement.<sup>1185</sup> The rights of individuals are divided into pre- and post-displacement phases and cross-border displacement. The pre-displacement rights (Chapter 3) consist of the right to information and participation, the right to travel (equivalent to the right to “evacuate” or “move”), and the right to refuse travel.<sup>1186</sup> Indeed, these rights are extremely pertinent in the case of nuclear disasters. The post-displacement rights (Chapter 4) are drawn from relevant human rights provisions including the right to housing, basic necessities, respect for the family unit, respect for property and domestic animals, work, education, collective rights,

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<sup>1182</sup> Article 2.2 Michel Prieur and others, ‘Draft Convention on the International Status of Environmentally-Displaced Persons’ (2008) 4 *Revue européenne de droit de l’environnement* 395. The Draft Convention further clarifies that “sudden environmental disaster” means ‘a rapidly-occurring catastrophe of natural and /or human origin’ and “gradual environmental disaster” means ‘a degradation of natural and/or human origin that is slow, progressive or planned’ (Article 2.2.2 and 2.2.3).

<sup>1183</sup> Prieur (n 106).

<sup>1184</sup> The responsibilities of public and private actors in both preventive and restorative phases

<sup>1185</sup> CRIDEAU-OMIJ (University of Limoges) (n 127). The Draft Convention has been amended three times since 2008. These principles are drawn from the latest version (2018).

<sup>1186</sup> *ibid.*

etc. The “collective rights” are described as equivalent to those recognised for minorities by international conventions.

The Draft Convention also proposed a refugee-status-determination style procedure to grant and terminate the protection status for environmentally displaced persons (Chapter 5). According to the Draft, each State Party shall establish a procedure to recognise the status of these persons and create a National Commission on Environmentally Displaced Persons which will be charged to examine applications and decide to grant or refuse the status for an individual or a group (Article 16-17). Like the refugee status, the status of environmental displaced persons also terminates ‘when the conditions for its recognition is no longer fulfilled’ (Article 19).

As for the organisational structure, the Draft Convention proposes the creation of a Global Environmental Displacement Agency (GEDA) to promote and facilitate the implementation of the Convention by the State Parties (Article 21), and a Global Fund for Environmentally Displaced Persons (GFEDP) with a view to pool fund and provide financial assistance to countries receiving and returning environmentally displaced persons (Article 23). The secretariat of both GEDA and GFEDP is entrusted to IOM. In addition, the High Authority would also be created at the international level, composed of experts seconded by State Parties on rotation basis. The High Authority adopts guidelines and sets criteria for the recognition of the status as well as plays the role of an appeal instance which re-examines the cases.

Despite these concrete and innovative proposals, creating a new binding international instrument for environmentally displaced persons does not seem to be an immediate reality. First of all, there is a general lack of political will among states to adopt another binding treaty related to migration when the subject of migrants and asylum-seekers is an extremely sensitive topic, especially among developed nations. Some scholars are also unconvinced that an

international treaty is the most effective way to address the issue.<sup>1187</sup> Notwithstanding, the above initiatives, the Nansen Initiative and the Draft Convention in particular, played a significant role in accelerating both the norm-making and political processes to address the issue of environmentally displaced persons.

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<sup>1187</sup> McAdam, for example, argues that drafting a treaty would lead to ‘a hardening of the concept, simultaneously defining groups “in” or “out” of protection’. Furthermore, negotiating a treaty may paradoxically encourage states to take a more minimalist approach, as a compromise or fallback position. See McAdam, ‘Swimming against the Tide’ (n 1150).

## Conclusion of Chapter 1

The analysis of this chapter amply demonstrated that nuclear accidents were not some kind of “special” disasters that only the nuclear regulation norms would apply. Nuclear accidents are indeed recognised by the forced migration normative framework as human-made environmental disasters to which its protection norms apply. In other words, the forced migration framework could be a viable and appropriate alternative or complement to the nuclear disaster framework established by international nuclear regulatory organisations.

Under the forced migration framework, nuclear disaster victims would be categorised as IDPs as well as environmentally displaced and trapped persons in need of special protection from competent authorities. Indeed, if the Japanese government had adopted such a framework in the Fukushima accident recovery programme, instead of the nuclear framework, returnees and resettlers would have most probably been equally assisted, and out-of-zone evacuees would have been simply called “IDPs” together with those from evacuation zones. Moreover, there would not have been “trapped” residents since they would have been given an option for assisted evacuation.

As shown in the Fukushima case study, the calls for adopting the IDP framework and applying the GPID in assisting the accident victims came from human rights lawyers and organisations, notably the Special Rapporteurs of the UN Human Rights Council. The last decade saw a growing influence of human rights law in the field of disaster management. States are increasingly held accountable under international law for their failings to take appropriate measures to protect the life of citizens in the event of natural and industrial disasters.<sup>1188</sup>

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<sup>1188</sup> The case-laws of ECtHR demonstrate this tendency, the most prominent of which are *Öneryildiz* case (cited above) and the *Budayeva* case (*Budayeva and others v. Russia*, App nos 15339/02, 21166/02, 20058/02, 11673/02 and 15343/02 (ECtHR, 20 March 2008)).

Currently, a nuclear accident is probably the only disaster which escapes or resists this trend, refusing to align with a rights-based approach or human rights law. The following chapter thus examines in detail how the validity of applying the nuclear normative framework in nuclear disaster response and protection is called into question by the international human rights regime.





## Chapter 2: Challenge from Human Rights and Environmental Law Regime

Luis E. Rodriguez-Rivera, a jurist of international environmental law, who studied the “peaceful” use of nuclear energy from the perspective of human rights and environmental laws concluded that the nuclear framework ‘evinces a complete violation of recognised human rights where decisions made or acquiesced to by states create grievous threats to present and future generations of its people, as well as the environment’.<sup>1189</sup> For him, ‘both radiation exposure and the risk of such exposure to humans would constitute a violation of the human right to environment’.<sup>1190</sup>

After the Fukushima nuclear accident, the only organisation within the UN system that criticised the handling of accident victims by the Japanese government was the human rights institutions, especially the UN Human Rights Council. Likewise, the UN Human Rights Committee is the only UN body which clearly recognised the use of nuclear weapons as “crimes against humanity” and strongly advised the world to get rid of its threat.<sup>1191</sup> In the Fukushima mission report, the Special Rapporteur of the UN Human Rights Council calls into question, for the first time, the validity of applying core nuclear regulation principles – justification and optimisation – in assisting accident victims, qualifying them ‘not in consonance with’ human rights principles.<sup>1192</sup> This is the very first time that an entity of the UN system has ever directly pronounced against the nuclear regime and its doctrine. In this respect, international human rights law seems to be the branch of international law that directly collides with and challenges

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<sup>1189</sup> Rodriguez-Rivera, ‘The Human Right to Environment and the Peaceful Use of Nuclear Energy’ (n 103) 181.

<sup>1190</sup> *ibid* 192.

<sup>1191</sup> CCPR, ‘General Comment No. 6: Article 6 (Right to Life)’ (Human Rights Committee 1982) 30 April 1982; CCPR, ‘General Comment No.14: Article 6 (Right to Life); Nuclear Weapons and the Right to Life’ (Human Rights Committee 1984) 9 November 1984; replaced by CCPR, ‘General Comment No. 36; Article 6: Right to Life’ (Human Rights Committee 2018) UN Doc CCPR/ C/GC/36 (30 October 2018). These expressions were removed in the 2018 amended version.

<sup>1192</sup> UNHRC, ‘Report of the Special Rapporteur on the Right of Everyone to the Enjoyment of the Highest Attainable Standard of Physical and Mental Health, Anand Grover’ (n 59) para 47.

the validity of the nuclear law and its framework. Meanwhile, the protection of human rights in disasters has been recognised as part of state obligations in the case-laws of international human rights tribunals such as European Court of Human Rights (ECtHR), and increasingly adopted as the core operational principle of disaster relief and management in a several international agreements related to disaster risk reduction.

On the level of scholarly debates, most studies and legal critiques of the Fukushima post-accident management were conducted by environmental law and study scholars, not human rights scholars, especially from the perspective of environmental rights and environmental law principles. International environmental law represents another field of international law which tends to question the appropriateness and adequacy of the nuclear legal and normative framework in dealing with nuclear disasters.

This chapter thus explores how human rights law and environmental law challenge the nuclear regime doctrine, identifying the rights and principles which would dispute or be at odds with such doctrine. This enables this doctoral study to pinpoint the key missing norms in the current nuclear disaster response framework, which must be incorporated in the new protection norms for nuclear victims proposed at the end of this study. With that in mind, the first section of the chapter examines the legal review of nuclear disasters conducted by the international human rights regime, focusing on the UN human rights system and the ECtHR (Section 1). Secondly, the chapter analyses nuclear disasters and the nuclear framework from the viewpoint of international environmental law and its principles, focusing on the notion of the right to a safe and healthy environment and precautionary principle (Section 2).

## Section 1: International Human Rights Law and Nuclear Disasters

The international human rights regime has begun reacting to the issue of nuclear energy only during the 1980s. As mentioned earlier, the UN Human Rights Committee, the treaty body of the ICCPR, first recognised the threat or use of nuclear weapons as “crimes against humanity” in 1982. Following the Chernobyl accident in 1986, the UN human rights treaty bodies expressed concerns on the handling of accident victims by the former Soviet republics in contrast to other UN reports which tended to underestimate its health consequences. During the 1990s, some important international court decisions were rendered as regards the military use of nuclear energy, notably the 1996 Advisory Opinion of the International Court of Justice (ICJ) on the threat or use of nuclear weapons and a few ECtHR cases on atomic bomb tests conducted by the UK. However, apart from these ad hoc comments and decisions, the international human rights community had not been very vocal about the civil use of nuclear energy in general, let alone its regulatory regime.<sup>1193</sup>

This reserved attitude began to change at the Fukushima nuclear accident. The notable difference is not just the volume but the scope of the reviews. The most remarkable example is the report of the UN Special Rapporteur on the right to health who conducted a field mission to Fukushima in 2012. The Rapporteur urged the Japanese government to formulate post-accident protection policies based on human rights rather than on risk-benefit analysis of the nuclear normative framework.<sup>1194</sup> This was echoed by the review made by the Committee on Economic, Social and Cultural Rights (CESCR), the UN treaty body of the ICESCR, which stated that the needs of vulnerable groups such as women and children were not sufficiently met by the post-disaster management of the Japanese government and strongly recommended to ‘adopt a human

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<sup>1193</sup> Abe (n 299).

<sup>1194</sup> UNHRC, ‘Report of the Special Rapporteur on the Right of Everyone to the Enjoyment of the Highest Attainable Standard of Physical and Mental Health, Anand Grover’ (n 59).

rights-based approach to disaster response, risk mitigation and reconstruction efforts'.<sup>1195</sup> For the first time, the UN human rights authority directly tackled the core philosophy of nuclear disaster management, specifically recommending the country to adopt a human rights-based approach.

The use of the rights-based approach in disaster management, while it has been the norm for the humanitarian and forced migration community from its inception, is increasingly adopted as the core principle by the wider community of Disaster Risk Reduction (DRR), the traditional state-based platform for natural disaster preparedness and response. The most recent DRR framework document, Sendai Framework on Disaster Risk Reduction (2015-2030),<sup>1196</sup> which included nuclear accidents for the first time, notably adopted the protection of human rights as one of the guiding principles for disaster management.

This section makes an in-depth analysis as to how international human rights law intersects and intervenes nuclear law and its norms in the context of nuclear disasters. First, it examines the assessments of nuclear disaster management, focusing on the Fukushima response, conducted by the UN human rights system (§1). Secondly, it explores the case-laws of international courts, both the ICJ and ECtHR, related to atomic energy and environmental disasters which have important implications for nuclear disaster preparedness and response (§2). The ICJ's opinion on atomic energy and radiation exposure, though it dealt only with the military use of atomic energy, provides valuable insights as to how the court considers the effects of radiation disasters on humans and the environment from the broader perspective of international law. Lastly, the section briefly examines the emerging protection norms in the field

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<sup>1195</sup> UN Committee on Economic, Social and Cultural Rights, 'Concluding Observations on the Third Periodic Report of Japan, Adopted by the Committee at Its Fiftieth Session (29 April-17 May 2013)' (10 June 2013) UN Doc E/C.12/JPN/CO/3 para 24.

<sup>1196</sup> UNDRR, 'Sendai Framework for Disaster Risk Reduction 2015-2030' (United Nations 2015).

of disaster risk reduction, which has been dramatically evolved during the last few decades and increasingly shaped by human rights law (§3). In fact, the disaster law covers technological hazards such as nuclear accidents and its recent adoption of a rights-based approach will have important implications for nuclear disaster management.

### **§1: The UN Human Rights Regime and Nuclear Accidents**

Unlike for armed conflicts, there is currently no global binding instrument which protects individuals and regulates state actions specifically in times of disasters. After the Second World War, the international community established the 1949 Geneva Conventions and the Protocols – international humanitarian law – to regulate state conduct and protect civilians during wartime. The experience of the Nazi persecution of its own nationals during the World War II gave birth to two international protection regimes, international refugee law and international human rights law. Both regimes were primarily established to protect individuals from intra-state violence, in other words, from their government actions and inactions. While the refugee regime tries to protect individuals once they are outside their countries, the human rights regime aims to protect them *in situ* by making their government responsible for such protection. The internationalization of human rights is thus also called turning the state “inside out”.<sup>1197</sup>

This paragraph first describes the legal and institutional framework of international human rights regime (A), after which it analyses in detail the legal review of the Fukushima nuclear accident management conducted by the regime (B).

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<sup>1197</sup> Simma and Pulkowski (n 66) 20.

## A. The Legal and Institutional Framework of the UN Human Rights System

The current international human rights regime was formed following the Second World War with the creation of the United Nations. Before that period, human rights had largely been considered a matter of domestic jurisdiction, prescribed in bills of rights<sup>1198</sup> or constitutional laws. But the Nazi atrocities committed against its own nationals during the World War II prompted the issue of human rights on the top of the international agenda.<sup>1199</sup> The UN Charter, considered by some as international constitutional law,<sup>1200</sup> reflects well such preoccupation of the international community. The Preamble declares to 'reaffirm faith in fundamental human rights, in the dignity and worth of the human person, in the equal rights of men and women and of nations large and small' and Articles 55 and 56 create legal obligations on Member States to respect, protect and ensure human rights.

Most importantly, the Charter prompted the establishment of the Commission on Human Rights under the auspices of the UN Economic and Social Council (ECOSOC, hereafter), which drafted and facilitated the quasi-universal adoption of the so-called International Bill of Human Rights, the core international human rights instrument composed of the 1948 Universal Declaration of Human Rights (UDHR, hereafter),<sup>1201</sup> the 1966 International Covenant on Civil and Political Rights (ICCPR)<sup>1202</sup> and the 1966 International

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<sup>1198</sup> Early texts include the UK Bill of Rights (1688), the French Declaration of the Rights of Man and of the Citizens (1789), and the US Bill of Rights (1791).

<sup>1199</sup> Christina M Cerna, 'Human Rights in Armed Conflict: Implementation of International Humanitarian Law Norms by Regional Intergovernmental Human Rights Bodies' in Frits Kalshoven and Yves Sandoz (eds), *Implementation of International Humanitarian Law/Mise en oeuvre du droit international humanitaire* (Martinus Nijhoff Publishers 1989); cited by Noëlle NR Quénivet, 'Introduction' in Roberta Arnold and Noëlle NR Quénivet (eds), *International humanitarian law and human rights law: towards a new merger in international law* (Martinus Nijhoff Publishers 2008).

<sup>1200</sup> Bertrand G Ramcharan, 'The Law-Making Process: From Declaration to Treaty to Custom to Prevention' in Dinah Shelton (ed), *The Oxford Handbook of International Human Rights Law* (Oxford University Press 2013). Ramcharan gave a reference to Ronald St John MacDonald and Douglas M Johnston, *Towards World Constitutionalism: Issues in the Legal Ordering of the World Community* (Martinus Nijhoff Publishers 2005)

<sup>1201</sup> UNGA, 'Universal Declaration of Human Rights' (n 84).

<sup>1202</sup> International Covenant on Civil and Political Rights (adopted 16 December 1966, entered into force 23 March 1976) 999 UNTS 171 (ICCPR)

Covenant on Economic, Social and Cultural Rights (ICESCR)<sup>1203</sup>. The adoption of the UDHR is today regarded as the birth of international human rights law which has fundamentally transformed the concept and the practice of human rights protection. For a long time, the rights of individuals had been bestowed by their own governments via constitutional laws, whose protection had often been under a balance of interests between the individual and the state, in other words, prone to interpretation according to states' interests and policies.<sup>1204</sup> In contrast, the international protection confers universal rights, aiming at protecting individuals regardless of state interests or policies.

In addition to the above tripartite instrument, there are many international treaties and regional instruments which form the international human rights legal regime. For global instruments alone, the UN counts at least 94 of them.<sup>1205</sup> There are nine so-called “core international human rights instruments” according to the UN: the ICCPR, the ICESCR, the International Convention on the Elimination of All Forms of Racial Discrimination (ICERD)<sup>1206</sup>, the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)<sup>1207</sup>, the Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (CAT)<sup>1208</sup>, the Convention on the Rights of the Child (CRC)<sup>1209</sup>, the International Convention on the Protection of the Rights of All Migrant Workers and Members

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<sup>1203</sup> International Covenant on Economic, Social and Cultural Rights (adopted 16 December 1966, entered into force 3 January 1976) 993 UNTS 3 (ICESCR)

<sup>1204</sup> Noëlle NR Quénivet and Catia Lopes, ‘Individuals as Subjects of International Humanitarian Law and Human Rights Law’ in Roberta Arnold and Noëlle NR Quénivet (eds), *International humanitarian law and human rights law: towards a new merger in international law* (Martinus Nijhoff Publishers 2008).

<sup>1205</sup> OHCHR, ‘Human Rights: A Compilation of International Instruments’ (Office of the United Nations High Commissioner for Human Rights 2002) UN Doc ST/HR/1/Rev. 6 (Vol. I/Part 2).

<sup>1206</sup> International Convention on the Elimination of All Forms of Racial Discrimination (adopted 7 March 1966, entered into force 4 January 1969) 660 UNTS 195

<sup>1207</sup> Convention on the Elimination of All Forms of Discrimination against Women (adopted 18 December 1979, entered into force 3 September 1981) 1249 UNTS 13

<sup>1208</sup> Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (adopted 10 December 1984, entered into force 26 June 1987) 1465 UNTS 85

<sup>1209</sup> Convention on the Rights of the Child (CRC) (adopted 20 November 1989, entered into force 2 September 1990) 1577 UNTS 3

of Their Families (ICMW)<sup>1210</sup>, the International Convention for the Protection of All Persons from Enforced Disappearance (CED)<sup>1211</sup>, and the Convention on the Rights of Persons with Disabilities (CRPD)<sup>1212</sup>. Among them, the most widely accepted treaty is the CRC with 189 State Parties.

Within the UN system, the Office of the United Nations High Commissioner for Human Rights (OHCHR, hereafter) is the focal point agency for human rights issues, which was established in 1993 by the General Assembly resolution.<sup>1213</sup> The UN human rights monitoring system comprises charter-based and treaty-based bodies. The OHCHR assumes the role of secretariat for both organs. The charter-based body is headed by the Human Rights Council (the successor of the Commission on Human Rights) which runs three monitoring procedures: the Universal Periodic Review (UPR), Special Procedures (SPs), and Complaint Procedure (1). The treaty-based body is composed of nine committees supervising the implementation of respective core human rights treaties (2). The brief description of both bodies are as follows.

### 1. Charter-Based Body

The Commission on Human Rights, which laid the foundation of the global human rights regime, was replaced by the Human Rights Council in 2006 by the General Assembly resolution (60/251).<sup>1214</sup> The newly created Council has the higher status than the predecessor as it directly reports to the General Assembly instead of the ECOSOC. This reform was brought

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<sup>1210</sup> International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families (adopted 18 December 1990, entered into force 1 July 2003) 2220 UNTS 3

<sup>1211</sup> International Convention for the Protection of All Persons from Enforced Disappearance (adopted 20 December 2006, entered into force 23 December 2010) 2716 UNTS 3

<sup>1212</sup> Convention on the Rights of Persons with Disabilities (adopted 13 December 2006, entered into force 3 May 2008) 2515 UNTS 3

<sup>1213</sup> UNGA 'Res 48/141 High Commissioner for the promotion and protection of all human rights' (1993) UN Doc A/RES/48/141 (20 December 1993)

<sup>1214</sup> UNGA, 'Res 60/251 Human Rights Council' (2006) UN Doc A/RES/60/251 (3 April 2006)



about under a growing criticism that the Commission's work had been increasingly paralysed by the politicisation and the instrumentalisation of the Commission by some of the Member States with questionable human rights records.<sup>1215</sup> The creation of the Council addressed some of these concerns. The Council consists of 47 Member States elected for three-year terms by the majority vote at the General Assembly via secret ballot. Unlike the Commission membership, candidate countries for the Council need to demonstrate their good human rights records as well as their commitments for the further promotion of human rights in the country. The membership also has to ensure equitable geographical representation and is limited to two consecutive terms, which responded to a particular criticism on the structure of the former Commission in which powerful or Western nations with quasi-permanent membership were condemning weaker developing nations.<sup>1216</sup>

But the most significant change from the Commission is the introduction of the Universal Periodic Review (UPR) system in 2008. It is the peer review mechanism which assesses the human rights situation of all UN Member States on a four-and-a-half year cycle. The State under the UPR must submit a national report on its human rights situation to the Council. Simultaneously, the OHCHR compiles an observation report on the State after collecting information from stakeholders such as civil society organisations and national human rights institutions. These reports are then evaluated by the Council who will produce an outcome report summarising both the progress and the shortcomings of human rights protection in the concerned State and providing recommendations to improve the situation. In the following cycle of UPR, the State is required to report on the progress that it has made in its implementation of the recommendations. The most recent UPR cycle for Japan took place in

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<sup>1215</sup> Miloon Kothari, 'From Commission to the Council: Evolution of UN Charter Bodies' in Dinah Shelton (ed), *The Oxford Handbook of International Human Rights Law* (Oxford University Press 2013). Kothari was the Special Rapporteur for the right to adequate housing from 2000 to 2008.

<sup>1216</sup> *ibid.*

2017 and its recommendations contained several Fukushima-related human rights concerns (the details of the outcome report will be examined in the following sub-paragraph B).

Nonetheless, the most important and “powerful” monitoring tool of the Council rests with special procedures (SPs). Hailed as “the crown jewel of the system”<sup>1217</sup>, SPs are the appraisal of a particular human right theme, or a specific country situation, conducted by independent human rights experts. These experts are appointed by the Council as the UN Special Rapporteurs for a maximum of six years and are neither employed nor remunerated by the UN, which is essential to maintain the independence of their work. In the words of the former Special Rapporteur, Miloon Kothari, SPs are ‘the voice of objectivity in a deeply politicized UN inter-governmental system and a deeply politicized world order’, which aims to protect individuals’ rights from a victim-oriented perspective. As of November 2021, there are 44 thematic and 11 country mandates.

Besides submitting annual reports on the global situation or a specific theme of their respective mandates, the key role of Special Rapporteurs is to investigate allegations of human rights violations and address them to the concerned States for remedy via two main tools available to SPs: country visits and communications. The fact-finding missions indeed form the most critical part of the SPs work, which yield most attention and results.<sup>1218</sup> During the mission, the Special Rapporteurs meet not only national and local authorities but also NGOs, the UN country offices, the media and the victims of human rights violations. These field visits allow the Special Rapporteur to hear testimonies directly from victims and gather evidence on

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<sup>1217</sup> The description made by the then UN Secretary General Kofi Annan in his speech to mark International Human Rights Day at the Time Warner Center, New York, on 8 December 2006; cited by Theodore J Piccone, *Catalysts for Change How the UN’s Independent Experts Promote Human Rights* (Brookings Institution Press 2012).

<sup>1218</sup> *ibid.*

the ground. After the mission, the Rapporteur submits a report to the Council with his/her findings and recommendations.

Though the SPs are neither judicial procedures nor endowed authority to enforce their recommendations, their unique status – being independent under the blue flag – makes them one of the most effective UN mechanisms in improving human rights situations around the globe.<sup>1219</sup> Thanks to their independent position, they are able to publicly denounce human rights violations committed by any UN Member State and even criticise the actions of UN agencies in a way that no UN employee can.<sup>1220</sup> Moreover, due to their UN label, countries cannot simply ignore or dismiss the findings of Special Rapporteurs as unwarranted. As one NGO expert puts it, the fact that they wear the UN hat ‘makes the government think twice before going too far in its repression’.<sup>1221</sup> The mission under the blue flag also attracts more media attention in general, providing added visibility for victims and advocacy groups and creating some pressure to the government to respond. After the Fukushima nuclear disaster, SPs was activated, and a fact-finding mission was conducted by the Special Rapporteur on the right of everyone to the enjoyment of the highest attainable standard of physical and mental health in November 2012. The content of the mission report will be analysed in detail below (B).

The other investigation tool, so-called “communications”, represents ‘the main entry point’ into the international recourse mechanism for victims and human rights defenders.<sup>1222</sup> Under the procedure, individuals, civil-society organisations, and national human rights bodies can directly send complaints to the SPs, upon which relevant Special Rapporteurs investigate the case by sending letters of allegations (“communications”) to the concerned States for a reply.

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<sup>1219</sup> Of course, the effectiveness depends on the context of respective countries. As Ted Piccone described, the SPs are more effective in countries where the general public and the media hold a positive opinion of the UN in general. Alternatively, in countries where the image of the UN is negative or berated, they have little influence. See *ibid.*

<sup>1220</sup> Kothari (n 1215).

<sup>1221</sup> Piccone (n 1217) 46.

<sup>1222</sup> *ibid.* 5.

Unlike other complaint mechanisms under treaty bodies or the Council's own complaint procedure, SPs communication does not require that the concerned State ratified a particular international or regional human rights treaty, or that the alleged victim has exhausted domestic remedies before sending a complaint. After the Fukushima nuclear accident, a total of five communications were sent to the government of Japan inquiring about alleged violations of its human rights obligations, which will be analysed in the following sub-paragraph (B).

Notwithstanding, a major weakness of both country visits and communications is lack of a follow-up mechanism for the recommendations made by mission reports and letters of allegation. Most States do not formally respond to the findings of mission reports while some send notes of explanation or justification to the Council (the Japanese government indeed sent a rebuttal note to the Council in reaction to the Fukushima mission report, as shown below).<sup>1223</sup> Accordingly, half of all communications receive no formal reply from the concerned states even though the Council's resolution (2/5) urges all states to do so.<sup>1224</sup> While no official response in writing does not necessarily mean that states simply ignored the communication, follow-up mechanism to SPs needs to be formalised by the Council in order to strengthen the effectiveness of SPs.

Apart from the investigative function, SPs also play a very important role as standard-maker for the further development of international human rights law. Upon Council's request or by an initiative of Special Rapporteurs themselves, they formulate guidelines and principles on particular themes of their mandates. Some of these guidelines have become influential non-binding instruments over the years. Such examples include the Guiding Principles of Internal

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<sup>1223</sup> Piccone (n 1217).

<sup>1224</sup> *ibid*; See UNHRC, 'Code of Conduct for Special Procedures Mandate-Holders of the Human Rights Council' (Human Rights Council 2007) UN Doc A/HRC/RES/5/2 (18 June 2007) para 1.

Displacement (1998)<sup>1225</sup> and the Basic Principles and Guidelines on Development-Based Evictions and Displacement (2007)<sup>1226</sup>.

## 2. Treaty-Based Body

The other pillar of the UN human rights system is the treaty-based body. Today all UN Member States have ratified at least one of the nine core international human rights treaties and 80% of them have ratified four or more.<sup>1227</sup> Human rights treaties constitute a major source of international human rights law, together with international customary law and general principles of law.<sup>1228</sup> It consists of nine committees which monitor the implementation of the above-mentioned core international human rights treaties.<sup>1229</sup> They are established pursuant to provisions of respective treaties in order to monitor the State Parties' implementation of treaty obligations. Among them, the work of the Human Rights Committee (CCPR) is spearheaded in the operational experience as well as the political weight that it exercises on its State Parties. The committees are composed of independent experts who are nominated and elected for a four-year term by State Parties. The main functions of the committees are as follows: examining periodic national reports, receiving individual complaints, and adopting so-called General Comments to interpret treaty provisions.

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<sup>1225</sup> As explained in the previous chapter, the GPID was presented to the Commission on Human Rights (the former body of Human Rights Council) in 1998 by the Representative of the UNSG on IDPs (1992-2004) Francis Deng. The mandate was succeeded by the Representative of the UNSG on the Human Rights of IDPs (2004-2010) Walter Kälin. To follow up on their work, the Special Rapporteur on the Rights of IDPs was created by the Human Rights Council in 2010 and the mandate continues today.

<sup>1226</sup> UNHRC, 'Report of the Special Rapporteur on Adequate Housing as a Component of the Right to an Adequate Standard of Living, Miloon Kothari' (Human Rights Council 2007) UN Doc A/HRC/4/18 (5 February 2007).

<sup>1227</sup> Source: OHCHR website (<https://www.ohchr.org/EN/HRBodies/Pages/HumanRightsBodies.aspx>), consulted 12 January 2022

<sup>1228</sup> Dinah Shelton, *Advanced Introduction to International Human Rights Law* (2nd edn, Edward Elgar 2020).

<sup>1229</sup> They are Committee on the Elimination of Racial Discrimination (CERD), Committee on Economic, Social and Cultural Rights (CESCR), Human Rights Committee (CCPR), Committee on the Elimination of Discrimination against Women (CEDAW), Committee against Torture (CAT), Committee on the Rights of the Child (CRC), Committee on Migrant Workers (CMW), Committee on the Rights of Persons with Disabilities (CRPD), and Committee on Enforced Disappearances (CED).

Under the treaties, State Parties are required to submit periodic reports every two to five years (after the initial report required one to two years following the ratification) to brief on its compliance with treaty provisions to respective committees. For example, the CCPR initially established a four-year cycle but changed later to a flexible cycle of three to five years depending on the human rights record of each State Party.<sup>1230</sup> Each treaty body examines the report in the presence of the concerned State Party delegation in a form of “constructive dialogue” at the plenary session. The committee members also receive information from the shadow reports submitted by NGOs and national human rights institutions. Based on the plenary session, the committee publishes “Concluding Observations” addressing its concerns and recommendations. Unlike the charter-based UPR and SPs, a number of treaty bodies have established follow-up procedures to the State report system. For example, the Human Rights Committee appoints a Special Rapporteur to follow up on concluding observations. If the State Party does not respond to the issues raised in the observations, the Rapporteur will contact the government, either by writing or for a meeting, to solicit a response or discuss the matter directly and will report the result of such contact at each Committee session.<sup>1231</sup>

Another tool of supervision is the complaint procedure. All committees except CMW are equipped with individual complaint procedures in which victims can send communications to the relevant committee for investigation under certain conditions.<sup>1232</sup> Their complaints are indeed considered by the committee only if the State of concern has already recognised the competence of the committee to receive such complaints and the victim has exhausted all domestic remedies. This makes the treaty-body communication mechanism less accessible

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<sup>1230</sup> Nigel S Rodley, ‘The Role and Impact of Treaty Bodies’ in Dinah Shelton (ed), *The Oxford Handbook of International Human Rights Law* (Oxford University Press 2013).

<sup>1231</sup> *ibid.*

<sup>1232</sup> All the committees are endowed with the complaint procedure by either treaty provisions or Optional Protocols. The communication procedure of CMW has not yet entered into force. Source: OHCHR website (<https://www.ohchr.org/EN/HRBodies/Pages/WhatTBDo.aspx>), consulted 12 January 2022

than the equivalent in the charter-based special procedures. In 2020, treaty bodies formally registered 317 complaints while the charter-body's SPs sent out 681 Communications to 152 States.<sup>1233</sup> But unlike "communications" of the SPs, committees' outcome document "views" has 'a quasi-judicial character', though not strictly legally binding, and constitutes as jurisprudence for treaty bodies as well as 'an authoritative interpretation of the Covenant under international law'.<sup>1234</sup>

Another major function of treaty bodies is to publish General Comments, the interpretation of treaty provisions. Over the course of years, these General Comments have developed into an important source of jurisprudence on a variety of human rights issues.<sup>1235</sup> Particularly, those of the Human Rights Committee play an influential role in actual judicial practice, hence contributing to setting international human rights norms. Together with "views" from individual communication procedures, the ICJ has cited the General Comments of the Committee at a number of occasions in its Advisory Opinions and stated that they represented a "great weight" to the interpretation of the Covenant.<sup>1236</sup> In spite of this, General Comments have globally received a mixed reception by national and international courts and sometimes stirred oppositions from certain States, notably the US and other nuclear powers (as to General Comment No.14 on nuclear weapons among others).<sup>1237</sup> But paradoxically, the fact that they

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<sup>1233</sup> OHCHR, 'United Nations Human Rights Report 2020' (OHCHR 2021) 28.

<sup>1234</sup> Shelton, *Advanced Introduction to International Human Rights Law* (n 1228) 255; Birgit Schlütter, 'Aspects of Human Rights Interpretation by the UN Treaty Bodies' in Helen Keller and Geir Ulfstein (eds), *UN Human Rights Treaty Bodies: Law and Legitimacy* (Cambridge University Press 2012).

<sup>1235</sup> Cecilia Medina Quiroga, 'The Role of International Tribunals: Law-Making or Creative Interpretation?' in Dinah Shelton (ed), *The Oxford Handbook of International Human Rights Law* (Oxford University Press 2013).

<sup>1236</sup> Rodley (n 1230).; *Case Concerning Ahmadou Sadio Diallo (Republic of Guinea v Democratic Republic of the Congo, Merits, Judgment [2020] ICJ Rep 2010, 639, para 66.*

<sup>1237</sup> Helen Keller and Leena Grover, 'General Comments of the Human Rights Committee and Their Legitimacy' in Helen Keller and Geir Ulfstein (eds), *UN Human Rights Treaty Bodies: Law and Legitimacy* (Cambridge University Press 2012).

triggered heated reactions from the global super power does also indicate the important implication of General Comments on global human rights norms.

## **B. The UN Human Rights Review of Nuclear Accidents and the Nuclear Regime**

As mentioned earlier, the UN human rights system has not directly dealt with the use of civil nuclear energy *per se*. Notwithstanding, it has expressed its views, comprehensively or partially, on nuclear weapons, nuclear accidents, and, most recently, the nuclear regime doctrine. In 1984, the Human Rights Committee (CCPR) has clearly pronounced on the irreconcilability between nuclear weapons and the right to life (article 6) by stating that nuclear weapons represented one of the greatest threats to the right to life of the mankind and ‘should be prohibited and recognised as crimes against humanity’.<sup>1238</sup> The most recent General Comment on the right to life, No. 36 (2018), which replaced the above No. 14, reaffirmed its position according to which nuclear arms are ‘incompatible with respect for the right to life and may amount to a crime under international law’.<sup>1239</sup> During the 1990s, the complaint procedure of CCPR also received several communications against the testing and the possible deployment of atomic bombs by some of the State Parties. But all these cases were closed without their merits having been examined by the CCPR on the ground of admissibility.<sup>1240</sup> As the thesis will also observe in the decisions of other international tribunals below (§2), there is a certain timidity of the human rights courts regarding nuclear questions.<sup>1241</sup>

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<sup>1238</sup> CCPR, ‘General Comment No.14: Article 6 (Right to Life); Nuclear Weapons and the Right to Life’ (n 1191) para 6.

<sup>1239</sup> CCPR, ‘General Comment No. 36; Article 6: Right to Life’ (n 1191) para 66.

<sup>1240</sup> Kiara Neri, ‘Catastrophes Nucléaires et Droits de l’homme. La Question Des Règles Régissant Les Opérations de Secours’ in Kiara Neri (ed), *Le droit international et le nucléaire* (Bruylant 2021); Abe (n 299).; As Neri describes, these communications were rejected each time on the ground that the claimants did not sufficiently demonstrate that they were “victims” whose right to life had been violated or under an imminent threat of violation.

<sup>1241</sup> Neri (n 1240).



The UN human rights bodies began to deal with issues related to nuclear accidents at the 1986 Chernobyl nuclear accident. The periodic state review process of charter bodies such as CESCR, CRC, and CEDAW all expressed concerns on the handling of the aftermath by the governments of Belarus and Ukraine following the accident.<sup>1242</sup> The CESCR also reacted to the 1999 JOC Tokai-mura criticality accident in the concluding observations of Japan's periodic report review in 2001. The Committee notably pointed out Japan's lack of transparency and preparation for nuclear accidents and recommended to redress these shortcomings.<sup>1243</sup>

At this point, the global human rights system was still evolving (especially the Commission on Human Rights under turbulence) and its appraisal was rather scattered among different treaty bodies who reacted to the concerned States' practices from the perspective of respective treaty obligations. The response to the Fukushima nuclear accident of 2011 under the new Human Rights Council was significantly different. The accident activated almost all the mechanisms across charter- and treaty-based bodies, and the outcome recommendations went further beyond simply expressing concerns on the State's behaviour and tackled its source for the first time: the nuclear regime's doctrine and safety standards.

The most effective and critical evaluation came from the Special Procedures of the Human Rights Council. This was completely new compared to previous accidents. The Fukushima accident prompted a fact-finding mission by the Special Rapporteur on the right to health, who visited Japan between 15-26 November 2012. The Rapporteur, Anand Grover, after having conducted numerous interviews with affected residents, NGOs, and concerned local and

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<sup>1242</sup> Abe (n 299). According to Abe, the examples include: as for CESCR, E/C.12/1/Add.7/Rev.1 (2 December 1996); as for CRC, CRC/C/15/Add.180 (13 June 2002), CRC/C/BLR/CO3-4 (8 April 2011); as for CEDAW, A/59/38 (Supp.) (2004), CEDAW/C/BLR/CO/7 (6 April 2011)

<sup>1243</sup> CESCR, 'Consideration of Reports Submitted by States Parties Under Articles 16 and 17 of the Covenant: Concluding Observations of the Committee on Economic, Social and Cultural Rights' (Committee on Economic, Social and Cultural Rights 2001) UN Doc E/C.12/1/Add.67 (24 September 2001).

central government officials, made a highly critical assessment of the Japanese post-accident management in a report submitted to the Council on 2 May 2013.

First, the Rapporteur called in question the reference level of 20 mSv/year established by the Japanese government following the accident. In his view, the choice of 20 mSv/year as reference level was not based on the current scientific evidence<sup>1244</sup> nor Japan's own radiation regulation<sup>1245</sup>, and should therefore be reduced to 1 mSv/year<sup>1246</sup> – public dose limit. He also cited an example from the Chernobyl accident where the Ukrainian government adopted the post-accident reference dose at 1 mSv/year for its citizens by enacting the 1991 law ‘on the status and social protection of the citizens who suffered as a result of the Chernobyl catastrophe’ (the Chernobyl Law).<sup>1247</sup> What was truly remarkable in this critique was that the Special Rapporteur went even further to review the source from which such a reference level was chosen by the Japanese government: the ICRP protection principles. The Grover report namely states:

The ICRP recommendations are based on the principle of optimisation and justification, according to which all actions of the Government should be based on maximizing good over harm. Such a risk-benefit analysis is not in consonance with

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<sup>1244</sup> The Rapporteur notably cited the study of David Richardson and others, ‘Ionizing Radiation and Leukaemia Mortality among Japanese Atomic Bomb Survivors, 1950-2000’ (2009) 172 *Radiation Research* 368, which found no low-threshold limit for excess radiation risk to non-solid cancers such as leukaemia. He also cited the following studies which had shown that solid cancer risk would increase in a linear dose-response relationship even at low doses: U.S. National Research Council, *Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2* (The National Academies Press 2006); Kotaro Ozasa and others, ‘Studies of the Mortality of Atomic Bomb Survivors, Report 14, 1950–2003: An Overview of Cancer and Noncancer Diseases’ (2012) 177 *Radiation Research* 229; David J Brenner and others, ‘Cancer Risks Attributable to Low Doses of Ionizing Radiation: Assessing What We Really Know’ (2003) 100 *Proceedings of the National Academy of Sciences of the United States of America* 13761.

<sup>1245</sup> Ministry of Labour Ordinance No. 41 of 30 September 1972, as amended. Article 3 specifically requires operators to demarcate those areas in which the radiation dose exceeds 1.3 mSv per 3 months (5 mSv/year) as “controlled areas”. In these areas, no one shall be allowed to enter except those with a specific mandate (article 3(4)).

<sup>1246</sup> In the report, it is clearly specified that the dose limit of 1 mSv/year means an annual additional effective dose excluding natural background and medical exposures.

<sup>1247</sup> UNHRC, ‘Report of the Special Rapporteur on the Right of Everyone to the Enjoyment of the Highest Attainable Standard of Physical and Mental Health, Anand Grover’ (n 59) para 46.

the right to health framework, as it gives precedence to collective interests over individuals rights. Under the right to health, the right of every individual has to be protected.<sup>1248</sup>

Accordingly, the Rapporteur recommended the government to implement nuclear disaster response ‘based on human rights rather than on a risk-benefit analysis’ and apply the dose limit of 1 mSv/year for the evacuation and return of residents. Especially for the return, the report specifically urged the government not to encourage it unless the radiation dose be reduced ‘to levels below 1 mSv/year’.<sup>1249</sup> By these remarks, the Special Rapporteur *de facto* refutes the nuclear regime’s core principles in light of international human rights law principles, advising the government to shift the guiding legal framework from nuclear regime to human rights regime.

In response to this mission report, the Japanese government submitted a note of comments to the SP. It strongly rejected the SP’s recommendation on the 1 mSv/year dose limit by reiterating the ICRP dose recommendation based on justification and optimisation principles and even taking the trouble to explain that health risk at doses at and less than 100 mSv is little to “non-existent”.<sup>1250</sup> This last statement is quite striking as it reveals the Japanese government’s fixation on the threshold model of low-dose risk, which even runs counter to the ICRP’s position on such risk – the LNT model. Most importantly, the attempted rebuttal of the Japanese government did not address the fundamental question posed by the SP on the validity of radiation protection principles in protecting the affected population nor the advice for the ‘regime change’ to the rights-based approach.

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<sup>1248</sup> *ibid* para 47.

<sup>1249</sup> *ibid* para 49, 78(a).

<sup>1250</sup> UNHRC, ‘Report of the Special Rapporteur on the Right of Everyone to the Enjoyment of the Highest Attainable Standard of Physical and Mental Health, Anand Grover. Addendum: Mission to Japan: Comments by the State on the Report of the Special Rapporteur’ (Human Rights Council 2013) UN Doc A /HRC/23/41/Add.5 (24 May 2013) 26.

A scathing review also came from the Special Rapporteur on the implications for human rights of the environmentally sound management and disposal of hazardous substances and wastes (toxics and human rights). The Rapporteur, Baskut Tuncak, found that ‘the Japanese government’s decision to raise by 20 times what it considered to be an acceptable level of radiation exposure’ was ‘deeply troubling’ and expressed his concern on ‘the potentially grave impact of excessive radiation on the health and wellbeing of children’ in 2018.<sup>1251</sup> By reminding the provisions of the Convention on the Rights of the Child (CRC), to which Japan is party, Tuncak implied that its return policy at the 20 mSv/year dose benchmark would constitute a violation of certain provisions of the Convention and urged the government to ‘halt returns’ of children and women of reproductive age to areas of Fukushima where radiation levels are higher than 1 mSv/year.<sup>1252</sup> In the same communication, he expressed his disappointment that ‘Japan appears to all but ignore the 2017 recommendation of the UN human rights monitoring mechanism (UPR) to return back to what it considered an acceptable dose of radiation before the nuclear disaster’. He also raised concerns that the Japanese government had not granted a country visit by the Special Rapporteur on toxics and human rights despite the explicit requests made by Japanese civil society organisations.

As such, the SPs of the UN Human Rights Council on Fukushima stood out for their investigative nature, in-depth empirical analysis, and strong wording used in recommendations, compared to previous reports made at the time of the Chernobyl and the Tokai JOC accidents.

Besides the mandate-holders’ reports, SPs accepted at least five individual complaints in relation to the Fukushima accident and sent communications to the Japanese government.

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<sup>1251</sup> OHCHR, ‘Japan Must Halt Returns to Fukushima, Radiation Remains a Concern, Says UN Rights Expert’ (n 60).

<sup>1252</sup> *ibid*; Also see UNHRC, ‘Report of the Special Rapporteur on the Implications for Human Rights of the Environmentally Sound Management and Disposal of Hazardous Substances and Wastes’ (n 94).

Two communications sent in 2017 and 2018 specifically dealt with the issue of evacuees.<sup>1253</sup> In these communications, Special Rapporteurs repeatedly reminded the Japanese government that both evacuees from evacuation zones and outside these zones constitute Internally Displaced Persons (IDPs) and that the government had specific obligations toward them in accordance with the provisions of the 1998 Guiding Principles on Internal Displacement. In addition, they recommended referring to the IASC Framework on Durable Solutions for IDPs, urging the government to provide continuous support to evacuees, especially self-evacuees, who chose resettlement over return. In the most recent communication and press release in 2021, Special Rapporteurs followed up on the issue and expressed their regret that the Japanese government had not yet acknowledged Fukushima evacuees as IDPs and thus their needs had not been sufficiently met.<sup>1254</sup> They also reiterated their serious concern over the 20 mSv/year permissible dose being continuously applied to the general public including children despite their repeated recommendations. The Special Rapporteurs reminded that such a dose level was equal to the annual dose limit for nuclear workers, to which children were known to be extremely sensitive.

The 2017 country review of Japan (UPR) by the Human Rights Council also highlighted the fact that the Fukushima accident management stood at odds with human rights principles. The outcome report of the review notably recommended the government to apply the Guiding Principles on Internal Displacement to all those affected by the accident and respect

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<sup>1253</sup> UNHRC, 'Joint Communication from Special Procedures (The Special Rapporteur on Toxics and Human Rights; The Special Rapporteur on the Human Rights of IDPs)' (n 62); UNHRC, 'Joint Communication from Special Procedures (The Special Rapporteur on Toxics and Human Rights; The Special Rapporteur on the Right to Health; The Special Rapporteur on the Human Rights of IDPs)' (n 62).

<sup>1254</sup> OHCHR, 'Japan Must Step up Efforts to Solve Human Rights Fallout from Fukushima Disaster: UN Experts' (n 100).

the rights of the affected, pregnant women and children in particular, by restoring the permissible dose of radiation to the 1 mSv/year limit.<sup>1255</sup>

The State review of treaty bodies was equally critical. Japan is a party to all nine human rights treaties and five Optional Protocols for CCPR, CAT, CED, and CRC.<sup>1256</sup> The CCPR expressed concerns that ‘the high threshold of exposure level set by the State party in Fukushima and the decision to cancel some of the evacuation areas give people no choice but to return to highly contaminated areas (arts. 6, 12 and 19)’ in the concluding observations of the 2014 periodic review of Japan.<sup>1257</sup> The Committee advised the Japanese government to ‘take all the necessary measures to protect the life of the people affected by the nuclear disaster in Fukushima’ and lift evacuation orders ‘only where the radiation level dose not place the residents at risk’.<sup>1258</sup> The CESCR’s concluding observations of the 2013 periodic review of Japan was even more categorical in stating that the needs of vulnerable groups such as women, children, persons with disabilities and older persons ‘were not sufficiently met during the evacuation and in the rehabilitation and reconstruction efforts’ and strongly recommended the government to ‘adopt a *human rights-based approach* to disaster response, risk mitigation and reconstruction efforts’.<sup>1259</sup> Though the report did not specifically refer to the nuclear regime doctrine as did the SPs’ mission report, this particular advice amounts to urging a regime change in handling the nuclear accident aftermath. This is a significant step forward from the traditional recommendations of treaty bodies in relation to nuclear accidents. It also reflects a growing

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<sup>1255</sup> UNHRC, ‘Report of the Working Group on the Universal Periodic Review: Japan’ (n 98) para 161.215, 161.216.

<sup>1256</sup> Source: OHCHR website

<[https://tbinternet.ohchr.org/\\_layouts/15/TreatyBodyExternal/Treaty.aspx?CountryID=87&Lang=EN](https://tbinternet.ohchr.org/_layouts/15/TreatyBodyExternal/Treaty.aspx?CountryID=87&Lang=EN)>, consulted 25 January 2022.

<sup>1257</sup> CCPR, ‘Concluding Observations on the Sixth Periodic Report of Japan’ (Human Rights Committee 2014) UN Doc CCPR/C/JPN/CO/6 (20 August 2014) para 24.

<sup>1258</sup> CCPR, ‘Concluding Observations on the Sixth Periodic Report of Japan’ (n 1257).

<sup>1259</sup> UN Committee on Economic, Social and Cultural Rights (n 1195) para 24.

trend in dealing with disasters where the human rights-based approach (HRBA) is becoming a dominant paradigm (see the analysis of the following sub-paragraph §3).

The concept of HRBA was initially developed by the UN in the context of development programmes. At the turn of the 21<sup>st</sup> century, the scope of application was extended to public policies in general, including disaster management. The HRBA places the protection of human rights ‘at the centre of the preparation, design, implementation, monitoring, and evaluation of policies, regulatory measures, and spending programmes’.<sup>1260</sup> Under the approach, rights-holders and duty-bearers are clearly identified as well as the entitlements for the former and the obligations for the latter. The principal duty-bearer, the state, has the obligation to respect, protect, and fulfil the human rights of all persons in their jurisdiction.<sup>1261</sup> These obligations are also called positive and negative obligations of the state, which have been extensively developed by the case-laws of an international human rights court, the ECtHR. Under the framework, state authorities are required to take affirmative steps to prevent the infringement and ensure the protection of human rights in addition to refrain from curtailing the enjoyment of human rights of rights-holders. In this respect, the positive obligation of the Japanese government to protect life (and respect for private and family life under the ECHR (Art 8)) could be invoked in the context of the Fukushima nuclear accident management, especially as regards its restrictive evacuation policy which led many residents to be trapped in the contaminated areas.

## **§2: The Case-laws of International Tribunals Related to Nuclear Disasters**

The question of nuclear energy and human rights was first brought to national courts long before any international instances. The most notable case was the civil lawsuit, “fallout

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<sup>1260</sup> OHCHR Europe, ‘Making A Difference: An Introduction to Human Rights’ (2018) 14.

<sup>1261</sup> *ibid* 6.

suit”, filed by the revered scientist Linus Pauling against atomic bomb tests in the United States in 1958.<sup>1262</sup> Pauling, the winner of both Nobel Prize in Chemistry and Nobel Peace Prize, argued that radiation emitted from the tests ‘will inflict serious genetic and somatic injury upon plaintiffs and the population of the world in general, including unborn generations’.<sup>1263</sup> Recalling that there was no such thing as “safe” doses of radiation by citing the studies of prominent scientists such as geneticist Hermann J. Muller and biologist Edward Lewis, Pauling and other plaintiffs proclaimed that ‘to live free of threats of nuclear war and *pollution* was a human right guaranteed by the US Constitution and international law’ and demanded injunction on the planned tests of the US military.<sup>1264</sup>

The claim was finally rejected by the District Court on the ground that the plaintiffs had not presented sufficient evidence for serious deleterious health effects allegedly caused by bomb tests, nor demonstrated such radiation risk outweighing ‘the public interest involved in the development of nuclear weapons through these tests in furtherance of the national defence and safety’.<sup>1265</sup> The US Court of Appeal affirmed the decision of the District Court and the appellants filed the writ to the Supreme Court which was denied in 1960.<sup>1266</sup> Nevertheless, this fallout suite represented a milestone and pioneer court case which made a direct connection between environmental risk – radiological contamination – and human rights. It also became a backbone case leading to the 1996 ICJ’s advisory opinion on the threat or use of nuclear weapons.<sup>1267</sup>

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<sup>1262</sup> *Pauling v. McElroy*, 164 F. Supp. 390 (D.D.C. 1958)

<sup>1263</sup> *ibid*: The text of the decision can be found at <<https://law.justia.com/cases/federal/district-courts/FSupp/164/390/1457101/>>, consulted 21 January 2021

<sup>1264</sup> Linda M Richards, ‘Fallout Suits and Human Rights: Disrupting the Technocratic Narrative’ (2013) 38 *Peace & Change* 56, 57 (emphasis added); See also Toshihiro Higuchi, ‘Tipping the Scale of Justice: The Fallout Suit of 1958 and the Environmental Legal Dimension of Nuclear Pacifism’ (2013) 38 *Peace & Change* 33; Soraya Boudia, ‘Global Regulation: Controlling and Accepting Radioactivity Risks’ (2007) 23 *History and Technology* 389.

<sup>1265</sup> *Pauling v. McElroy* 164 F. Supp. 390 (D.D.C. 1958)

<sup>1266</sup> *Pauling v. McElroy* 278 F.2d 252 (D.C. Cir. 1960); Higuchi (n 1264).

<sup>1267</sup> Richards (n 1264).



Following the end of the Cold War in the 1990s, the issue of nuclear risk from bomb tests and nuclear reactors was brought before international courts, namely the ICJ and the ECtHR. This paragraph examines the decisions of these instances on the obligations of states as regards the question of radiation exposure and nuclear risk from nuclear fission devices.

### **A. International Court of Justice (ICJ) on Nuclear Energy**

Upon the request from the UN General Assembly,<sup>1268</sup> the ICJ gave an Advisory Opinion on the Legality of the Threat or Use of Nuclear Weapons in 1996.<sup>1269</sup> Before this, the UN General Assembly had already adopted several resolutions declaring that the use of nuclear weapons would be a violation of the UN Charter and a crime against humanity.<sup>1270</sup> Although the case dealt only with the military use of nuclear energy, the ICJ's opinion on the consequence of such use – radiation pollution – set an important precedent for looking into the civil use of nuclear energy and its consequences in case of nuclear accidents. Namely, the ICJ argued in the Opinion:

By its very nature, that process (explosion), in nuclear weapons as they exist today, releases not only immense quantities of heat and energy, but also powerful and prolonged radiation. [...] The radiation released by a nuclear explosion would affect health, agriculture, natural resources and demography over a very wide area. Further, the use of nuclear weapons would be a serious danger to future generations. Ionizing radiation has the potential to damage the future environment, food and marine ecosystem, and to cause genetic defects and illness in future generations. [...] (I)t is imperative for the Court to take account of the unique characteristics of nuclear

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<sup>1268</sup> UNGA, 'Res 49/75 General and complete disarmament' (1995) UN Doc A/RES/49/75. The resolution for the request was adopted at the 90<sup>th</sup> plenary session on 15 December 1994.

<sup>1269</sup> *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Rep 1996

<sup>1270</sup> UNGA resolution 1653 (XVI) of 24 November 1961, 33/71 B of 14 December 1978, 34/83 G of 11 December 1979, 35/152 D of 12 December 1980, 36/92 I of 9 December 1981, 45/59 B of 4 December 1990, and 46/37 D of 6 December 1991

weapons, and in particular their destructive capacity, their capacity to cause untold human suffering, and their ability to cause damage to generations to come.<sup>1271</sup>

Although the ICJ did not find a specific provision in international law to prohibit the threat or use of nuclear weapons in the end, the Court's characterisation of their consequences on humankind over generations and the environment would suggest a violation of at least some or all human rights.<sup>1272</sup> From the above description of radiation damage, some scholars suggested that radiation exposure and the risk of such exposure to humans, either from bomb detonation or reactor core meltdown, would clearly constitute a violation of the human right to the environment.<sup>1273</sup> Indeed, the Court also recognised that nuclear weapons have a catastrophic effect on the environment which is, according to its opinion, 'not an abstraction but represents the living space, the quality of life and the very health of human beings, including generations unborn'.<sup>1274</sup> In this respect, radiation exposure and contamination particularly implicate, *inter alia*, the rights to life, to a safe and healthy environment, to health, and to an adequate standard of living, and the environmental principle of intergenerational equity.

## **B. European Court of Human Rights (ECtHR) on Nuclear Energy and Disasters**

This sub-paragraph examines the ECtHR's case-laws which have important implications for the protection of persons in nuclear disasters. These case-laws are divided into two groups: military and civil uses of nuclear energy (1) and environmental disasters (2).

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<sup>1271</sup> *Legality of the Threat or Use of Nuclear Weapons* (cited above) para 35. Bracket added.

<sup>1272</sup> Rodriguez-Rivera, 'The Human Right to Environment and the Peaceful Use of Nuclear Energy' (n 103); Louise Doswald-Beck, 'Human Rights Law and Nuclear Weapons' in Annie Golden Bersagel, Gro Nystuen and Stuart Casey-Maslen (eds), *Nuclear Weapons under International Law* (Cambridge University Press 2014).

<sup>1273</sup> Rodriguez-Rivera, 'The Human Right to Environment and the Peaceful Use of Nuclear Energy' (n 103).

<sup>1274</sup> *Legality of the Threat or Use of Nuclear Weapons*, para 29

## 1. Case-Laws on Nuclear Energy

The ECtHR was confronted by the question of nuclear bomb tests and their effects on human life and health at the same moment as the ICJ. In 1998, the Court gave two judgments to cases where individuals (former soldiers and their family members) exposed to the 1958 bomb test conducted by the UK in Christmas Island argued that their illness were associated with radiation exposure from the test, accusing the UK government of violating its obligations under the Convention provisions, notably Article 2 (the right to life) and Article 8 (the right to private and family life).<sup>1275</sup> While the Court rejected the applicants' claim in both cases, it established that the state had a positive obligation for information, which arose from Article 8, by stating that:

(w)here a Government engages in hazardous activities, such as those in issue in the present case, which might have hidden adverse consequences on the health of those involved in such activities, respect for private and family life under Article 8 requires that an effective and accessible procedure be established which enables such persons to seek all relevant and appropriate information.<sup>1276</sup>

In this respect, the ECtHR tackled the issue of nuclear bomb tests and their effects on life and health of individuals on the procedural ground, from a very narrow angle of Article 8: access to information. In this decision, one can observe a sort of uneasiness or hesitancy of the Court to directly deal with nuclear matters, that is, the political decisions of respective governments concerning nuclear energy, as seen in other international and national court decisions. This difficulty of directly challenging the choice of governments on nuclear matters

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<sup>1275</sup> *L.C.B. v. UK* (1998) App no 23413/94 (ECtHR, 9 June 1998) and (1998) App no 21825/93 and 23414/94 (ECtHR, 9 June 1998); cited by Neri (n 1240).

<sup>1276</sup> *McGinley and Egan v. UK* (1998) App no 21825/93 and 23414/94 (ECtHR, 9 June 1998), para 101; See the further analysis by Kiara Neri, 'Catastrophes nucléaires et droits de l'homme. La question des règles régissant les opérations de secours' in Kiara Neri (ed), *Le droit international et le nucléaire* (Bruylant 2021).

obliged plaintiffs to change the tactic and focus their claim on procedural rights such as the right to an effective remedy or the right to a fair trial over the years.<sup>1277</sup>

The question of civil nuclear power and human rights is not an exception to this rule. The applicants often confronted the so-called “direct harm” requirement,<sup>1278</sup> the question of applicability – qualification of being a “victim” – just like Pauling faced in the US fallout suit. In order to be assessed by the Court, the plaintiff has to be the direct or indirect victim of a violation of the Convention by an act or inaction of the State *a posteriori*, non *a priori*, unless s/he can demonstrate a real and imminent threat of such a violation.<sup>1279</sup> In both *Balmer-Schafroth* and *Athanassoglou* cases, residents living in the vicinity of nuclear power plants (Mühleberg and Beznau) opposed an extension of the plants’ operation approved by the Government on the ground of safety concerns.<sup>1280</sup> They argued that the continuous operation of these nuclear power plants posed a risk to their rights to life and physical integrity, demanding thus their immediate and permanent closure. In the *Balmer-Schafroth* case, the Court denied the application of Article 6 (the right to a fair trial) on the grounds that:

(applicants) did not for all that establish a direct link between the operating conditions of the power station which were contested by them and their right to protection of their physical integrity, as they had failed to show that the operation of Mühleberg power station exposed them personally to a danger that was not only serious but also specific and, above all, imminent.<sup>1281</sup>

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<sup>1277</sup> *ibid.*

<sup>1278</sup> Karen Morrow, ‘The ECHR, Environment-Based Human Rights Claims and the Search for Standards’ in Stephen J Turner and others (eds), *Environmental Rights* (1st edn, Cambridge University Press 2019).

<sup>1279</sup> European Court of Human Rights, ‘Practical Guide on Admissibility Criteria’ (Council of Europe 2011); See further Loukis Loucaides, *The European Convention on Human Rights: Collected Essays* (Martinus Nijhoff Publishers 2007).

<sup>1280</sup> *Balmer-Schafroth and Others v. Switzerland* (1997) App no. 22110/93 (ECtHR, 26 August 1997), *Athanassoglou and others vs Switzerland* (2000) App no. 27644/95 (ECtHR, 6 April 2000)

<sup>1281</sup> *Balmer-Schafroth and Others v. Switzerland*, para 40

Furthermore, in the *Athanassoglou* case, the judges dismissed the claim in a similar fashion by adding that ‘how best to regulate the use of nuclear power is a policy decision for each Contracting State to take according to its democratic processes’.<sup>1282</sup> However, the dissenting opinion written by Judges Costa, Tulkens, Fischbach, Casadevall, and Maruste in the present case is of particular interest. By recognising that ‘it is virtually impossible to prove imminent danger in the case of inherently dangerous installations: the catastrophes that have happened in a number of countries were obviously unforeseeable or, in any event, unforeseen’, they argued that Article 6§1 (the right to a fair trial) and Article 13 (the right to an effective remedy) were applicable in the case, emphasising that ‘the dangers presented to the environment and the population by such installations make it, if anything, more necessary for such decisions to be subject to review by an independent and impartial tribunal in adversarial proceedings’.<sup>1283</sup>

After all, like nuclear weapons, there is no international law which specifically prohibits the “peaceful” use of nuclear energy. On the contrary, such a use is warranted under the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) of 1968<sup>1284</sup> which affirms that all Parties, especially non-nuclear-weapon State Parties, have ‘the inalienable right’ to develop, produce, and use nuclear energy for peaceful purposes on the condition that these State Parties renounce developing atomic weapons and accept IAEA safeguards measures.<sup>1285</sup>

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<sup>1282</sup> *Athanassoglou and others vs Switzerland*, para 54

<sup>1283</sup> *Athanassoglou and others vs Switzerland* (Joint Dissenting Opinion of Judges Costa, Tulkens, Fischbach, Casadevall and Maruste), 27; cited by Loucaides (n 1279).

<sup>1284</sup> The Treaty on the Non-Proliferation of Nuclear Weapons (adopted 1 July 1968, entered into force 5 March 1970) 729 UNTS 161 (NPT), Art IV.1.

<sup>1285</sup> *ibid* (introductory text).

## 2. Case-Laws on Environmental Disasters

Nevertheless, protecting citizens from potential harms and risks related to dangerous industrial activities, especially from disasters, constitutes one of the States obligations under the European Convention on Human Rights (the Convention or the ECHR, hereafter).<sup>1286</sup> Over the course of years, the Court has taken progressive steps to adapt and extend the interpretation of the Convention's provisions to deal with the issue of environmental hazards including those associated with natural and industrial disasters. These provisions mainly concern the right to life (Article 2), the right to respect for private life and home (Article 8), and the right to property (Article 1 of Protocol No. 1).<sup>1287</sup> These extensions by the Court have principally been effected through reinforcing the notion of positive obligations of States. The traditional and inherent notion of State obligations under the ECHR has always been the so-called "negative obligations" where States are required to refrain from interfering with the enjoyment of the rights and freedoms of rights-holders. But the Court has over time broadened the notion of obligations, imposing also on States to take more proactive roles to ensure rights protection.

Since the notion of positive obligations was first formulated in the late 1960s,<sup>1288</sup> case-laws have established a detailed set of positive, as well as negative, obligations to all the standard-setting provisions of the Convention.<sup>1289</sup> By interpreting the States' obligation under Article 1 of the Convention to "secure" rights,<sup>1290</sup> judges have repeatedly held that the State

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<sup>1286</sup> Convention for the Protection of Human Rights and Fundamental Freedoms (adopted 4 November 1950, entered into force 3 September 1953) 213 UNTS 221 (European Convention on Human Rights - ECHR)

<sup>1287</sup> Loucaides (n 1279).

<sup>1288</sup> The notion was first referenced in "*Relating to certain aspects of the laws on the use of language in education in Belgium*" v. *Belgium* (the "Belgian linguistic case") App no 1474/62; 1677/62; 1691/62; 1769/63; 1994/63; 2126/64 (ECtHR, 23 July 1968), which was further polished in *Marckx v. Belgium* App no 6833/74 (ECtHR, 13 June 1979).; See Dinah Shelton and Ariel Gould, 'Positive and Negative Obligations' in Dinah Shelton (ed), *The Oxford Handbook of International Human Rights Law* (Oxford University Press 2013).

<sup>1289</sup> Jean-François Akandji-Kombe, 'Positive Obligations under the European Convention on Human Rights: A Guide to the Implementation of the European Convention on Human Rights' (Council of Europe 2007) *Human Rights Handbooks*, No.7; Shelton and Gould (n 1288).

<sup>1290</sup> Article 1 (Obligation to respect human rights) states that '(t)he High Contracting Parties shall secure to everyone within their jurisdiction the rights and freedoms defined in Section I of this Convention'.

had a duty to take the necessary measures to safeguard a right, or to adopt ‘reasonable and appropriate’ measures to protect the rights of the individual, in addition to restraining from interfering in the exercise of rights.<sup>1291</sup> This enabled the Court to strengthen, or even extend, the requirements that the States must satisfy as regards both substantive and procedural rights prescribed in the Convention.<sup>1292</sup>

The UN treaty body, the Human Rights Committee (CCPR), has also extended the scope of protection under the right to life (Article 6(1)) through the notion of positive obligation. By qualifying the right to life as ‘the supreme right from which no derogation is permitted even in time of public emergency which threatens the life of the nation’,<sup>1293</sup> the Committee argued that the right ‘can be effectively guaranteed only by a combination of negative and positive State obligations’.<sup>1294</sup> Accordingly, the Committee expanded the scope of the right to life from merely ‘the right to protection against arbitrary killing’ to the protection from ‘other threats to human life, such as malnutrition, life-threatening illness, *nuclear energy* or armed conflict’.<sup>1295</sup>

In the context of the ECHR, the right to life (Article 2) and the right to private and family life (Article 8) are undoubtedly the two areas where the concept of positive obligation is most developed. Case laws have established that the State’s positive duty to safeguard life would also encompass protection from environmental harm as well as disasters where the risk is known to the State.<sup>1296</sup>

Namely in the landmark case of *Öneryıldız v. Turkey* (2004), the Court affirmed that the positive obligation for the purpose of Article 2 ‘indisputably’ applies in the context of

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<sup>1291</sup> Akandji-Kombe (n 1289).

<sup>1292</sup> *ibid.*

<sup>1293</sup> CCPR, ‘General Comment No. 36; Article 6: Right to Life’ (n 1191) para 1.

<sup>1294</sup> Manfred Nowak, *UN Covenant on Civil and Political Rights: CCPR Commentary* (2nd revised edition, NP Engel 2005) xxi.

<sup>1295</sup> *ibid* 123 (emphasis added); cited by Shelton and Gould (n 1288).

<sup>1296</sup> McAdam, ‘Displacement in the Context of Climate Change and Disasters’ (n 1103).

dangerous activities, or ‘any activity, whether public or not, in which the right to life may be at stake, and *a fortiori* in the case of industrial activities, which by their very nature are dangerous’.<sup>1297</sup> Nuclear power plant operations are indeed considered as part of these ‘dangerous activities’ in the case.<sup>1298</sup> The Court further explained that ‘this positive obligation entails above all a primary duty on the State to put in place a legislative and administrative framework designed to provide effective deterrence against threats to the right to life’, to make information available to the public (the right to information recognised under Article 8), and to ensure ‘an adequate response’ so that such preventive framework would be properly implemented and any breaches would be punished and redressed.<sup>1299</sup> The concept was also extended to the risk related to natural disasters by the case of *Budayeva* (2008).<sup>1300</sup> Through these judgements, the Court has effectively extended the scope of the right to life, linking it to a healthy environment.

The right to a healthy environment also derives from the provision of Article 8. For example, in the *Lopez Ostra* judgement, the Court acknowledged a violation of Article 8 for the applicant who had been subjected to gas fumes and contamination from a waste-treatment plant by stating that ‘severe environmental pollution may affect individuals’ well-being and prevent them from enjoying their homes in such a way as to affect their private and family life adversely’.<sup>1301</sup> Under the circumstances, judges continued, the State had ‘a positive duty to take *reasonable and appropriate* measures to secure the applicant’s rights’.<sup>1302</sup> By the ‘reasonable and appropriate’ measures, the Court meant that the actions of the State had to strike

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<sup>1297</sup> *Öneryildiz v. Turkey*, App no 48939/99 (ECtHR, 30 November 2004) para 71, 90

<sup>1298</sup> In effect, the case-law *Öneryildiz v. Turkey* specifically cites the Chernobyl disaster as one of “dangerous activities” recognised by the Council of Europe (para 59).

<sup>1299</sup> *Öneryildiz v. Turkey* para 89-91

<sup>1300</sup> *Budayeva and others v. Russia*, App nos 15339/02, 21166/02, 20058/02, 11673/02 and 15343/02 (ECtHR, 20 March 2008)

<sup>1301</sup> *Lopez Ostra v. Spain*, App no. 16798/90 (ECtHR, 9 December 1994) para 51; cited by Akandji-Kombe (n 1289) 47.

<sup>1302</sup> *Lopez Ostra v. Spain*, para 51; emphasis added



a ‘fair balance [...] between the competing interests of the individual and of the community as a whole and in any case the State enjoys a certain margin of appreciation’ of such balancing act.<sup>1303</sup>

Similarly, in the *Ilascu* case, the Court emphasised that the State measures should be ‘appropriate and sufficient’, which would constitute a ‘fair balance [...] between the general interest and the interests of the individual and the choices to be made in terms of priorities and resources’ and should not impose an ‘impossible or disproportionate burden’ on States.<sup>1304</sup>

These are the concepts of ‘margin of appreciation’ and ‘fair balance’ that the ECtHR uses to assume its adjudicatory role, like other international human rights instances, which could end up constraining ‘both the role that it plays and how it is played’.<sup>1305</sup> They serve a dual function: allowing States a considerable degree of latitude in running its affairs, and emphasising its supervisory or subsidiarity-like nature of the jurisdiction.<sup>1306</sup> This juxtaposition or balancing between the public interest and that of individuals is particularly present in case-law decisions dealing with environmental-based claims.<sup>1307</sup> This is the challenge that victims of environmental harm, such as nuclear disaster victims, would probably face in making a claim at international human rights courts.

In fact, these concepts allude to the core radiation protection principles of justification and optimisation. However, an important difference exists between the ECtHR’s ‘fair balance’ concept and the ICRP’s ‘do more good than harm’ and ‘risk-benefit analysis’ principles. While

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<sup>1303</sup> *Lopez Ostra v. Spain*, para 51

<sup>1304</sup> *Ilascu and others v. Moldova and Russia*, App no. 48787/99 (ECtHR, 8 July 2004) para 7; cited by Akandji-Kombe (n 1289) 9. In the *Budayeva* case (n 96), judges reiterated the same point but added that the consideration for not imposing ‘impossible or disproportionate burden’ must be afforded greater weight in case of natural disasters – events beyond human control – than in the sphere of dangerous activities of a man-made nature.

<sup>1305</sup> *Morrow* (n 1278).

<sup>1306</sup> *ibid.*

<sup>1307</sup> *ibid.*

the nuclear regime clearly puts the priority on ‘collective interests’ over individual rights,<sup>1308</sup> the ECtHR puts a limit on the general interest (often economic interest) in assessing the ‘fair balance’. Namely, *Băcilă v Roumania* case (2010) provides an interesting example.<sup>1309</sup> In this case, residents living close to a metal treatment plant were contaminated by lead poisoning due to the inaction of the State who wanted to preserve the main economic activity of the city. The Court stated that ‘this interest (the economic well-being of the city) cannot outweigh the right of the persons concerned to enjoy a balanced and healthy environment’ and that the State had ‘a positive obligation to adopt and implement reasonable and adequate measures capable of protecting their well-being’.<sup>1310</sup>

This particular case law would have an important implication for an event of large nuclear disasters where protective actions such as precautionary evacuation of residents could be considered one of the ‘reasonable and adequate measures’ to protect individuals’ right to life and to ‘a balanced and healthy environment’, which should not be outweighed by collective economic interests. This will be further explored in the following section on environmental rights (Section 2).

### **§3: Disaster (Disaster Risk Reduction) Law and Nuclear Disasters**

The past 20 years have seen a remarkable normative development in the field of international disaster law (IDL).<sup>1311</sup> This coincides with accelerated policymaking for the

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<sup>1308</sup> As analysed in the previous part (Part One), the 2007 ICRP recommendations notably state that any protective action shall ‘ensure an overall benefit in the broadest sense to society and thus not necessarily to each individual’. See ICRP, ‘The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.’ (n 28) 90.

<sup>1309</sup> *Băcilă v Roumania* (2010) App no. 19234/04 (ECtHR, 30 March 2010)

<sup>1310</sup> *Băcilă v Roumania* (cited above) para 71; Translation from the original text (French) by R. Hasegawa. Brackets added

<sup>1311</sup> Marie Aronsson-Storrier and Karen da Costa, ‘Regulating Disasters? The Role of International Law in Disaster Prevention and Management’ (2017) 26 *Disaster Prevention and Management* 502; Marlies Hesselman and Lottie Lane, ‘Disasters and Non-State Actors – Human Rights-Based Approaches’ (2017) 26 *Disaster Prevention and Management* 526.

protection of environmentally displaced persons, as analysed earlier. Since the turn of this century, the effects of climate change have intensified around the globe, prompting multiple and intensive international policy and legal initiatives to enforce protection frameworks for disasters at regional and international levels.<sup>1312</sup> Traditionally, the term “disaster” had been used to describe “natural disasters” but has evolved over the years to designate both “natural and human-made disasters”, differentiated from conflicts and generalised violence. For example, “disaster” is defined in the 1998 Tampere Convention as:<sup>1313</sup>

a serious disruption of the functioning of society, posing a significant, widespread threat to human life, health, property or the environment, whether caused by accident, nature or human activity, and whether developing suddenly or as the result of complex long-term processes<sup>1314</sup>

The UN International Law Commission defined it as ‘calamitous event or series of events resulting in widespread loss of life, great human suffering and distress, mass displacement, or large-scale material or environmental damage, thereby seriously disrupting the functioning of society’<sup>1315</sup>. According to these definitions, “disaster” comprises *inter alia* natural disasters (either caused by geophysical hazard or climate change), industrial accidents (e.g., chemical and nuclear plant accidents), and slow-onset environmental degradation (e.g., drought, desertification, ocean acidification, rising sea levels, etc). As such, the norms developed in the IDL will have important implications for nuclear disaster response and protection.

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<sup>1312</sup> Hesselman and Lane (n 1311).

<sup>1313</sup> Tampere Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations (adopted 18 June 1998, entered into force 8 January 2005) 2296 UNTS 5 (Tampere Convention)

<sup>1314</sup> Tampere Convention, Article 1(6)

<sup>1315</sup> ILC, ‘Draft Articles on the Protection of Persons in the Event of Disasters’ (n 1082) Art 3(a).

The IDL is still an emerging field of international law which aims to regulate state actions and protect persons in times of disasters.<sup>1316</sup> Traditionally, international norm-making for disaster management had evolved separately from humanitarian and human rights regimes within the UN. Under the framework of Disaster Risk Reduction (DRR), the UN Office for Disaster Risk Reduction (UNDRR), formally the UN International Strategy for Disaster Reduction (UNISDR)<sup>1317</sup>, has developed over the years international frameworks and soft-law instruments to better deal with disaster risks and reduce disaster impacts. Unlike the humanitarian and forced migration frameworks which aim to protect the rights of individuals in disasters, the DRR framework focuses on reinforcing the states' capacity to prepare for and mitigate disaster impacts and the protection of their citizens had long been considered a matter of domestic jurisdiction.

This began to change during the last decades when the intensive international policymaking to tackle the effects of climate change pushed the DRR framework and the forced migration framework to crossover the traditional divide and begin to converge in order to address the issue of protecting individuals from these effects. In this context, the humanitarian and forced migration framework began to address disaster protection in the context of natural and environmental disasters and the DRR framework started to address human rights protection in disaster management.

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<sup>1316</sup> The majority of normative texts in the field of IDL are non-binding. Some are them are legally binding but their scope is limited either in geography or in concerned sector. The 1998 the Tempere Convention applies only in the sector of disaster communication, while the 2000 the International Civil Defence Organization's Framework Convention on Civil Defence Assistance only deals with the activities of civil defence organisations in disasters. The most comprehensive binding instrument among the existing treaties is the 2005 ASEAN Agreement on Disaster Management and Emergency Response, but it is a regional instrument and applies only to ASEAN countries.

<sup>1317</sup> UNISDR took over the work of the UN initiative 'International Decade for Natural Disaster Reduction (1990-1999)'.

This paragraph thus examines the recent normative development in the DRR regime. After tracing the evolution of the DRR institutional and normative framework (A), it studies in detail one of the most recent and influential normative proposals made in the field of disaster law: the 2016 Draft Articles on the Protection of Persons in the Event of Disasters, proposed by the UN International Law Commission (ILC) (B). All these analyses will feed into the reflection of new protection norms for nuclear disaster victims at the end of the thesis.

### **A. The DRR Normative Development**

As mentioned earlier, international norms for disaster management have been developed on the international DRR platform led by the UNDRR, formerly known as UNISDR. Some of its major initiatives are the 1994 Yokohama Strategy for a Safer World,<sup>1318</sup> the Hyogo Framework for Action 2005-2015,<sup>1319</sup> and the Sendai Framework for Disaster Risk Reduction 2015-2030.<sup>1320</sup>

These DRR frameworks have been based on the principle of prevention, preparedness, and mitigation. While preparedness and mitigation are DRR specific concepts, prevention is the key principle also for human rights and environmental law frameworks.<sup>1321</sup> In the DRR framework, these pre-disaster measures are considered essential, more effective and cost-efficient than disaster response, in achieving its ultimate goal: reducing disaster damages and losses in lives, livelihoods and health.<sup>1322</sup> This indeed contrasts with humanitarian and forced

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<sup>1318</sup> UNIDNDR, 'Yokohama Strategy and Plan of Action for a Safer World: Guidelines for Natural Disaster Prevention, Preparedness and Mitigation' (UN International Decade for Natural Disaster Reduction 1994) The World Conference on Natural Disaster Reduction, Yokohama, Japan 23-27 May 1994.

<sup>1319</sup> UNISDR, 'Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters' (UN International Strategy for Disaster Reduction 2005) The World Conference on Disaster Reduction, Kobe, Hyogo, Japan 18-22 January 2005.

<sup>1320</sup> UNDRR (n 1196).

<sup>1321</sup> Marie Aronsson-Storrier, 'Exploring the Foundations: The Principles of Prevention, Mitigation, and Preparedness in International Law' in Katja LH Samuel, Kirsten Nakjavani Bookmiller and Marie Aronsson-Storrier (eds), *The Cambridge Handbook of Disaster Risk Reduction and International Law* (Cambridge University Press 2019).

<sup>1322</sup> UNIDNDR (n 1318) 'Yokohama Message' para 3; cited by Aronsson-Storrier (n 1321).

migration frameworks which tend to focus on the post-disaster protection: response and recovery. While the humanitarian framework aims at mitigating disaster effects on individuals, the DRR framework ultimately focuses on mitigating disaster effects on the state as a whole. So, the DRR had long been an institution-focused regime rather than a people-centred or rights-based regime.

This began to change entering the 21<sup>st</sup> century. It has seen an increasing convergence of these two frameworks where the DRR normative documents are making a connection between disaster management and human rights protection. Likewise, the humanitarian and forced migration framework started to produce normative documents on the protection of persons in natural disasters. Some demonstrative examples include the Sphere Project,<sup>1323</sup> the Inter-Agency Standing Committee (IASC)'s Operation Guidelines on the Protection of Person in Natural Disasters,<sup>1324</sup> the Sendai Framework for Disaster Risk Reduction 2015-2030, and the UN International Law Commission (ILC)'s Draft Articles on the Protection of Persons in the Event of Disasters.<sup>1325</sup> All of them adopt human rights principles in protecting disaster victims.

While the rights-based approach adopted in the Sphere Project and the IASC's Guidelines comes as no surprise,<sup>1326</sup> the last two documents – Sendai Framework and ILC Draft Articles – are symbolically significant. For example, the 2015 Sendai Framework, which follows up on the Hyogo Framework 2005-2015 and comes from the DRR platform of the UN

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<sup>1323</sup> The Sphere Project was initiated in 1997 by a group of NGOs (Médecins sans frontières, Save the Children, Oxfam, etc.) and the International Federation of Red Cross and Red Crescent Societies (IFRC) to develop a set of universal minimum standards to improve the quality of humanitarian response in situations of disasters and conflicts, which gave the Sphere Handbook. The latest edition of the Handbook, *Humanitarian Charter and Minimum Standards in Humanitarian Response*, can be consulted at <<https://spherestandards.org/handbook/editions/>>.

<sup>1324</sup> IASC, 'IASC Operational Guidelines on the Protection of Persons in Situations of Natural Disasters' (n 542).

<sup>1325</sup> ILC, 'Draft Articles on the Protection of Persons in the Event of Disasters' (n 1082).

<sup>1326</sup> These initiatives were made by international humanitarian platforms and agencies.

(UNDRR), states in its guiding principles that ‘[m]anaging the risk of disasters is aimed at protecting persons and their property, health, livelihoods and productive assets, as well as cultural and environmental assets, *while promoting and protecting all human rights, including the right to development*’.<sup>1327</sup> This marks a clear shift from the previous DRR frameworks, the Yokohama Strategy and the Hyogo Framework, where human rights were not mentioned at all in the text. Moreover, for the first time, the Sendai Framework expanded its scope to cover ‘environmental, technological and biological hazards and risks’ in addition to natural hazards.<sup>1328</sup> This means that nuclear accidents are now clearly included in the DRR framework, to which the Sendai Framework applies.

Notwithstanding, the most consequential of all is undoubtedly the Draft Articles on the Protection of Persons in the Event of Disasters, published by the UN International Law Commission in 2016. The implication of the Draft Article is significant because it has a potential to become a binding treaty one day,<sup>1329</sup> or at least an important normative instrument for disaster protection, in view of its mandate to encourage ‘the progressive development of international law and its codification’ given by the UN Charter.<sup>1330</sup> Although the scope of the current Draft Articles is primarily focused on natural disasters,<sup>1331</sup> it lays some ground rules of protection in the context of disasters which may be extended to man-made disasters such as nuclear accidents in the near future.

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<sup>1327</sup> UNDRR (n 1196) para 19. Emphasis added.

<sup>1328</sup> *ibid* para 15.

<sup>1329</sup> Aronsson-Storrier and da Costa (n 1311). But as the authors explained, the idea of making the Draft Articles a treaty has already been rejected by some Member States and thus its realisation is quite uncertain.

<sup>1330</sup> UN Charter, art 13(1)(a)

<sup>1331</sup> ILC, ‘Protection of Persons in the Event of Disasters: Memorandum by the Secretariat’ (UN International Law Commission 2007) UN Doc A/CN.4/590 (11 December 2007).

## B. ILC's Draft Articles on the Protection of Persons in the Event of Disasters

In 2007, the ILC decided to take up the topic 'the protection of persons in the event of disasters' in its work programme. The aim was to elaborate 'a set of provisions which would serve as a legal framework for the conduct of international disaster relief activities, clarifying the core legal principles and concepts and thereby creating a legal "space" in which such disaster relief work could take place on a secure footing'.<sup>1332</sup> For this purpose, the Commission appointed Mr. Eduardo Valencia-Ospina as Special Rapporteur in 2008, who compiled the 'Draft Articles on the Protection of Persons in the Event of Disasters' in 2016.<sup>1333</sup> The ILC then submitted the document to the General Assembly recommending the elaboration of a convention on the basis of such a document, but no firm commitment has been made by the Member States until today.

The purpose of the Draft Articles is stated as 'to facilitate the adequate and effective response to disasters, and reduction of the risk of disasters, so as to meet the essential needs of the persons concerned, *with full respect for their rights*' (Article 2). As such, the Draft Articles addresses both the DRR and humanitarian relief aspects of disaster management, linking them to human rights protection. This link is further cemented in Article 5 where human rights are given full weight, stating '[p]ersons affected by disasters are entitled to the respect for and protection of their human rights in accordance with international law'. By this, the Draft Articles put human rights protection at the heart of the instrument and firmly establish the continuous obligation of states over the protection of human rights both during and before the disaster.

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<sup>1332</sup> ILC, 'Report of the International Law Commission: Fifty-Eighth Session' (UN International Law Commission 2006) UN Doc A/61/10 Annex C Protection of persons in the event of disasters, para 24.

<sup>1333</sup> ILC, 'Draft Articles on the Protection of Persons in the Event of Disasters' (n 1082).



A similar idea has been also proposed by Walter Kälin in his 2009 report as the UN RSG on the Human Rights of IDPs, where he promoted the concept of “a cycle of protection” which consists of preparedness, prevention, mitigation, response and recovery in dealing with natural disasters.<sup>1334</sup> According to him, the state is responsible for protecting the rights of its population in all these phases of natural disasters.

In the Draft Articles (Article 5), the applicable human rights in the event of disasters are not specified. In the commentary, ILC explained that it was done so because they largely depended on the nature, the context, and the scale of each disaster.<sup>1335</sup> Instead, the Commission made specific reference to two non-binding texts – the IASC Operational Guidelines on the Protection of Persons in Situations of Natural Disasters<sup>1336</sup> and the Guiding Principles on Internal Displacement – as ‘best practices for the protection of human rights’ to help identify those rights.<sup>1337</sup> Also, by the expression ‘the respect for and protection of their human rights’, Article 5 recalls both the positive and negative obligations of the states in protecting individuals in the context of disasters.

The Draft Articles indeed represents the latest status of international protection norms for disaster victims, which in effect combines humanitarian, human rights, and DRR principles. In view of this, the victims of nuclear disasters should also be protected under these principles.

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<sup>1334</sup> Walter Kälin, ‘Report of the Representative of the Secretary-General on the Human Rights of Internally Displaced Persons, Walter Kälin: Addendum on Protection of Internally Displaced Persons in Situations of Natural Disasters’ (UNGA, 5 March 2009) UN Doc A/HRC/10/13/Add.1.

<sup>1335</sup> ILC, ‘Report of the International Law Commission: Sixty-Eighth Session’ (UN International Law Commission 2016) UN Doc A/71/10 31.

<sup>1336</sup> The Guideline divides the most relevant human rights in case of natural disasters into four groups. The first group comprises the rights related to life, security and physical integrity, and family ties while the second groups is composed of the rights to food, health, shelter, and education. The third group incorporates the rights to housing, land and property, and livelihoods and the fourth group is consisted of the rights to documentation, free movement, re-establishment of family ties, expression and opinion, and elections.

<sup>1337</sup> ILC, ‘Report of the International Law Commission: Sixty-Eighth Session’ (n 1335) 31.

## Section 2: International Environmental Law and Nuclear Disasters

In contrast to human rights law which is largely absent in the nuclear regime, environmental law is referred to, by nuclear law experts, as the law in a “growing symbiosis”<sup>1338</sup> and “*pollinisation contrôlée* (controlled pollination)”<sup>1339</sup> with nuclear law. The relationship between the two laws has also been more explored by legal scholars than the one between human rights law and nuclear law.<sup>1340</sup> Some jurists of environmental law argue that nuclear activities and their regulation regime are not adequately in conformity with, or sometimes in contradiction to, certain environmental principles – notably no harm rule, polluter pays principle, and state responsibility for transboundary damage.<sup>1341</sup> Others (mainly nuclear law experts) point out certain commonalities of the legal branches, namely precautionary principle, polluter pays principle and prevention principle.<sup>1342</sup>

However, the reality is that many environmental instruments do not apply to nuclear activities, let alone military ones.<sup>1343</sup> In effect, the nuclear regime is composed of special legislations which largely derogate themselves from civil code (common law) or general environmental laws, conventions and regulations. As examined in Part One of the thesis, nuclear law is a tailor-made branch of law created first and foremost to enable the states to develop civil nuclear activities.

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<sup>1338</sup> Emmerechts (n 101).

<sup>1339</sup> Reyners (n 101) 149. The English translation of the word was done by the author of the article.

<sup>1340</sup> For example, see Reyners (n 101); Sam Emmerechts, ‘Droit de l’environnement et droit nucléaire: une symbiose croissante’ (2008) 2008 Bulletin de droit nucléaire 95; Nanda (n 102); Durand-Poudret (n 202).

<sup>1341</sup> See for example, Dyke (n 115); Currie (n 115); Nanda (n 102); Kiss, ‘State Responsibility and Liability for Nuclear Damage’ (n 115).

<sup>1342</sup> See for example, Reyners (n 101).

<sup>1343</sup> Emmerechts (n 101); Durand-Poudret (n 202).

For example, nuclear activities are explicitly excluded from the Convention on the Transboundary Effects of Industrial Accidents (Helsinki Convention hereafter)<sup>1344</sup> and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal<sup>1345</sup>.<sup>1346</sup> During the negotiation of the Basel Convention, nuclear countries opposed the inclusion of radioactive waste in the text and succeeded in excluding it from the scope ‘as a result of being radioactive’.<sup>1347</sup> To follow suit, the nuclear regime has developed its own set of international instruments – the Convention on Early Notification, the Convention on Nuclear Safety, and the Joint Convention –, the content of which is rather a skimmed version of the Helsinki and Basel Conventions. For example, the Helsinki Convention includes a provision on public access to information and participation in decision-making and mentions the rights of ‘natural or legal persons’,<sup>1348</sup> while the equivalent nuclear conventions (on Early Notification and Safety) do not prescribe any procedural rights, nor any rights in general other than those of the states.

Some of the rare treaties which do apply to nuclear activities include the 1972 London Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter (London Convention)<sup>1349</sup> and the 1996 London Protocol<sup>1350</sup>, the 1974 Convention for the Prevention of Marine Pollution from Land-Based Sources<sup>1351</sup>, the 1982 UN Convention on the

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<sup>1344</sup> The Convention on the Transboundary Effects of Industrial Accidents (adopted 17 March 1992, entry into force 19 April 2000) 2105 UNTS 457 (Helsinki Convention)

<sup>1345</sup> Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (adopted 22 March 1989, entry into force 5 May 1992) 1673 UNTS 57

<sup>1346</sup> Durand-Poudret (n 202).

<sup>1347</sup> Basel Convention (cited above), Article 1(3). See Reyners (n 101).

<sup>1348</sup> Helsinki Convention (cited above), article 9

<sup>1349</sup> Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter (adopted 19 December 1972, entered into force 30 August 1975) 1046 UNTS 120 (London Convention)

<sup>1350</sup> 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (7 November 1996, entered into force 24 March 2006) 36 ILM 1 (London Protocol)

<sup>1351</sup> Convention for the Prevention of Marine Pollution from Land-Based Sources (adopted 4 June 1974, entered into force 6 May 1978) 1546 UNTS 103. It was ultimately replaced by Convention for the Protection of the Marine Environment of the North East Atlantic (adopted 22 September 1992, entered into force 25 March 1998) 2354 UNTS 67 (the OSPAR Convention)

Law of the Sea (UNCLOS)<sup>1352</sup>, the 1991 Espoo Convention on Environmental Impact Assessment in a Trans-boundary Context<sup>1353</sup>, the 1998 Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention)<sup>1354</sup>, and the 2003 Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context (Kiev Protocol)<sup>1355</sup>.

However, the effectiveness of these conventions is often marred by scope limitations. For example, the London Convention and its Protocol are largely ineffective in the event of land-based nuclear accidents since they only prohibit a deliberate ocean dumping, not an accidental release, ‘from vessels, aircraft, platforms or other man-made structures at sea’ excluding land structures.<sup>1356</sup> The provisions of UNCLOS do apply to land-based sources but they do not clearly prohibit the release of waste, nor impose quantifiable limits, relying solely on the good faith of State parties to control such release ‘to the fullest extent possible’.<sup>1357</sup> The effect of other conventions is also limited by the geographical scope as they mainly apply to European countries and the region only.

For example, 70% of the Fukushima atmospheric release (caesium-137) fell on the Pacific ocean in addition to direct release in liquid, which totaled 13-16 PBq (petabecquerel= $10^{15}$ Bq), reaching the high seas as well as the territorial waters of other

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<sup>1352</sup> United Nations Convention on the Law of the Sea (10 December 1982, entered into force 16 November 1994) 1833 UNTS 397 (UNCLOS)

<sup>1353</sup> Convention on Environmental Impact Assessment in a Transboundary Context (adopted 25 February 1991, entered into force 10 September 1997) 1989 UNTS 309 (Espoo Convention)

<sup>1354</sup> Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention) (adopted 25 June 1998, entered into force 30 October 2001) 2161 UNTS 447

<sup>1355</sup> Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context (adopted 21 May 2003, entered into force 11 July 2010) 2685 UNTS 140 (Kiev Protocol)

<sup>1356</sup> London Convention (cited above), Art III.1(a); London Protocol (cited above), Art 1.4.1.

<sup>1357</sup> UNCLOS (cited above), Art 207.5; See Darian Ghorbi, ‘There’s Something in the Water: The Inadequacy of International Anti-Dumping Laws as Applied to the Fukushima Daiichi Radioactive Water Discharge’ (2012) 27 American University International Law Review 473, 499.

countries such as Russia and the US.<sup>1358</sup> In addition, the Japanese government recently decided to release 1.25 million tons of “treated” wastewater contaminated by the accident into the Pacific Ocean from April 2023.<sup>1359</sup> Against these accidental and intentional radiation releases into the sea, both the London Convention and UNCLOS, to which Japan is party, are toothless.<sup>1360</sup>

For Rodriguez-Rivera, the civil use of nuclear energy also falls in a gap of international environmental law.<sup>1361</sup> This gap particularly lies where human life and health are threatened by environmental contamination caused by an act or omission attributable to a state.<sup>1362</sup> Typically, nuclear accident victims find themselves in such a situation. Some scholars argue that the concept of human right to a safe and healthy environment, where human rights law comes to intersect with environmental law, plays a crucial role in addressing this gap.<sup>1363</sup>

The human right to environment – more broadly, environmental rights – is a concept which emerged in the 1960s and 1970s when the environmental movement was at its height in the US and other Western countries. However, it is the Stockholm Declaration of 1972, the outcome document of the UN Conference on the Human Environment, which first incorporated the concept in the text, albeit non-binding in nature, galvanising the attention of the international community. According to Michel Prieur, the protection of persons in disasters concerns both

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<sup>1358</sup> Takuya Kobayashi, ‘福島第一原発事故に伴う海洋汚染に関する研究 (The Study on Marine Pollution Related to the Fukushima Daiichi Nuclear Accident)’ (Japan Atomic Energy Agency 2017) Presentation at the 8th Fukushima Radiation Measure Forum, held on 19 July 2017.

<sup>1359</sup> Normile (n 696). As reported in the article, despite the filtering process, the wastewater contains a large quantity of tritium in addition to smaller quantities of other radionuclides such as ruthenium, cobalt, strontium, and plutonium.

<sup>1360</sup> Ghorbi (n 1357); cited by Durand-Poudret (n 202).

<sup>1361</sup> Rodriguez-Rivera, ‘The Human Right to Environment and the Peaceful Use of Nuclear Energy’ (n 103).

<sup>1362</sup> Rodriguez-Rivera, ‘Is the Human Right to Environment Recognized under International Law - It Depends on the Source’ (n 103) 9.

<sup>1363</sup> Dinah Shelton, ‘Human Rights and the Environment: What Specific Environmental Rights Have Been Recognised?’ (2006) 35(1) *Denver Journal of International Law and Policy* 129; Rodriguez-Rivera (n 108).

classic human rights as well as *the new human rights to environment*.<sup>1364</sup> In his view, ‘a new global recognition of a human right to a safe environment should undoubtedly accompany a new universal recognition of the human rights of environmental victims’.<sup>1365</sup>

Under the above hypothesis of Rodriguez-Rivera and Prieur, this section first explores the notion of this new human right to environment (§1), especially as to how the recognition of such right would reinforce the protection of persons affected by nuclear disasters. Secondly, it explores environmental law principles applicable to the nuclear regime with a view to identify possible gaps and discrepancies (§2.) This section aims to understand how the nuclear framework stands at odds with certain environmental law principles and environmental rights, which would help this thesis to design the protection norms for nuclear victims in conformity with environmental law.

## **§1 “The Right to Environment” in Protecting Victims of Nuclear Disasters**

The concept of ‘human right to a safe and healthy environment’ first appeared in the text of an international instrument at the occasion of the UN Conference on the Human Environment, held in Stockholm in 1972. Its outcome document, the Stockholm Declaration on the Human Environment<sup>1366</sup>, affirmed that humans had ‘the fundamental right to freedom, equality and *adequate conditions of life in an environment of a quality that permits a life of dignity and well-being*’ (Principle 1).<sup>1367</sup> This is the first time where the connection between

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<sup>1364</sup> Michel Prieur, ‘Draft Convention on the International Status of Environmentally Displaced Persons’ (International Centre of Comparative Environmental Law 2016) Report submitted to Executive Committee of the Warsaw International Mechanism for Loss and Damage, UNFCCC <[https://unfccc.int/files/adaptation/groups\\_committees/loss\\_and\\_damage\\_executive\\_committee/application/pdf/prieur-convention\\_on\\_the\\_international\\_status\\_of\\_environmentally.pdf](https://unfccc.int/files/adaptation/groups_committees/loss_and_damage_executive_committee/application/pdf/prieur-convention_on_the_international_status_of_environmentally.pdf)> accessed 20 May 2019. Emphases added

<sup>1365</sup> *ibid* 10.

<sup>1366</sup> UN, ‘Report of the United Nations Conference on the Human Development’ (UN 1973) UN doc A/Conf.48/14/Rev.1.

<sup>1367</sup> Emphasis added

human rights and environmental protection was recognised in a non-binding but global instrument, thus marking it ‘a matter of considerable jurisprudence’<sup>1368</sup> in the decades to follow.

The human right to a safe environment is part of so-called “environmental rights”. It is also called the third generation of human rights, which emerged following the first and second generations of rights: the civil and political rights and the economic, social and cultural rights respectively.<sup>1369</sup> Environmental rights are generally twofold: substantive and procedural.<sup>1370</sup> The first group of rights includes the right to a safe and healthy environment and those substantive human rights that are most likely threatened by environmental degradation, namely the rights to life, health, an adequate standard of living, privacy and family life, property, and indigenous rights. The latter group of rights consists of procedural human rights that are applicable to environmental protection or deemed necessary for the enjoyment of the substantive rights, such as the rights to information, participation in decision-making, and remedy.

Since the Stockholm Declaration, four regional human rights instruments have recognised a substantive human right to environment: the African Charter on Human and Peoples’ Rights<sup>1371</sup>, the Aarhus Convention, the Additional Protocol to the American Convention on Human Rights in the Area of Economic, Social and Cultural Rights (Protocol of

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<sup>1368</sup> A Kiss and D Shelton, *Guide to International Environmental Law* (BRILL 2007) 36.

<sup>1369</sup> The concept of three generations of human rights was articulated by Karel Vasak in 1977. See Karel Vasak, ‘A 30-Year Struggle: The Sustained Efforts to Give Force of Law to the Universal Declaration of Human Rights’ (1977) 11 *The UNESCO Courier: a window open on the world* 29; Stephen P Marks, ‘Emerging Human Rights: A New Generation for the 1980s Stoffer Lectures’ (1980) 33 *Rutgers Law Review* 435; cited by Rodriguez-Rivera, ‘Is the Human Right to Environment Recognized under International Law - It Depends on the Source’ (n 103). According to Stephen Marks, the third-generation of rights involves the following six areas: environment, development, peace, the common heritage, communication, and humanitarian assistance.

<sup>1370</sup> Rodriguez-Rivera proposes a different term, *the expansive right to environment*, to describe “environmental rights”. Such right is composed of the right to environment (substantive component), right of environment (intrinsic rights of the environment itself), and environmental rights (procedural component). See Rodriguez-Rivera, ‘Is the Human Right to Environment Recognized under International Law - It Depends on the Source’ (n 103).

<sup>1371</sup> African Charter on Human and Peoples’ Rights (adopted 27 June 1981, entered into force 21 October 1986) 1529 UNTS 217

San Salvador)<sup>1372</sup> and the Arab Charter on Human Rights<sup>1373</sup>. However, none of the global human rights instruments, namely the ICCPR and ICESCR, nor the ECHR, has incorporated such a right into their provisions via amendments or adoption of protocols.

As for the UN human rights institutions, the UN Commission on Human Rights endorsed the first mandate of Special Rapporteur on Human Rights and the Environment in 1990, which was initially commissioned by the UN Sub-Commission on Prevention of Discrimination and Protection of Minorities. The Rapporteur, Mrs. Fatma Zohra Ksentini, presented the Draft Principles on Human Rights and the Environment in her 1994 final report to the UN General Assembly for adoption. The Draft Principles notably affirmed that ‘(a)ll persons have the right to a secure, healthy and ecologically sound environment’ as well as ‘the right to freedom from pollution, environmental degradation and activities that adversely affect the environment, threaten life, health, livelihood, well-being or sustainable development within, across or outside national boundaries’.<sup>1374</sup>

The second mandate was created by the Human Rights Council in 2012 appointing Prof. John Knox as the mandate-holder. In his 2018 final report, the Special Rapporteur proposed a set of sixteen “Framework Principles” which set out basic obligations of States under human rights law related to the enjoyment of a safe, clean, healthy and sustainable

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<sup>1372</sup> Additional Protocol to the American Convention on Human Rights in the Area of Economic, Social and Cultural Rights (Protocol of San Salvador) (adopted 17 November 1988, entered into force 16 November 1999) OAS Treaty Series No 69 (1988) reprinted in Basic Documents Pertaining to Human Rights in the Inter-American System OEA/Ser L V/II.82 Doc 6 Rev 1 at 67 (1992)

<sup>1373</sup> League of Arab States and OHCHR, the Arab Charter on Human Rights (adopted 22 May 2004, entered into force in 2008) (Article 38). The English translation of the Charter is found at <<https://digitallibrary.un.org/record/551368?ln=en>>, consulted 20 March 2022. Some provisions of the Charter are criticised as being inconsistent with international human rights norms. See the comment made by the then UN High Commissioner for Human Rights, Louise Arbour, in 2008 (<https://news.un.org/en/story/2008/01/247292-arab-rights-charter-deviates-international-standards-says-un-official>). She expressed serious concerns over, *inter alia*, the application of the death penalty for children, the treatment of women and non-citizens, and the equating of Zionism with racism.

<sup>1374</sup> UNCHR, ‘Human Rights and the Environment: Final Report Prepared by Mrs. Fatma Zohra Ksentini, Special Rapporteur’ (UN Commission on Human Rights, 6 July 1994) UN Doc E/CN.4/Sub.2/1994/9 Annex I (Principle 2, 5).



environment, recommending the UN to adopt a resolution that expressly recognises ‘the right to a safe, clean, healthy and sustainable environment’.<sup>1375</sup> Nearly 30 years from the first SP’s report and 50 years from the Stockholm Declaration, the UN General Assembly adopted a resolution (76/300) in August 2022, clearly recognising this right and urging States, the international community, business, and other stakeholders to step up efforts to ensure a clean, healthy and sustainable environment for all.<sup>1376</sup> The Human Right Council had adopted a similar resolution a year earlier.<sup>1377</sup>

The inextricable link between environment protection and human rights was also affirmed by one of the ICJ judges in the case of *Gabčíkovo-Nagymaros Project*<sup>1378</sup> in 1997. In his separate opinion, the Vice-President of the Court, Judge Christopher Weeramantry, explicitly recognised a human right to environmental protection stating that the ‘protection of the environment is likewise a vital part of contemporary human rights doctrine, for it is a *sine qua non* for numerous human rights such as the right to health and the right to life itself’.<sup>1379</sup> In other words, the protection of the environment is indispensable for human survival and the enjoyment of basic human rights. This was also corroborated, though without directly referring to human rights, by the 1996 ICJ advisory opinion on the legality of the threat or use of nuclear weapons, which described the environment as ‘not an abstraction but represents the living space, the quality of life and the very health of human beings, including generations unborn’.<sup>1380</sup>

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<sup>1375</sup> UNHRC, ‘Report of the Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment’ (Human Rights Council 2018) UN Doc A/HRC/37/59 (24 January 2018) para 14.

<sup>1376</sup> UNGA, ‘Res 76/300 The Human Right to a Clean, Healthy and Sustainable Environment’ (n 121).

<sup>1377</sup> UNHRC, ‘Resolution Adopted by the Human Rights Council on 8 October 2021’ (n 122). The four abstaining countries are China, India, Japan and Russian Federation.

<sup>1378</sup> *Gabčíkovo-Nagymaros Project (Hungary v. Slovakia)* (Judgment) [1997] ICJ Rep 1997, 7

<sup>1379</sup> *ibid* 90-91 (Separate Opinion of Judge Weeramantry)

<sup>1380</sup> *Legality of the Threat or Use of Nuclear Weapons* (cited above), para 29

However, the most remarkable development of environmental rights is seen at the national level. Currently, 110 constitutions in the world include the right to a safe, healthy, ecologically-balanced (or similarly described) environment and 126 countries are part of regional treaties that recognise this right.<sup>1381</sup> The first country to have done it is Portugal.<sup>1382</sup> The Constitution adopted in 1976 following the peaceful revolution expressly recognised the right by stipulating that ‘(e)veryone shall possess the right to a healthy and ecologically balanced human living environment and the duty to defend it’ (art 66).<sup>1383</sup> The move has since been followed by other European countries. France amended its Constitution (the Preamble of the 1958 Constitution) in 2005 to include the Charter for the Environment.<sup>1384</sup> Article 1 of the Charter stipulates that ‘(e)veryone has the right to live in a balanced environment which shows due respect for health’.<sup>1385</sup> This right was recently reaffirmed by the decision of *Conseil d’Etat*<sup>1386</sup> as one of fundamental freedoms guaranteed by the Constitution.<sup>1387</sup> This decision indeed places the right on equal terms with other key civil and political rights such as the freedom of expression, the right to property, the right to respect for life, etc, which grant access to the emergency interim relief procedure in case of a threat of an infringement.<sup>1388</sup>

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<sup>1381</sup> UNHRC, ‘Right to a Healthy Environment: Good Practices; Report of the Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment’ (n 118).

<sup>1382</sup> Stephen J Turner, ‘Introduction: A Brief History of Environmental Rights and the Development of Standards’ in Stephen J Turner and others (eds), *Environmental Rights: the Development of Standards* (Cambridge University Press 2019).

<sup>1383</sup> The Constitution of the Republic of Portugal of 1976 as amended. Translation by constituteproject.org <<https://www.constituteproject.org/?lang=en>> consulted 14 February 2022

<sup>1384</sup> Loi constitutionnelle 2005–205, 1 March 2005 (Loi constitutionnelle relative à la Charte de l’environnement (1)), JORF 2 March 2005, 3697

<sup>1385</sup> La Charte de l’environnement de 2004 (cited above) art 1

<sup>1386</sup> The *Conseil d’Etat* is the highest jurisdiction of administrative courts as well as the legal advisor to the executive branch in France.

<sup>1387</sup> CE 2e et 7e ch.-réunies, 20 Sep 2022, n° 451129 ; The list of « fundamental freedom » recognised by the *Conseil d’Etat* in case laws is found at <https://www.conseil-etat.fr/actualites/vivre-dans-un-environnement-equilibre-et-respectueux-de-la-sante-reconnu-liberte-fondamentale>, consulted 21 October 2022

<sup>1388</sup> In cases where an administrative decision could seriously infringe a fundamental freedom of a citizen, guaranteed by the Constitution, in an urgent manner, s/he may file a request for interim relief (*référé liberté*) to administrative courts. The interim relief judge (*le juge des référés*) can order provisional and rapid measures to safeguard the rights and freedoms of citizens until the final judgement on the complaint will be issued by the courts.

One of the most advanced provisions can be found in the Constitution of Costa Rica which proclaims that ‘(e)very person has the right to a healthy and ecologically balanced environment, being therefore entitled to denounce any acts that may infringe the said right and claim redress for the damage caused’ (art 50).<sup>1389</sup> Another example is the Ecuadorian Constitution which included and recognised the existence of the “right of nature” (art 71-72) in 2008.<sup>1390</sup> These moves have since been followed by Bolivia and New Zealand.<sup>1391</sup>

Despite these legal developments at the national level, the recognition of a human right to environment under international law is still a matter of scholarly debates.<sup>1392</sup> Some legal experts particularly point to its lack of positive law evidence and supportive state practices.<sup>1393</sup> The main argument lies in the fact that the right has been incorporated almost exclusively in national constitutions, a few regional treaties, and soft-law instruments: none in a single international binding instrument. Moreover, current state practices also do not seem to reflect the codification of such right in their domestic laws and constitutions.<sup>1394</sup> As for some jurists, ‘[c]onstitutions with human rights provisions that are little more than window-dressing can hardly be cited as significant evidence of practice or “general principles” of law’.<sup>1395</sup>

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<sup>1389</sup> The Constitution of Costa Rica. Translation by UNHRC, ‘Report of the Independent Expert on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment, John H. Knox; Addendum: Mission to Costa Rica’ (Human Rights Council 2014) UN Doc A/HRC/25/53/Add.1 (8 April 2014).

<sup>1390</sup> The Constitution of the Republic of Ecuador of 2008

<sup>1391</sup> Turner (n 1382).

<sup>1392</sup> *ibid*; Rodriguez-Rivera, ‘Is the Human Right to Environment Recognized under International Law - It Depends on the Source’ (n 103); Donald K Anton and Dinah L Shelton, *Environmental Protection and Human Rights* (Cambridge University Press 2011).

<sup>1393</sup> See for example, Günther Handl, ‘Human Rights and Protection of the Environment: A Mildly Revisionist View’ in Antonio Augusto Cançado Trindade (ed), *Human Rights, Sustainable Development and the Environment* (Instituto Interamericano de Derechos Humanos San José de Costa Rica 1995).

<sup>1394</sup> *ibid*.

<sup>1395</sup> Oscar Schachter, *International Law in Theory and Practice: General Course in Public International Law* (Brill 2008) 336; Handl (n 1393).

Indeed, states seem to be rather reluctant in expressly affirming the new substantive right under international law.<sup>1396</sup> This was most evidenced at the UN Conference on Environment and Development held in Rio de Janeiro in 1992, the follow-up meeting of the Stockholm Conference. Contrary to the Stockholm Declaration, its outcome document (the Rio Declaration) made no reference to human rights, downplaying the existence of a human right to environment, and instead proclaimed that the procedural content of environmental rights handles environmental issues best (Principle 10).<sup>1397</sup> As such, the advancement of environmental rights under international law has been primarily focused on procedural rights which are now recognised in many environmental agreements and jurisprudence.<sup>1398</sup>

The most recent recognition of the right by the UN Human Rights Council also demonstrated this reluctance among certain nations.<sup>1399</sup> The resolution which specifically recognised the right to a safe environment was abstained at the vote by four nuclear powers including Russia and Japan who have experienced major nuclear accidents in the past.

The reality is that none of the UN-supervised human rights treaties, nor ECHR, today mentions or has since been amended to include the right to a safe and healthy environment. Instead, UN treaty bodies such as the CCPR and the CESCR have been “greening” the existing provisions to address the issues of environmental rights.<sup>1400</sup> The ECtHR has also adopted a

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<sup>1396</sup> Sumudu Atapattu, ‘Environmental Rights and International Human Rights Covenants: What Standards Are Relevant?’ in Dinah L Shelton and others (eds), *Environmental Rights: The Development of Standards* (Cambridge University Press 2019); Shelton, ‘Human Rights and the Environment: What Specific Environmental Rights Have Been Recognised?’ (n 1399).

<sup>1397</sup> UNGA, ‘Report of the United Nations Conference on Environment and Development: Annex I Rio Declaration on Environment and Development’ (n 108).

<sup>1398</sup> Dinah Shelton, ‘Developing Substantive Environmental Rights’ (2010) 1 *Journal of Human Rights and the Environment* 89. Shelton provides examples including the Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment (Lugano 21 June 1993) Art 13-16; North-American Agreement on Environmental Co-operation (13 September 1993) Art 2(1)(a); International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa (Paris 17 June 1994), and Aarhus Convention (cited above).

<sup>1399</sup> UNHRC, ‘Resolution Adopted by the Human Rights Council on 8 October 2021’ (n 122).

<sup>1400</sup> Atapattu (n 1396).

similar approach. As shown earlier, the ECtHR has developed a set of solid jurisprudence in cases of environmental harm through reformulation of certain rights such as the right to life, the right to private and family life, and the right to property.<sup>1401</sup>

As specifically for the right to environment, the cases of *Băcilă* (2010) and *Di Sarno* (2012) are of particular importance.<sup>1402</sup> As shown earlier, in the *Băcilă* case, the Court pronounced that the State violated Article 8 (the right to privacy and family life) by failing to assume its positive duty to protect the individuals against environmental risks and recalled that the general interest, the economic interest of the city in this case, should not prevail over the right of those individuals ‘to enjoy a balanced and healthy environment’.<sup>1403</sup> In the case of *Di Sarno* where the pollution from a waste management plant caused health effects on the population, the Court similarly admitted the State’s infringement of Article 8 by stating that the State had a positive obligation ‘to take reasonable and adequate steps to protect the right of the people concerned to respect for their homes and their private life and, more generally, *to live in a safe and healthy environment*’.<sup>1404</sup> As the ECtHR is regarded as one of the most, if not the most, developed of the regional human rights systems, this jurisprudence plays an influential role in creating international norms related to substantive environmental rights.<sup>1405</sup>

Keeping in mind the above ambivalent status of the right, the thesis examines both the challenges (A) and advantages (B) of applying the right in the case of nuclear disasters below.

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<sup>1401</sup> For example, *Lopez Ostra* (1994), *Öneryildiz* (2004) and *Budayeva* (2008) as cited above.

<sup>1402</sup> *Băcilă v Roumania* App no. 19234/04 (ECtHR, 30 March 2010) and *Di Sarno and others v Italy* App no 30765/08 (ECtHR, 10 January 2012)

<sup>1403</sup> *Băcilă v Roumania*, para 70-71

<sup>1404</sup> *Di Sarno and others v Italy*, para 113

<sup>1405</sup> Turner (n 1382).

## A. Challenges of Applying the Right in Nuclear Disasters

In addition to the political unwillingness of some major powers, a substantive environmental right – the right to a safe and healthy environment – is subject to some critiques from international law scholars. From the perspective of applying the right for the protection of nuclear victims, the thesis tackles two of these critiques which concern the practical aspect of the right: definitional ambiguity (1) and redundancy (2). In addition, it addresses the issue of proportionality principle which would modulate the scope of this right in its implementation (3).

### 1. Definitional Ambiguity

The human right to environment is said to suffer from definitional ambiguity. The quality of environment to which humans are entitled under the right is often described as “safe”, “healthy”, “adequate”, “decent”, “clean”, “satisfactory”, “ecologically-balanced”, etc.<sup>1406</sup> But what degree of environmental state is really “safe” or “satisfactory”? How “safe” is safe enough? Who decides it? And what if there is a scientific controversy to the “safety” standards? This was exactly the problem dealing with radiation risk after a severe nuclear accident in Fukushima. The definition of the right to environment ultimately requires the adoption of environmental standards developed through scientific research and stakeholder negotiation by regulatory bodies.<sup>1407</sup> However, as Günther Handl fairly suggested, the development of such norms has always been shaped by ‘a constant re-ordering of socio-economic priorities’, subject to accommodating, adjusting, and the balancing-of-interests test.<sup>1408</sup> This is quite true with the

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<sup>1406</sup> Michael R Anderson, ‘Human Rights Approaches to Environmental Protection: An Overview’ in Michael R Anderson and Alan Boyle (eds), *Human rights approaches to environmental protection* (New ed, Clarendon Press 1998).

<sup>1407</sup> Shelton, ‘Human Rights and the Environment: What Specific Environmental Rights Have Been Recognised?’ (n 1399).

<sup>1408</sup> Handl (n 1393).; Handl is a staunch critic who opposes the establishment of a right to environment in international law.

formulation of radiation norms that the thesis has examined in the last Part. Just like radiation protection standards, the definition of the scope of such right will always be ‘susceptible to restrictions for the sake of other, socio-economic objectives, such as ensuring continued “development” or “saving jobs”’.<sup>1409</sup> Indeed, the radiation standard fixed by the Japanese government following the Fukushima accident was the very product of a balancing exercise where the dose level was raised 20 times the public dose limit in order to accommodate local economic interests, territorial integrity, and political priorities as regards national security and nuclear energy. According to Handl’s view, this inherent instability or relativity of environmental standard-setting makes it impossible for the right in question to have a universal substantive content and to become an inalienable human right.<sup>1410</sup>

To this critique, Dinah Shelton retorted that the right cannot be established since being susceptible to restrictions imposed by other socio-economic interests is like establishing ‘the conclusion as a criterion’.<sup>1411</sup> In her view, non-recognition of the right would precisely result in environmental protection being balanced against other socio-economic interests, not the other way around. Moreover, the problem of relativity or ambiguity is not new to human rights. It exists in other well-established human rights such as the right to health, an adequate standard of living, and education.<sup>1412</sup> For these rights, international human rights tribunals have developed their interpretations over the years, providing more precise contents. Alexandre Kiss and Dinah Shelton contend that ‘in the public conscience of a given society, these concepts can

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<sup>1409</sup> *ibid* 122.

<sup>1410</sup> Handl (n 1393).

<sup>1411</sup> Dinah Shelton, ‘What Happened in Rio to Human Rights?’ (1992) 3 *Yearbook of International Environmental Law* 75, 91.

<sup>1412</sup> Shelton, ‘What Happened in Rio to Human Rights?’ (n 1411); Rodriguez-Rivera, ‘Is the Human Right to Environment Recognized under International Law - It Depends on the Source’ (n 103).

have sufficient precision to permit a judge or administrator to apply them' and 'give meaning in a concrete social and historical context'.<sup>1413</sup>

Furthermore, judges can also arrive at substantive minima through reference to *independent* environmental findings and regulations since human rights instruments are generally not designed to specify quality standards within their provisions.<sup>1414</sup> This has already been done, for example, in the case of the right to an adequate standard of living and to social security.<sup>1415</sup> Indeed, independent scientific findings and stakeholder participation in establishing safety standards are totally lacking in radiation protection norms. These two elements are the key to making the right to environment effective in preventing serious environmental harm for the population, which shall be applied in the context of nuclear post-accident situations.

## 2. Problem of Redundancy with Environmental Law

The second practical problem of the right in question is redundancy with international environmental law. Alan Boyle, for example, asserts that such a right would add little to what already exists in international environmental law.<sup>1416</sup> Today environmental law covers almost all aspects of environmental protection in a manner that limits the reserved domain of state sovereignty, just as human rights law. It would thus at best keep the status quo and at worst

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<sup>1413</sup> Alexandre Charles Kiss and Dinah Shelton, *International Environmental Law* (Third edition, Brill 2004) 23; cited by Rodriguez-Rivera, 'The Human Right to Environment and the Peaceful Use of Nuclear Energy' (n 103).

<sup>1414</sup> Shelton, 'Human Rights and the Environment: What Specific Environmental Rights Have Been Recognised?' (n 1399).

<sup>1415</sup> *ibid.*; Shelton gave some examples of instruments such as the European Social Charter and Conventions and Recommendations of the International Labour Organisation.

<sup>1416</sup> Alan Boyle, 'The Role of International Human Rights Law in the Protection of the Environment' in Michael R Anderson and Alan Boyle (eds), *Human rights approaches to environmental protection* (New ed, Clarendon Press 1998).



divert attention from reinforcing already existing environmental instruments by establishing a robust global environmental review mechanism.<sup>1417</sup>

To this, Rodriguez-Rivera provides an effective counter-argument, pointing out that there indeed exists a gap in international environmental law where a citizen's life or health is jeopardised or threatened by environmental hazards resulting from an action or an inaction of a state.<sup>1418</sup> As analysed earlier, the case of nuclear disaster victims typically fall in this gap, all the more so since nuclear activities are often excluded from regular environmental laws and regulations. In addition, procedural rights that have already been well established in the environmental regime are not sufficient to fill that gap.<sup>1419</sup> Without the establishment of the substantive right to environment, environmental instruments with procedural rights alone would ultimately be ineffective in protecting individuals from environmental harm since, as is often the case with environmental protection, short-term economic interests and scientific uncertainty would often influence the decision-making even with the participation of the public.<sup>1420</sup>

This was well demonstrated by the case of the Fukushima nuclear accident. The procedural rights of victims – access to information, public participation, and access to justice – were given some attention, albeit very patchy in implementation, by the Japanese authorities during the post-accident management. Despite that, the authorities pushed through policies such as the 20 mSv/year reference dose and the promotion of evacuees' return to contaminated territories. Hence, the establishment of the right to a safe environment, in other words, setting

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<sup>1417</sup> Handl (n 1393).

<sup>1418</sup> Rodriguez-Rivera, 'Is the Human Right to Environment Recognized under International Law - It Depends on the Source' (n 103); Rodriguez-Rivera, 'The Human Right to Environment and the Peaceful Use of Nuclear Energy' (n 103).

<sup>1419</sup> Shelton, 'Developing Substantive Environmental Rights' (n 1398); Marc Pallemmaerts, 'The Human Rights to a Healthy Environment as a Substantive Right' in Maguelonne Déjeant-Pons and Marc Pallemmaerts (eds), *Human rights and the environment* (Council of Europe Publishing 2002); Rodriguez-Rivera, 'Is the Human Right to Environment Recognized under International Law - It Depends on the Source' (n 103).

<sup>1420</sup> Shelton, 'Developing Substantive Environmental Rights' (n 1398).

the minimum standard of environmental conditions ‘which do not adversely affect human health’<sup>1421</sup> and ‘still allows for the realization of a life of dignity and well-being’<sup>1422</sup>, will be indispensable for ensuring the protection of individuals after radiation disasters. And such “minimum standard” shall be determined, as argued earlier, through reference to independent or alternative scientific opinions and meaningful public participation in the decision-making process.

### 3. Principle of Proportionality

Finally, the protection of such a right would be subject to the principle of proportionality, or ‘fair balance’ test between the general interest and individual interests, as other human rights protection. As shown in the ECtHR case-laws above, the state is given a “margin of appreciation” in the balancing exercise. In the case of nuclear disasters, this margin of appreciation entrusted to respective states could seriously compromise the right of individuals to a safe environment. This is because the radiation protection regime is founded upon “a utilitarian ethic indifferent to individual rights”,<sup>1423</sup> which systematically give precedence to the collective interests (often economic or state interests) over individual rights in policymaking related to safety and protection.

Against this, the case laws of the ECtHR have shown that the “margin of appreciation” and “fair balance” have certain limits in cases where the individual’s right to a safe and healthy environment is seriously at risk. As mentioned earlier, the case of *Băcilă* (2010) established that the general interest such as economic interest of the city should not prevail over the right of those individuals ‘to enjoy a balanced and healthy environment’.<sup>1424</sup> This decision has a

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<sup>1421</sup> *Pallemaerts* (n 1419) 20.

<sup>1422</sup> *Rodriguez-Rivera*, ‘The Human Right to Environment and the Peaceful Use of Nuclear Energy’ (n 103) 183.

<sup>1423</sup> Chris Miller, *Environmental Rights: Critical Perspectives* (Taylor & Francis Group 1998) 117.

<sup>1424</sup> *Băcilă v Roumania* (cited above) para 70-71

particularly important implication for the protection of individuals in future nuclear accidents in Europe.

## **B. Advantages of Applying the Right in Nuclear Disasters**

The advantages of establishing such right in general and in the context of nuclear disasters are three-fold: the advancement of both human rights and environmental protection (1), strengthening of the enforcement mechanism (2), broadening the scope of protection (3), and reinforcement of the health protection (4).

### **1. Mutual Advancement of Human Rights and Environment**

While some environmentalists and scholars criticise its anthropocentric nature, the recognition of the right to environment would certainly lead to the enforcement of both human rights and environmental protection. First, it reinforces the notion that humans are part of a global ecosystem and survival is dependent on environmental protection.<sup>1425</sup> Though the right to environment does not address all the environmental issues, it certainly provides a boost to the conservation of the environment since counting the environment as part of human rights protection would result in some of state environmental obligations being also supervised by human rights law enforcement mechanisms that are, in general, more developed than compliance mechanisms of international environmental law.<sup>1426</sup> Ultimately, the right to environment functions as a legal “safety net” to catch legitimate claims that have fallen through a crack of environmental regulations and other laws.<sup>1427</sup> Typically, nuclear disaster protection

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<sup>1425</sup> Shelton, ‘Human Rights and the Environment: What Specific Environmental Rights Have Been Recognised?’ (n 1399).

<sup>1426</sup> *ibid.*

<sup>1427</sup> Anderson (n 1406) 21–22; cited by Rodriguez-Rivera, ‘Is the Human Right to Environment Recognized under International Law - It Depends on the Source’ (n 103).

is a case in point where the rights of individuals risk being trampled by special executive decisions and laws which are often derogated from environmental regulations.

## 2. Strengthening of the Enforcement Mechanism

Secondly, human rights are said to have so-called “trumping” effects in our society, pre-empting other interests and preferences that a state acts upon purportedly for the sake of common good.<sup>1428</sup> Rights can thus function as limiting the political will of a democratic majority, as well as a dictatorial minority.<sup>1429</sup> By connecting the environment to human rights, the status of environmental concern will be elevated from ‘a mere policy choice that may be modified or discarded at will’ to the vital condition for human beings to live in dignity and well-being.<sup>1430</sup> On this point, Shelton particularly argues that ‘human rights law currently provides the only set of international legal procedures that can be invoked to seek redress for harm that is the consequence of an act or omission attributable to a state’.<sup>1431</sup> While incorporating such a right in national constitutions and international conventions does not guarantee that victims of environmental harm will always obtain adequate redress, it ‘certainly creates a situation in which not only must the right always be considered, but very good reasons will be needed for denying it [*sic*] effect’.<sup>1432</sup> This moral weight of human rights could also affect the utilitarian ethic of radiation protection if the right is firmly established. It has the potential to reinforce the legal argument for nuclear damage claims at international and national courts.

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<sup>1428</sup> Ronald Dworkin, *Taking Rights Seriously* (Harvard University Press 1977); cited by Shelton, ‘What Happened in Rio to Human Rights?’ (n 1411).

<sup>1429</sup> Dinah Shelton, ‘Environmental Rights’ in Philip Alston (ed), *Peoples’ Rights* (Oxford University Press 2001) 132.

<sup>1430</sup> Kiss and Shelton, *Guide to International Environmental Law* (n 1368) 238.

<sup>1431</sup> Shelton, ‘Human Rights and the Environment: What Specific Environmental Rights Have Been Recognised?’ (n 1399) 130.

<sup>1432</sup> JG Merrills, ‘Environmental Protection and Human Rights: Conceptual Aspects’ in Michael R Anderson and Alain E Boyle (eds), *Human rights approaches to environmental protection* (New ed, Clarendon Press 1998) 27.

### 3. Extension of the Scope of Protection

Finally, the extension of existing human rights provisions to cover the cases of environmental harm, so-called “greening” of existing provisions, has some limitation. As Bertrand G. Ramcharan suggested, the expansive formulation of the right to life would extend only to those ‘environmental hazards which involve direct risks of immediate loss of life if the hazard is not removed’.<sup>1433</sup> The same risk of limitation also exists for the right to health.<sup>1434</sup> This means that threats from long-term environmental hazards with latent health effects such as radiological contamination would not be properly addressed by the greening method of existing rights. The advantage of the new right is precisely that it extends both the scope and the temporality of protection that are currently afforded by human rights law. Notably, it adds the perspective of protecting not only present but future generations in an environment ecologically balanced and sustainable around the globe.<sup>1435</sup> This extending aspect of the right, both in scope and time, is crucial for the case of nuclear damage as its effect can linger over several decades and affect a vast area of land and sea involving dozens or more countries.

### 4. Reinforcement of the Health Protection

Apart from the right to a safe environment, human health is also said to be the most significant bridge between human rights and environmental protection, where the protection (or neglect) of health would lead to reinforcing (or weakening) of both areas of law.<sup>1436</sup> But in the international human rights regime, the right to health is classified as part of economic, social

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<sup>1433</sup> Bertrand G Ramcharan, ‘The Concept and Dimension of the Right to Life’ in Bertrand G Ramcharan (ed), *The Right to Life in International Law* (Martinus Nijhoff Publishers 1985) 7; cited by Rodriguez-Rivera, ‘Is the Human Right to Environment Recognized under International Law - It Depends on the Source’ (n 103).

<sup>1434</sup> Rodriguez-Rivera, ‘Is the Human Right to Environment Recognized under International Law - It Depends on the Source’ (n 103).

<sup>1435</sup> Shelton, ‘Environmental Rights’ (n 1429).

<sup>1436</sup> Shelton, ‘Human Rights and the Environment: What Specific Environmental Rights Have Been Recognised?’ (n 1399).

and cultural rights, so-called the second-generation rights, covered by the International Covenant on Economic, Social, and Cultural Rights (ICESCR). The ICESCR is often regarded as more of an aspirational than coercive instrument where states are demanded to ‘progressively realize’ these rights according to their resources and capabilities.<sup>1437</sup> In contrast, its twin convention, the International Covenant on Civil and Political Rights (ICCPR), so-called the first-generation rights, is considered justiciable and absolute where States are required ‘to respect and to ensure’ these rights.

In the European context, health is also treated as a second-class right. First, the right to health is not included in the ECHR as the Convention essentially deals with civil and political rights. Instead, the protection of health is covered by the EU treaties. Under the EU Charter of Fundamental Rights (CFR),<sup>1438</sup> health protection is treated in the same manner as environmental and consumer protection, so-called “poor parents (*les parents pauvres*)” of the Charter.<sup>1439</sup> The Article 35 (Health care) indeed does not use the term “the right” and simply states that ‘[a] high level of human health protection shall be ensured in the definition and implementation of all Union policies and activities’. By observing that health, environment and consumer protection are drafted differently compared to other provisions in the Charter, Alexandre Kiss concluded that health and environment are in fact not treated as *the rights* of individuals but simply as *the policies* of the Union.<sup>1440</sup> As such, under the CFR, the right to health and the right to environment are rather recognised as procedural rights, not substantive rights.

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<sup>1437</sup> Theodor Meron, ‘On a Hierarchy of International Human Rights’ (1986) 80 *American Journal of International Law* 1.

<sup>1438</sup> Charter of Fundamental Rights of the European Union [2000] (CFR) OJ C 326/391.

<sup>1439</sup> Alexandre Kiss, ‘Environmental and Consumer Protection’ in Peers Steve and Ward Angela (eds), *The European Union Charter of Fundamental Rights* (Hart Publishing 2004).

<sup>1440</sup> *ibid.*

In this context, the establishment of a substantive right to environment in international law is all the more important as such concept would mobilise both environmental and human rights laws, not in the way the right to health would be able to, with a view to protect those whose lives and health are jeopardised or threatened by environmental degradation caused by state actions or inactions, such as persons affected by nuclear disasters.

## **§2: Environmental Law Principles Applicable to the Nuclear Regime**

Despite the claim of a nuclear law expert according to whom ‘nuclear law practitioners had long practiced the environmental law without realizing it’,<sup>1441</sup> nuclear law has many deviations and discordance with environmental law principles.<sup>1442</sup> Ultimately, as the expert himself recognises, nuclear law was designed as a special regime, largely derogating itself from common law standards, in order to control the risk associated with “ultra-hazardous activity” and to facilitate a “better acceptance” of this energy among the general public.<sup>1443</sup> This partisan-like nature of the regime partially explains its indifference to human rights principles and its continued resistance to adhere to regular environmental controls.

International environmental law consists of treaties, customary international law, and general principles of law – the traditional sources of international law – as well as non-binding “soft-law” instruments such as declarations, resolutions, principles, guidelines and recommendations adopted by the UN and other international organisations.<sup>1444</sup> During the four decades following the Stockholm Declaration, the number of environmental instruments, both binding and non-binding, has dramatically increased, reaching 272 multinational environmental

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<sup>1441</sup> Reyners (n 101) 183.

<sup>1442</sup> Nanda (n 102); Dyke (n 115); Currie (n 115); Kiss, ‘State Responsibility and Liability for Nuclear Damage’ (n 115).

<sup>1443</sup> Reyners (n 101) 168, 184.

<sup>1444</sup> Nanda (n 102).

treaties by 2005 and hundreds more soft-law instruments.<sup>1445</sup> Today, there are said to be more than 2,000 global, regional, and bilateral treaties directly or indirectly addressing the issue of the environment.<sup>1446</sup> But what characterises and differentiates international environmental law from other branch of international law is its extensive use of legal principles and soft-law instruments.<sup>1447</sup> Many of the obligations in international environmental law are thus recognised as “soft” in nature.<sup>1448</sup>

The core environmental law principles are articulated in the 1992 Rio Declaration on Environment and Development.<sup>1449</sup> They include sustainable development, prevention principle, polluter pays principle, precautionary principle, procedural environmental rights, and the principle of intergenerational equity. Some of them have been incorporated into international environmental conventions, thus reflecting rules of customary law (e.g., prevention principle).<sup>1450</sup> In environmental law, these principles function as policy guidance for environmental regulation as well as legal concepts which would guide judicial decision-making. While this “grey” status allows a wide recognition and endorsement of these principles by states, it also enables the states to declare their intentions without making a firm commitment for implementation.<sup>1451</sup>

This paragraph examines international environmental law principles and norms applicable to nuclear activities with a view to identify those norms that could be incorporated into the protection standards for nuclear victims, which will be proposed in the last Title of the

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<sup>1445</sup> UNEP, ‘Register of International Treaties and Other Agreements in the Field of the Environment’ (UN Environment Programme 2005) UN Doc UNEP/Env.Law/2005/3.

<sup>1446</sup> Sands and Peel (n 109).

<sup>1447</sup> Alexandre Kiss and Dinah Shelton, *Guide to International Environmental Law* (BRILL 2007).

<sup>1448</sup> Elizabeth Fisher, Bettina Lange and Eloise Scotford, *Environmental Law: Text, Cases & Materials* (Second Edition, Oxford University Press 2019) 190.

<sup>1449</sup> UNGA, ‘Report of the United Nations Conference on Environment and Development: Annex I Rio Declaration on Environment and Development’ (n 108).

<sup>1450</sup> de Sadeleer, *Environmental Principles* (n 109); Sands and Peel (n 109).

<sup>1451</sup> Pascale Martin-Bidou, *Droit de l’environnement* (2nd edn, Bréal 2021).



thesis. While nuclear experts proclaim that certain environmental law principles converge with or have already been incorporated into the nuclear regime,<sup>1452</sup> their interpretation of these principles raises many questions. These principles are *inter alia* sustainable development (A), prevention principle (B), precautionary principle (C), polluter pays principle (D), procedural rights (E), and the principle of equity (F).<sup>1453</sup>

### A. Sustainable Development

Sustainable development is undoubtedly ‘the most contested of environmental principles’ to date.<sup>1454</sup> Introduced by the Brundtland Report in 1987,<sup>1455</sup> the concept of sustainable development has gained significant international attention and political weight during the last three decades. The principle was further cemented by the 1992 Rio Declaration on Environment and Development which states that ‘[i]n order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it’ (Principle 4).<sup>1456</sup> Initially conceived to invoke the issue of environmental protection into economic and social development projects, sustainable development has evolved over the years to become an ambivalent concept. The notion is increasingly accompanied by the principles of integration and conciliation in which social and economic considerations (often costs) must be put in balance against environmental protection. This, according to some legal scholars, led to the ‘*économisation*’ of environmental law,<sup>1457</sup> where economic interests are often prioritised in a balancing act, putting

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<sup>1452</sup> Reyners (n 101); Emmerechts (n 101).

<sup>1453</sup> Nanda (n 102); Anastassov (n 102).

<sup>1454</sup> Fisher, Lange and Scotford (n 1448) 406.

<sup>1455</sup> UNGA, ‘Report of the World Commission on Environment and Development: “Our Common Future” (Brundtland Report)’ (n 449).; The Brundtland Commission was established by the UN General Assembly Resolution 38/161 of 19 December 1983.

<sup>1456</sup> UNGA, ‘Report of the United Nations Conference on Environment and Development: Annex I Rio Declaration on Environment and Development’ (n 108).

<sup>1457</sup> Romi (n 111) 917.

aside environmental requirements.<sup>1458</sup> Environmental protection and development are ultimately difficult to reconcile and if the balance always tilts toward economic interests, the reference to sustainable development simply serves as a window-dressing of ecological concern.<sup>1459</sup>

In the EU policy, the principle of sustainable development became a dominant doctrine in the field of environmental protection. For example, the Treaty on the Functioning of the European Union (TFEU) prescribes that in the preparation of environmental policy, the Union shall take account, *inter alia*, ‘the economic and social development of the Union as a whole and the balanced development of its regions’.<sup>1460</sup> In the French Charter of the Environment, Article 6 states that ‘[p]ublic policies shall promote sustainable development. To this end they shall reconcile the protection and enhancement of the environment with economic development and social progress’.<sup>1461</sup> These expressions indeed evoke the ALARA principle of radiation protection that this thesis analysed in the previous Title, though in the latter case, it is about human protection instead of environmental protection. The ALARA says that doses shall be kept as low as reasonably achievable, *economic and social considerations being taken into account*. And often, as is the case with sustainable development, economic interests are prioritised in a balancing exercise, putting aside human rights protection. In borrowing the above expression of Raphaël Romi,<sup>1462</sup> the radiation protection principle is essentially the ‘*économisation*’ of human rights law. This also affirms the Kiss’ analysis on the treatment of human health and environment under the CFR, being the *parents pauvres* of the EU Charter.<sup>1463</sup>

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<sup>1458</sup> Nicolas de Sadeleer, *Environnement et marché intérieur* (Éditions de l’Université de Bruxelles 2010).

<sup>1459</sup> Martin-Bidou (n 1451).

<sup>1460</sup> Treaty on the Functioning of the European Union (TFEU) Art 191(3)

<sup>1461</sup> La Charte de l’environnement de 2004 art 6. Translation by David Marrani and Stephen J Turner, ‘The French Charter of the Environment and Standards of Environmental Protection’ in Dinah L Shelton and others (eds), *Environmental Rights: The Development of Standards* (Cambridge University Press 2019).

<sup>1462</sup> Romi (n 111).

<sup>1463</sup> Kiss, ‘Environmental and Consumer Protection’ (n 1439).

## B. Prevention Principle

Prevention is the fundamental principle of environmental law. It is a twin of the curative approach, the polluter pays principle (PPP), which had been established in environmental law since its inception. The curative approach is often not sufficient to protect the environment as it intervenes only after an event of environmental damage that is often irreparable. In contrast, prevention measures allow averting such damage, or otherwise, minimising its effect by reducing, controlling or stopping polluting activities.

The idea originates from the “no-harm” principle, an international customary rule, whose source can be traced back to the *Trail Smelter* arbitration in 1938 and 1941.<sup>1464</sup> The arbitration tribunal famously concluded that ‘no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence’.<sup>1465</sup> This decision was confirmed by the ICJ’s judgement in the *Corfu Channel* case in 1949.<sup>1466</sup> The no-harm rule in effect imposes a limit on one of the fundamental principles of international law: the sovereign right of states to exploit their own resources. The Rio Declaration reaffirmed it in Principle 2: States have ‘the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction’. This formulation placed greater emphasis on the prevention of damage than the limitation of State sovereignty and enlarged the geographical scope of damage from transboundary to global.<sup>1467</sup>

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<sup>1464</sup> *Trail Smelter Case (United States v. Canada) (1938 and 1941) 3 R.I.A.A. 1905*. This arbitration notably became the basis for two fundamental principles of international environmental law: the no-harm and the polluter-pays rules.

<sup>1465</sup> *Ibid*, 1965

<sup>1466</sup> *Corfu Channel (U.K. v. Albania) (Judgement of 9 April 1949) [1949] ICJ 4*

<sup>1467</sup> de Sadeleer, *Environmental Principles* (n 109).

Today, the duty of prevention has been recognised as “a principle of general international law”<sup>1468</sup> as well as “a customary rule”<sup>1469</sup>. Indeed, the ICJ emphasised the importance of prevention in environmental protection in the case of *Gabčíkovo-Nagymaros Project* by stating that ‘in the field of environmental protection, vigilance and prevention are required on account of the often irreversible character of damage to the environment and of the limitations inherent in the very mechanism of reparation of this type of damage’.<sup>1470</sup> The prevention principle also has its origins in due diligence.<sup>1471</sup> However, as Nicolas de Sadeleer points out, due diligence is ultimately an obligation of conduct, not of result, and thus does not guarantee that harm will not occur.<sup>1472</sup> In other words, taking all appropriate and necessary steps are sometimes not enough to prevent environmental harm.

Despite its solid international legal status, the state obligation of prevention is often marred by a margin for socio-economic considerations, or a balance of interests, introduced by international and national laws.<sup>1473</sup> For example, under the EU law, the principle of proportionality enshrined in Article 5 (1) (4) of TEU is often applied to moderate environmental protection measures.<sup>1474</sup> Under the principle, the level of preventive measures ‘do not necessarily have to be the highest that is technically possible’ if the economic cost of such measures exceeds consequent environmental gain.<sup>1475</sup> In France, the Environmental Code prescribes that the principle of preventive action shall be implemented by applying the best

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<sup>1468</sup> *Iron Rhine case (Arbitration regarding the Iron Rhine (“IJzeren Rijn”) Railway (Belgium v. Netherlands))* (2005) 27 RIAA 35, para 59

<sup>1469</sup> *Pulp Mills on the River Uruguay (Argentina v. Uruguay)* (Judgement) [2010] ICJ Rep 14, para 101

<sup>1470</sup> *Gabčíkovo-Nagymaros Project*, para 140

<sup>1471</sup> *Pulp Mills case*, para 59

<sup>1472</sup> de Sadeleer, *Environmental Principles* (n 109).

<sup>1473</sup> *ibid.*

<sup>1474</sup> Treaty of European Union (TEU) Art 5(1)(4)

<sup>1475</sup> Thieffry (n 112) 79. The citation is from two case-laws of European Court: Case C-284/95 *Safety Hi-Tech Srl v S.&T. Srl* (1998) ECR I-04301, paras. 49 and 58; Case C-341/95 *Gianni Bettati v Safety Hi-Tech Srl* (1998) ECR I-04355, para 47.

available techniques ‘at acceptable economic costs’.<sup>1476</sup> Also, the Swedish Environmental Code requires that the cost-benefit analysis shall be taken into account in determining protective activities.<sup>1477</sup> This relativity of protection necessarily invokes the similitude with sustainable development which is becoming a dominant doctrine in the field of environmental protection.

Several legal scholars expressed concerns that this balancing exercise, relying entirely on classical economic analysis, would not afford an equal value to the environment which is difficult to quantify than its socio-economic counterpart, resulting in underestimating the future costs and benefits of the environment.<sup>1478</sup> In response to this concern, the 2001 ILC Draft Articles on Prevention of Transboundary Harm from Hazardous Activities proposed a new approach to codify the state obligation of prevention.<sup>1479</sup> The Draft Articles notably established a set of criteria which shall trigger such obligation ‘so as not to impose such obligations in respect of virtually any activity’ on States.<sup>1480</sup> According to the Draft Articles, preventive actions have to be activated when there is a high probability of transboundary harm or a low probability of “disastrous” transboundary harm (Article 2(a)). In other words, states are required to implement preventive measures when the level of ‘risk (probability)’ or ‘harm (damage)’ is significant. By setting up these criteria, the ILC not only deflected the focus away from cost-benefit analysis, but also evinced its view that making prevention obligation conditional on a balancing of interests is ultimately inappropriate.<sup>1481</sup>

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<sup>1476</sup> Code de l’environnement, Art L110-1, II-2°

<sup>1477</sup> Swedish Environmental Code of 1998, Chapter 2, Section 7, which reads: ‘particular importance shall be attached in this connection to the benefits of protective measures and other precautions in relation to their cost. The cost-benefit relationship shall also be taken into account in assessments...’. Translation by the Swedish Government <<https://www.government.se/legal-documents/2000/08/ds-200061/>> consulted 20 February 2022; cited by de Sadeleer, *Environmental Principles* (n 109).

<sup>1478</sup> *ibid.*

<sup>1479</sup> ILC, ‘Draft Articles on Prevention of Transboundary Harm from Hazardous Activities’ (2001) (A/56/10) Report of the International Law Commission: Fifty-third session para 97.

<sup>1480</sup> *ibid* 387 Commentary to Article 2(2).

<sup>1481</sup> de Sadeleer, *Environmental Principles* (n 109).

Typically, nuclear power plant operations represent those activities which have a low probability of “disastrous” transboundary harms, triggering the state obligation of prevention. The 1986 Early Notification Convention<sup>1482</sup> and the 1994 Convention on Nuclear Safety<sup>1483</sup> are said to be specifically based on the ‘no-harm’ customary rule and the prevention principle respectively. However, the weak legal substances of both Conventions, as analysed in Part One, cast doubt on their effectiveness in preventing transboundary effects or nuclear accidents. Moreover, as the example of the US and the Japanese regulators have shown, nuclear safety preventive measures are often subject to compromise due to pressures exercised by the nuclear industry and sometimes lawmakers.

Notwithstanding, nuclear accidents, once they occur, most likely implicate the prevention obligation of the installation state as a nuclear regulator on the national level. In addition, radioactive materials released by accidents can travel a great distance with winds, clouds, and ocean currents, easily affecting the territory of neighbouring countries and far beyond. In such cases, the polluter pays principle shall apply. The following sub-paragraph will examine how the nuclear regime adopts the polluter pays principle.

### **C. Polluter Pays Principle (PPP)**

The Polluter pays principle (PPP) is an economic principle first introduced by the Organisation for Economic Co-operation and Development (OECD) in 1972.<sup>1484</sup> Based on the theory of externalities in economics, the principle requires the polluter to bear the costs arising from the pollution, that is, prevention and control measures (e.g., through taxation) and reparation of damage (e.g., civil liability). While the 1992 Rio Declaration incorporated the

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<sup>1482</sup> Convention on Early Notification of a Nuclear Accident (cited above)

<sup>1483</sup> Convention on Nuclear Safety (cited above) art 1(iii)

<sup>1484</sup> OECD, ‘Recommendation of the Council on Guiding Principles Concerning International Economic Aspects of Environmental Policies’ (Organisation for Economic Co-operation and Development 1972) C(72)128 (26 May 1972).

principle (Principle 16), the PPP is recognised largely in the OECD and EU texts but rarely acknowledged outside these structures.<sup>1485</sup>

The PPP is another principle that nuclear experts assert has been incorporated into the nuclear regime since its inception. They first assert that the nuclear sector has already internalised the externalities of their operation – costs of decommissioning and radioactive waste management – into operation costs through various financial and administrative legislations.<sup>1486</sup> Moreover, they contend that international conventions on civil liability for nuclear damage, the 1960 Paris Convention and the 1963 Vienna Convention, represent one of the first international instruments which incorporated the spirit of the PPP. However, these applications of the PPP in the nuclear regime has in fact many loopholes and limitations. They include flawed incorporation of externalities (1), grossly inadequate liability regime (2), and non-coverage of transboundary harm (3).

### 1. Incomplete Internalisation of Externalities

The externalities of nuclear power plant operations are said to include ‘future financial liabilities arising from decommissioning and dismantling of nuclear facilities, health and environmental impacts of radioactivity releases in routine operation, radioactive waste disposal and effects of severe accidents’.<sup>1487</sup> However, a non-negligible part of the costs related to nuclear waste management is said to be non-internalised.<sup>1488</sup> Long-term health and environmental impacts are not also counted as part of the externalities of nuclear activities

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<sup>1485</sup> de Sadeleer, *Environmental Principles* (n 109). One of the exceptions is the 1985 ASEAN Agreement on the Conservation of Nature and Natural Resources (Art 10(d))

<sup>1486</sup> Reyners (n 101).

<sup>1487</sup> NEA/OECD, ‘Nuclear Electricity Generation: What Are the External Costs?’ (Nuclear Energy Agency 2003) 7.

<sup>1488</sup> Pierre Kunsch, ‘Externalities and Internalisation of Radioactive Waste Producing Activities: The Analogy With Environmental Practices’ (ASME 2001) Presentation at the 8th International Conference on Radioactive Waste Management and Environmental Remediation 30 Sep-4 Oct 2001.

although the longevity of radioactivity is the symptomatic of these activities. While effects of severe accidents are allegedly covered by the nuclear liability regime, the internalisation of such externality is far from adequate, as analysed below. In the event of a severe nuclear accident, radiation contamination of a vast territory causes long-term effects on the ecosystem, the health and well-being of present and future generations. These externalities are typically not included in the current internalisation mechanism of nuclear activities.

## 2. Grossly Inadequate Liability Regime

The nuclear civil liability regime is extremely patchy with little participation<sup>1489</sup> and gross inadequacy both in terms of insurance coverage and the scope of recognised damage.<sup>1490</sup> Except European nuclear powers, major nuclear countries such as the United States, Japan, Canada, China, India, Pakistan, and Korea are not party to either of the Conventions. Although the 1997 CSC Convention<sup>1491</sup> was ratified by some of these countries,<sup>1492</sup> the number of State Parties to international nuclear liability conventions is generally very low. For example, the above CSC Convention has only 11 Parties and the 1997 Vienna Protocol has only 15 Parties.

The strict liability of the operator, while it brings certain benefits to victims, exonerate the manufacturer, supplier and financier liabilities. The regime also imposes limits on liability amounts and statutes of limitations on claim (the period for making claims). For example, the liability amount that the operator must assure is capped at maximum 700 million euros by the regime<sup>1493</sup>, which is nowhere near the actual costs of a severe accident (the Fukushima accident is said to cost up to 600 *billion* euros). If a nuclear operator were to fully cover the potential

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<sup>1489</sup> For example, the 1960 Paris Convention has 16 State Parties, and the 1963 Vienna Convention has 43 State Parties.

<sup>1490</sup> Currie (n 115); Dyke (n 115); Kiss, 'State Responsibility and Liability for Nuclear Damage' (n 115).

<sup>1491</sup> Convention on Supplementary Compensation for Nuclear Damage (cited above)

<sup>1492</sup> Canada, India, Japan, and US ratified the CSC convention.

<sup>1493</sup> The 2004 Protocol to Paris Convention (cited above), Article 7(a)



cost of a nuclear accident, as required under the polluter pays principle, the operation cost of a nuclear power plant would increase significantly.<sup>1494</sup> A Greenpeace study has suggested that insurance premiums would increase the operation cost of French operator EDF by around 300%, or 5 c€/kSWh.<sup>1495</sup> Limited liability is in fact the limit imposed by the insurance market. Today, no single insurance company is capable of covering the risk related to civil nuclear activities. In view of this, an international environmental lawyer effectively asked the following question: why citizens, especially of non-nuclear neighbouring states, should be subject to risks which would exceed the capacity of the insurance market?<sup>1496</sup>

Moreover, the scope of nuclear damage is limited to ‘loss of life or personal injury’ and ‘loss of or damage to property’ in these nuclear liability instruments. The 2004 Protocol to Paris Convention expanded it to include economic loss and environmental reparation costs but left each States Party to decide whether or not to incorporate them into its national law.<sup>1497</sup> Critically, the regime ignores damage that are typical to nuclear disasters, which was demonstrated by the case of Fukushima nuclear accident, such as emotional distress (anxiety) related to radiation exposure, evacuation and resettlement costs, prejudice related to loss of homeland, enhanced risk of disease, and long-term medical monitoring costs.

Any attempt to put a cap on the liability constitutes a *de facto* ‘subsidy to support the nuclear industry’ and is utterly ‘inconsistent with the polluter-pays principle’.<sup>1498</sup> This was confirmed by the IAEA itself which explained that ‘[t]he limitation of the amount of his liability is clearly designed as an advantage for the operator, in order not to discourage nuclear-related

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<sup>1494</sup> Currie (n 115).

<sup>1495</sup> *ibid.*

<sup>1496</sup> *ibid* 86.

<sup>1497</sup> The 2004 Paris Protocol (cited above), Article 1(a)(vii)

<sup>1498</sup> Dyke (n 115) 36.

activities’.<sup>1499</sup> As Currie aptly put it, ‘[w]hile unlimited liability may lead to the ruin of the operator, limited liability may lead to the ruin of the victim’.<sup>1500</sup> Ultimately, the failure to develop a comprehensive and adequate regime constitutes a continuing subsidy to the nuclear industry and ultimately distorts decisions regarding energy choices.<sup>1501</sup>

### 3. Little to Non-Coverage of Transboundary Harm

Finally, these nuclear liability conventions do not cover the damage incurred to the territory beyond the national jurisdiction of the nuclear installation state. The only exception is the 1997 Vienna Protocol<sup>1502</sup> which extended the geographical coverage of damage to “wherever suffered” but leaves the Installation State to decide whether to exclude such damage if it concerns the territory of a non-Contracting State. Moreover, there are only 15 countries party to the said Protocol<sup>1503</sup> and none of the major nuclear powers are included.

Nuclear law belongs to so-called “self-contained regimes”, or a strong form of *lex specialis*, a subsystem of international law which ‘embrace a full, exhaustive and definitive, set of secondary rules’, designed to ‘exclude the application of the general regime of state responsibility [...] by virtue of a regime’s particular structure or its object and purpose’.<sup>1504</sup> However, due to its significant inadequacy or non-exhaustiveness of the liability regime as described above, it is sensible to consider that it does not completely preclude the application

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<sup>1499</sup> IAEA, ‘The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage — Explanatory Texts’ (IAEA 2017) Text IAEA International Law Series No. 3 (Revised) 12.

<sup>1500</sup> Currie (n 115) 85.

<sup>1501</sup> Dyke (n 115) 46.

<sup>1502</sup> Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage (cited above)

<sup>1503</sup> To put the number in perspective, there are currently 32 countries who operate civil nuclear reactors in the world. See IAEA data at <<https://pris.iaea.org/PRIS/WorldStatistics/NuclearShareofElectricityGeneration.aspx>>, consulted 20 March 2022

<sup>1504</sup> Simma and Pulkowski (n 66) 493.

of the general principles of international law on state responsibility in case of a major nuclear accident.

However, state practice concerning transboundary damage following the Chernobyl and Fukushima accidents has not yet clearly demonstrated the establishment of the principle as a customary rule.<sup>1505</sup> For example, the Chernobyl fallout (caesium-137 alone) affected 40% of the total surface area of Europe where more than 5% of the territories of Finland and Sweden were contaminated to high levels (> 40,000 Bq/m<sup>2</sup>).<sup>1506</sup> However, no state has finally made a formal claim against the Soviet Union for damage due to legal and technical uncertainties (the country was not party to any international liability regime) as well as political considerations of some nuclear states not to create a precedent which has possible future implications for them.<sup>1507</sup> In the Fukushima accident, more than half of the total release fell on the Pacific ocean, and related pollution reached the high seas as well as the territorial waters of other countries such as Russia and the US.<sup>1508</sup> Again, no state has officially filed a damage claim against TEPCO or Japan. The reason behind this state inaction is probably the same with the Chernobyl accident. As a result, neither the USSR nor Japan has paid any compensation for transboundary damage caused by their respective accidents. As such, state practice for transboundary damage in the context of nuclear accidents is inconsistent with the PPP and the principle of state responsibility for transboundary damage.

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<sup>1505</sup> Alan Boyle and Catherine Redgwell, *Birnie, Boyle, and Redgwell's International Law and the Environment* (Fourth Edition, Oxford University Press 2021); Astrid Epiney, "'Environmental Refugees': Aspects of International State Responsibility" in Etienne Piguet, Antoine Pécoud and Paul de Guchteneire (eds), *Migration and Climate Change* (UNESCO Publishing/Cambridge University Press 2011); Ved Nanda and George (Rock) Pring, *International Environmental Law and Policy for the 21st Century* (2nd revised edn, Brill Nijhoff 2012). Nanda and Pring argued that the state practice following Chernobyl accident did not provide a sufficient ground to deny the general practice and *opinio juris* on the principle of state responsibility because of its specific diplomatic context in which nuclear states decided not to claim damages after nuclear disasters.

<sup>1506</sup> Fairlie and Sumner (n 8).

<sup>1507</sup> Patricia W Birnie, Alan E Boyle and Catherine Redgwell, *International Law and The Environment* (Oxford University Press 2009).

<sup>1508</sup> Kobayashi (n 1358).

## D. Precautionary Principle (PP)

Precautionary principle (PP, hereafter) is the third variation of environmental protection measures after the polluter pays principle and the prevention principle. It is the most advanced form of prevention, which aims to take actions for potential, uncertain, or hypothetical threats that may or may not occur.<sup>1509</sup> While prevention principle is triggered on calculable and certain risks, the PP solicits actions on risks that have not yet been scientifically elucidated, described rather as “threats” or “uncertain dangers”<sup>1510</sup>. As such, the principle is prone to scientific controversy and implementation challenges.

Notwithstanding, the PP has been incorporated into multiple international environmental instruments. Article 15 of the 1992 Rio Declaration states:

(T)he precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.<sup>1511</sup>

This formulation in fact limits the application of the PP by adding a margin of appreciation, ‘according to their capabilities’, and some conditions such as ‘serious or irreversible damage’ and ‘cost-effective’ measures. Nevertheless, today some 60 multilateral treaties are said to have embraced the principle.<sup>1512</sup>

The ICJ jurisprudence has fallen short of clearly pronouncing the principle but the dissenting opinion of Judge Weeramantry in the 1995 reexamination of the *Nuclear Tests* case

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<sup>1509</sup> Kiss and Shelton, *Guide to International Environmental Law* (n 1447).

<sup>1510</sup> The terms employed by a French sociologist, Yannick Barthes, in an interview conducted in the context of the article, Shirabe, Hasegawa and Fassert (n 829).

<sup>1511</sup> UNGA, ‘Report of the United Nations Conference on Environment and Development: Annex I Rio Declaration on Environment and Development’ (n 108) Art 15.

<sup>1512</sup> de Sadeleer, *Environmental Principles* (n 109).

clearly addressed the issue.<sup>1513</sup> In his view, the PP is ‘gaining increasing support as part of the international law of the environment’ since it functions as a response to the evidentiary difficulty that the claimant often faces in cases of possible environmental damage of an irreversible nature ‘as the necessary information may largely be in the hands of the party causing or threatening the damage’.<sup>1514</sup>

In fact, it is in the EU context that the concept of PP is most developed. Under EU law, the PP has been established as “a new general principle of community law”.<sup>1515</sup> Enshrined in Article 191(2) of the TFEU among other environmental principles, it has been elaborated and given corps through the Community case laws of the Court of Justice of the EU (CJEU). These case laws have provided a definition of the principle over the years, which reads, ‘where there is uncertainty as to the existence or extent of risks to human health, protective measures may be taken without having to wait until the reality and seriousness of those risks become fully apparent’.<sup>1516</sup> As clearly shown by the definition, the scope of application of the PP has been extended to cover other fields beyond environmental protection, particularly in the domain of public health. However, the implementation of the PP is also moderated or conditioned, as other principles such as prevention, by available scientific data, cost-benefit balance test, and sustainable development (TFEU 191(3)) and the principle of proportionality (TEU 5(1)(4)).

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<sup>1513</sup> *Request for an Examination of the Situation in Accordance with Paragraph 63 of the Court’s Judgment of 20 December 1974 in the Nuclear Tests (New Zealand v. France) Case (Order)* [1995] ICJ Rep 288 (Dissenting Opinion of Judge Weeramantry 317)

<sup>1514</sup> *Request for an Examination of the Situation* (n 1525) 342

<sup>1515</sup> Nicolas de Sadeleer, ‘The Precautionary Principle in EC Health and Environmental Law’ (2006) 12 *European Law Journal* 139.

<sup>1516</sup> These case laws include: Case C-180/96 *United Kingdom v Commission* [1998] ECR I-2265, para 99, ‘the BSE judgement’; Case C-157/96 *National Farmers’ Union and Others* [1998] ECR I-2211, para 63; Case C-180/96 *United Kingdom v Commission* [1998] ECR I-2265, para 99; Case C-236/01 *Monsanto Agricoltura Italia* [2003] ECR I-08105, para 111; Case T-13/99 *Pfizer Animal Health SA v Council* [2002] ECR II-03305, para 139; cited by *ibid.*

This sub-paragraph details the challenges attached to the implementation of the PP – the role of scientific assessment (1) and socio-economic and cost-benefit balance tests (2) – and the reality of the PP implementation by the nuclear regime (3).

## 1. The Role of Science

Science plays a determinant role in environmental law, more than any other branches of law, especially in the application of certain principles, especially the prevention and precautionary principles.<sup>1517</sup> The PP indeed operates on the framework of risk analysis based largely on scientific data. Risk analysis comprises two steps: risk assessment done by experts and risk management decided by policymakers based on the former assessment.<sup>1518</sup> The problem arises when there is scientific controversy on the assessment of risks or the interpretation of scientific data. In this case, should the risk assessment reflect the mainstream scientific opinion or take into account dissenting or alternative opinions? How are the experts selected for the scientific committee or the risk assessment taskforce? These questions are indeed extremely pertinent to the case of radiation risk. Ultimately, drawing the line between the “mainstream” thesis and the “minority” or “diverting” thesis is not a scientific issue but a political one.<sup>1519</sup>

The Fukushima case study effectively showed that the radiation experts chosen for government advisory committees were always those who supported the threshold theory according to which low dose radiation (less than 100 mSv) posed little to no health risk.

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<sup>1517</sup> Dinah Shelton, ‘Certitude et incertitude scientifiques’ (1998) 23 *Revue juridique de l’Environnement* 39.

<sup>1518</sup> de Sadeleer, ‘The Precautionary Principle in EC Health and Environmental Law’ (n 1515). According to his analysis, the EU court decisions have established that risk assessment is required as a prerequisite for the implementation of preventive actions (p.150).

<sup>1519</sup> Shirabe, Hasegawa and Fassert (n 829); de Sadeleer, ‘The Precautionary Principle in EC Health and Environmental Law’ (n 1515).

Independent scientists and academic scholars of different views were systematically excluded from these decision-making bodies.

## 2. Socio-Economic Balance and Cost-Benefit Analysis

In a response to the socio-economic balance test, or sustainable development principle, case-laws of the EU courts have pronounced at a number of occasions the precedence of health protection over economic interests.<sup>1520</sup> Yet, it also established that this principle of health precedence still has to be balanced with the principle of proportionality or cost-benefit analysis.<sup>1521</sup> This means that while health protection is given a priority for consideration, it is still up to the decision makers of the EU institutions or Member States to determine the appropriate level of protection through cost-benefit calculation. In this respect, the principle of health pre-eminence and the principle of proportionality has not been completely reconciled by the EU case laws, which subsequently leaves a great degree of discretion to EU institutions and Member States for the interpretation of concerned risks and the level of precautionary actions to take.

Moreover, the reliance on cost-benefit analysis risks human health not to be afforded appropriate protection. As is the case with environmental protection, the incommensurability of health assets would make such analysis inapt to provide a *juste* (fair and right) evaluation. Ultimately, cost-benefit analysis is an attempt to mimic a basic function of markets, pretending to ‘price the priceless values of life, health, nature, and the future’ and reducing them into

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<sup>1520</sup> Cases T-70/99 *Alpharma v Council* [2002] ECR II-3495; Case T-13/99 *Pfizer Animal Health v Council* [2002] ECR II-3305; T-74/00 *Artegodan v Commission* (Joined Cases T-74/00, T-76/00, T-83/00, T-84/00, T-85/00, T-132/00, T-137/00 and T-141/00, *Artegodan GmbH and Others v Commission* [2002] II-ECR 4945); Case C-180/96 *P UK v Commission* [1996] ECR I-3903, para 93; Case C-183/95 *Affish* [1997] ECR I-4315, para 43; Case C-473/98 *Toolex*, para 45; cited by de Sadeleer, ‘The Precautionary Principle in EC Health and Environmental Law’ (n 1515).

<sup>1521</sup> The requirement of proportionality was pronounced in Case T-74/00 *Artegodan*, para 173. A cost-benefit analysis was considered as ‘a particular expression of the principle of proportionality’ in the context of risk management in Case T-13/99 *Pfizer*, para 410.

numbers.<sup>1522</sup> There is a fundamental problem in applying cost-benefit analysis in the protection of health and the environment without binding minimum protection standards which have been established through independent scientific reviews and stakeholder participation.

The principle of proportionality also reigns in national laws which have incorporated the precautionary principle. For example, France has established the principle in both the Charter of the Environment, which is part of the French Constitution, and the Environmental Code. The Environmental Code namely prescribed that ‘the precautionary principle, according to which the absence of certainty, in view of current scientific and technical knowledge, shall not delay the adoption of effective and *proportionate* measures aiming to prevent a risk of serious and irreversible damage to the environment *at an economically acceptable cost*’ (art L110-1-II-1).<sup>1523</sup> The formulation is similar in the Charter (Article 5) which requires public authorities to apply the principle through the evaluation of risks and adopt *provisional and proportionate* measures.<sup>1524</sup> Also, the particularity of the PP in French law is that it is a temporary measure in contrast to prevention measures which could be permanent.

### 3. The PP and Nuclear Regime

According to some nuclear law experts, the PP is one of the principles that the nuclear regime has long incorporated in its practice.<sup>1525</sup> They particularly refer to the adoption of the linear non-threshold (LNT) model on low-dose risk, the system of dose limit, and the ALARA principle as such examples. Curiously, when they explain the association of these concepts to the PP, the focus is placed on the principle of proportionality that accompanies the PP, its

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<sup>1522</sup> Frank Ackerman and Lisa Heinzerling, ‘Pricing the Priceless: Cost-Benefit Analysis of Environmental Protection’ (2002) 150 University of Pennsylvania law review 1553, 1584.

<sup>1523</sup> Translation by R. Hasegawa. Emphasis added.

<sup>1524</sup> Emphasis added.

<sup>1525</sup> Reyners (n 101).



similitude to their optimisation principle, rather than the precautionary principle itself.<sup>1526</sup> Moreover, from the analysis conducted in Part One (Title I), a question arises as to whether these nuclear “precautionary” measures are genuinely precautionary or adequately protective in protecting people in nuclear disasters.

First, there is a question as to whether the ALARA principle, ‘as low as reasonably achievable, economic and social considerations taken into account’, is genuinely a precautionary principle. And if so, is it precautionary enough to avert serious and irreversible harm done to human health and the environment? The application of the ALARA principle after the Fukushima accident precisely resulted in the establishment of the 20 mSv/year reference dose by the Japanese government as a way to restrict the extent of evacuation zones and the number of evacuees. In the opinions of the UN Special Rapporteurs and human rights treaty bodies, such a measure was far from precautionary. Secondly, both the LNT model and the principle of dose limit is in reality irrelevant in situations of nuclear emergencies. Under the radiation protection regime, dose limits cease to apply in emergency and existing exposure situations, in other words, as soon as radiation exposure exceeds such a dose limit. The reference level replacing the dose limit can be fixed between 1 to 100 mSv/year, up to 100 times the dose limit, despite the “adoption” of the LNT model according to which cancer mortality risk increases in proportion to doses between 1-100 mSv. In this respect, the concepts of dose limit and the LNT model have more ‘window-dressing’ effects of appearing to be “precautionary” than to be actually precautionary or protective.

The dissenting opinion of Judge Weeramantry in the 1996 ICJ Advisory Opinion on the Legality of Nuclear Weapons corroborates in this regard. The judge solemnly declares that nuclear weapons (their effects) are in clear violation of a number of environmental law

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<sup>1526</sup> See *ibid.*

principles, namely the precautionary principle and polluter pays principle.<sup>1527</sup> Though the pronouncement was made specifically about nuclear weapons, this opinion has a significant relevance for the nuclear regime in general since his remark mainly concerned the effect of such weapons: radiological contamination.

Notwithstanding, precautionary principle can be an extremely powerful tool for the protection of nuclear accident victims. Since nuclear disasters always involve scientific controversy on low-dose risk, the principle could be particularly instrumental to warrant protective measures such as precautionary evacuation, precautionary relocation, and precautionary life-time medical check-up, as well as to justify the claim for damage related to “voluntary” evacuation from and forced immobility in contaminated territories. Under the paradigm of precautionary principle, affected persons do not have to provide a definitive proof of harm; the existence of a potentially ‘serious or irreversible damage’ is sufficient to justify their evacuation or demand for more protection. The implementation of precautionary principle in the context of nuclear accidents will be further explored in the final chapter of this thesis (Title II, Chapter 2).

### **E. Procedural Environmental Rights**

Procedural environmental rights represent a part of human rights law which has been adopted by environmental law, mainly consisting of access to information, public participation in decision-making, and access to remedy. The nuclear regime has long been hesitant to open up to society and thus took decades before embracing it into its framework. In the beginning, most governments did not see the need to inform the public of its potential risks or invite the public in deciding nuclear policy.<sup>1528</sup> This was certainly owing to its military origin, the fact

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<sup>1527</sup> *Legality of the Threat or Use of Nuclear Weapons* (Dissenting opinion of Judge Weeramantry), 502-503

<sup>1528</sup> Emmerechts (n 101).

that nuclear energy was closely linked to national security and interests, that the nuclear policy had long been considered a matter of the state. However, during the 1990s, the pressure for transparency and stakeholder involvement increased even for the nuclear sector as environmental concerns grew among the public and many environmental legislations were passed both nationally and internationally. In this respect, environmental law has triggered a shift in the nuclear regime. The first international nuclear instrument which addressed the issue of public information was the 1997 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Joint Convention).<sup>1529</sup> However, the Joint Convention made an obligation for public access to information only, excluding the right to participation and access to remedy. No other nuclear conventions recognise any of the procedural rights of the public.

This situation changed at the adoption of the 1998 Aarhus Convention<sup>1530</sup>, the 1991 Espoo Convention<sup>1531</sup> and the 2003 Kiev Protocol<sup>1532</sup> to supplement the Espoo Convention. Although they are regional agreements organised by the United Nations Economic Commission for Europe (UNECE) covering mostly European, Central Asian, and North American countries, they represent one of the few international environmental treaties which apply to nuclear activities and comprise many nuclear powers as State parties.<sup>1533</sup> The Aarhus Convention is today the only existing international binding instrument specifically addressing the trinity of procedural environmental rights: access to information, public participation, and access to

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<sup>1529</sup> Joint Convention (cited above), Article 6, 13.

<sup>1530</sup> Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (cited above)

<sup>1531</sup> Convention on Environmental Impact Assessment in a Transboundary Context (cited above)

<sup>1532</sup> Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context (cited above)

<sup>1533</sup> The Aarhus Convention has 47 State parties which include all European nuclear nations and many Central Asian nuclear countries. The Espoo Convention has a total of 45 State parties which include all European nuclear countries and Canada (the US and Russia are only the signatories). The Kiev Protocol, on the other hand, has 33 State parties in which France and the UK are only the signatories.

justice. While it fell short of codifying a substantial environmental right, it is a rights-based treaty which recognises in Preamble that ‘every person has the right to live in an environment adequate to his or her health and wellbeing, and the duty [...] to protect and improve the environment for the benefit of present and future generations’.<sup>1534</sup> The novelty of the Convention is that it applies to a wide range of nuclear activities. For example, under the provisions (Article 6-8), the public has the right to participate in decision-making concerning the construction, operation and decommissioning of nuclear power plants, reprocessing and enrichment facilities, radioactive waste storage, and final disposal site for spent nuclear fuel.

The Espoo Convention is the primary international environmental instrument addressing the issue of public participation through environmental impact assessments (EIA). The Convention requires States to undertake an EIA with public participation before authorising a proposed activity that is likely to cause a significant adverse transboundary environmental effect.<sup>1535</sup> This participation is addressed to the public residing in the areas likely to be affected by the proposed activity, not only within the country but also in *the neighbouring states*. In the case of nuclear installations, the EIA often represents one of the platforms for the public to address the question of safety.<sup>1536</sup> The Kiev Protocol further developed the concept of public participation in the decision-making of matters affecting the environment. Namely, the Protocol introduced a strategic environmental assessment (SEA) which intervenes at an earlier stage of the decision-making process than the EIA. This assessment shall be conducted for “plans and programmes” before they are materialised as “proposed activities” by the authorities. Therefore, under the Kiev Protocol, States who plan to develop a nuclear programme have to ensure that all the stakeholders including the public, NGOs, national, regional and local environmental and

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<sup>1534</sup> Aarhus Convention, Preamble.

<sup>1535</sup> Espoo Convention, Article 2(3)

<sup>1536</sup> Emmerechts (n 101).

health authorities, are consulted through the SEAs at a very early stage ‘when all options are open’.<sup>1537</sup> Article 7 of the Aarhus Convention also prescribes public participation concerning plans, programmes and policies related to the environment, but the wording of the provision is weaker than that of the Kiev Protocol. The article merely states that: ‘(t)o the extent appropriate, each Party shall *endeavour* to provide opportunities for public participation’.<sup>1538</sup>

Article 7 of the Aarhus Convention was specifically used by the decision of a High Court (Administrative Court) of England and Wales in the *Greenpeace v. Secretary of State for Trade and Industry* case<sup>1539</sup> to annul the British government’s decision in relation to nuclear power policy on the ground that it had failed to consult the public before making such a decision.<sup>1540</sup> In the 2003 Energy White Paper, the UK government stated that “the fullest public consultation” would be held before making any decisions on a new nuclear build. However, the 2006 government’s report (Consultation Document) declared that ‘nuclear has a role to play in the future UK generating mix’ without organising the public consultation before the publication. In this case, the High Court recognised that there was ‘a procedural unfairness’ and ‘a breach of the claimant’s legitimate expectation’ for “the fullest public consultation” and therefore decided that the government’s decision that nuclear new build ‘has a role to play...’ was unlawful.<sup>1541</sup> The Court also expressed its opinion that ‘in the development of policy in the environmental field consultation is no longer a privilege to be granted or withheld at will by the executive’.<sup>1542</sup>

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<sup>1537</sup> Kiev Protocol, Article 8(1)

<sup>1538</sup> Emphasis added

<sup>1539</sup> *Greenpeace Ltd v. Secretary of State for Trade and Industry* [2007] EWHC 311 (Admin) (15 February 2007), HTML version of judgement available at <<http://www.bailii.org/ew/cases/EWHC/Admin/2007/311.html>> consulted 23 February 2022

<sup>1540</sup> The case was cited by Emmerechts (n 101).

<sup>1541</sup> *Greenpeace v. Secretary of State for Trade and Industry*, para 117, 120

<sup>1542</sup> *Greenpeace v. Secretary of State for Trade and Industry*, para 49

While Japan is not party to any of the above treaties, the Japanese government organised the National Debate on Nuclear Energy in 2012 to decide on the future energy mix following the Fukushima accident. The Debate used a method of deliberative policymaking process known as Deliberative Polling<sup>1543</sup> in which randomly selected 300 citizens were invited to discuss and exchange views with competing experts on the pros and cons of nuclear energy. After two-day discussions, they voted for an energy mix option among the three with varying portions of nuclear energy (0% - 15% - 25%). The result was that about 50% of the participants voted for the nuclear-zero option while 15% of them voted for the option 15% nuclear mix and only 13% of participants for the option 25% nuclear mix. However, three months after the result, the ruling party which organised the National Debate, Democratic Party, was defeated in a national election and lost the majority in the Diet. The new government headed by Shinzo Abe of Liberal Democratic Party quickly dismissed the result of the National Debate and brought back the energy decision to the Ministry of Economy, Industry and Trade (METI) who immediately decided the continuation of nuclear programme with an objective of 20-22% nuclear share in the energy mix. Such a proportion of nuclear share in effect represented the least supported option – only by 15% of the participants – at the National Debate.

## **F. Intergenerational Equity**

The concept of intergenerational equity was developed and conceptualised by Edith Brown Weiss during the 1990s.<sup>1544</sup> The term “equity” in environmental law generally means the fair distribution of both the benefits and the burdens (costs and degradation) of scarce environmental resources among all members of society, based on the principle of distributive justice. This principle derives from the notion that ‘humans who are alive today have a special

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<sup>1543</sup> The concept was first introduced by James Fishkin, a professor of Stanford University, in 1988.

<sup>1544</sup> Edith Brown Weiss, ‘In Fairness to Future Generations and Sustainable Development’ (1992) 8 *American University Journal of International Law and Policy* 19.

obligation as custodians or trustees of the planet to maintain its integrity to ensure the survival of the human species'.<sup>1545</sup> Those alive today have a duty to pass on their environmental heritage to the next generation in no worse condition than what they received from their forbearers. Nuclear power plant or military operations which use fissionable materials could run well counter to this principle not only in case of accidents but also in regular activities. The regular operation of nuclear reactors produces a large amount of highly toxic radioactive waste which accumulates over the years. The amount of these spent nuclear fuels was reported to reach over 60,000 tons only in Europe (excluding Russia and Slovakia) in 2019, one fourth of which was produced by France.<sup>1546</sup> By the nature of radioactivity, these wastes remain hazardous for several decades, or even centuries (e.g., plutonium-239, a typical radionuclide contained in spent nuclear fuel, has a half-life of *24,111 years*). In addition to the waste problem, if a severe accident of the type-Chernobyl and Fukushima occurs, long-term radiation contamination will threaten the life of present and future generations as well as the ecosystem of vast territories beyond national borders.

In 2018, the ICRP published a new type of recommendation entitled Ethical Foundations of the System of Radiological Protection (Publication 138).<sup>1547</sup> The Publication introduced for the first time the notion of “justice/equity” as one of core ethical values that govern radiation protection. However, ICRP’s notion of equity is a peculiar one. It explains that the “equity” means the fair distribution of individual radiation exposures among the public and workers through the introduction of dose constraints and reference levels in existing and emergency situations. One may wonder how it could be anything ethical about ‘distributing

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<sup>1545</sup> Kiss and Shelton, *Guide to International Environmental Law* (n 1447) 106.

<sup>1546</sup> Source: The 2019 World Nuclear Waste Report by the World Nuclear Waste Report Project at <<https://worldnuclearwastereport.org/>>, consulted 17 February 2022

<sup>1547</sup> ICRP, ‘Ethical Foundations of the System of Radiological Protection. ICRP Publication 138.’ (ICRP 2018) Ann. ICRP 47(1).

exposure fairly’ among the affected population in nuclear accidents that are caused by the negligence of a private operator or the state. The Publication also refers to “intergenerational distributive justice” by explaining that nuclear waste shall be managed ‘with reference to precautionary principle and sustainable development in order to preserve the health and environment of future generations’.<sup>1548</sup> According to the ICRP, “intergenerational distributive justice” means that ‘individuals and populations in the future should be afforded at least the same level of protection as the current generation’.<sup>1549</sup> These interpretations sound more like an appropriation or a distortion of the environmental law principle, adapting it in a way to suit the radiation protection doctrine. Most of all, these recommendations crucially ignore the most basic fact about radiation, expressly described by the 1996 ICJ advisory opinion: ‘[i]onizing radiation has the potential to damage the future environment, food and marine ecosystem, and to cause genetic defects and illness in future generations’.<sup>1550</sup> Before such a threat, the incorporation of environmental law principles by the nuclear regime rather resembles a practice of cherry-picking and cosmetic adaptation.

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<sup>1548</sup> *ibid* para 58.

<sup>1549</sup> *ibid*.

<sup>1550</sup> *Legality of the Threat or Use of Nuclear Weapons* (cited above), para 35



## Conclusion of Chapter 2:

The states' right to use nuclear energy for "peaceful" purposes is enshrined in the Article IV of the NPT upon the condition of non-proliferation. However, the exact content of this right is largely contested.<sup>1551</sup> This chapter's analysis showed that the right to the "peaceful" use of atomic energy is in effect called into question by certain principles of international human rights and environmental laws, especially in the event of nuclear accidents. The UN human rights review of the Fukushima nuclear accident clearly indicated that the nuclear regime's protection principles and standards are in discordance with human rights requirements under international conventions, threatening especially the rights and the wellbeing of vulnerable groups. The nuclear framework fails to acknowledge the positive obligation of states to protect and ensure the rights of citizens to life, health, private and family life, and to a safe environment in nuclear disaster response and recovery, whose obligation was repeatedly affirmed by human rights tribunals, notably the ECtHR.

The nuclear regulatory framework is also inconsistent with several environmental law principles, notably precautionary principle, polluter pays principle, "no-harm" principle, and intergenerational equity in the case of nuclear accidents. It is also devoid of any conception toward future generations and sustainable environment while the principal characteristic of nuclear risk – radioactivity – is longevity where it can remain toxic over decades or centuries. Ultimately, the nuclear framework was invented by duty-bearers – states – to facilitate the activity of duty-bearers, contrary to human rights and environmental protection frameworks

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<sup>1551</sup> Daniel Rietiker, 'Between Prosperity and Destruction: A Modern Interpretation of the Right to Peaceful Use of Nuclear Energy in Light of the Protection of Human Rights and Future Generations' in Jonathan L Black-Branch and Dieter Fleck (eds), *Nuclear Non-Proliferation in International Law - Volume III* (TMC Asser Press 2016).

which were created to protect rights-holders and the environment from the acts or omissions attributable to duty-bearers.

In this context, the nuclear disaster management (protection) is in need of an effective international control, and its norms require an overhaul or a substantial review from the perspective of the latter frameworks. As the recent evolution of the DRR framework suggests, nuclear emergency preparedness, response and recovery framework cannot be totally indifferent to the emerging international norm of disaster management – the human rights-based approach. In addition, this chapter's analysis indicated that environmental principles such as the precautionary principle, the polluter pays principle and the state responsibility as well as the right to a safe and healthy environment and precautional principle would play a key role in filling the protection gaps created by the nuclear regulation framework. The final chapter of this thesis will explore ways to practically incorporate these concepts in nuclear disaster protection norms so as to properly address the needs of nuclear accident victims.

## **Conclusion of Title I**

The probe conducted in this Title showed that the protection of persons in nuclear disasters is also covered or guided by other international normative frameworks than the nuclear regulation framework – namely, forced migration (IDPs and environmental displacement), human rights, DRR, and environmental norms. Despite a general disregard shown on the part of the nuclear regime, these normative frameworks do apply to nuclear disasters, the alignment to which is repeatedly advised by numerous UN reports and international normative texts.

Nuclear accidents trigger displacement, involuntary immobility, radiation exposure, human rights violations, loss of habitable environment, and loss of home and hometowns. Typically, the current nuclear disaster response framework does not sufficiently, or at all, address these major consequences of nuclear disasters. Most importantly, the notions of voluntary choice of individuals in deciding their own recovery solutions as well as the positive and negative obligations of the state in respecting such a decision-making and facilitating the chosen solution are completely absent in the nuclear framework. This cross-examination with other international laws and normative frameworks corroborated this thesis' hypothesis according to which the current nuclear framework has a huge normative gap in protecting individuals from nuclear disaster effects and is in urgent need of a comprehensive review or a refoundation.

In view of this, the thesis proposes a new or revised set of protection norms and principles for nuclear disaster victims in the following Title, which is in accordance with the findings of this Title's analysis.



## **Title II: Proposal of Nuclear Disaster Protection Norms**

Part One of the thesis demonstrated that the nuclear normative framework applied in the Fukushima nuclear accident was largely insufficient to protect the life, health, and well-being of affected individuals. Furthermore, the analysis of the previous Title showed that the nuclear regime is largely not in accordance with the international legal and normative regime of disaster management, which generally apply in the event of human-made and natural disasters. Based on these findings, this last Title of the thesis attempts to propose alternative protection norms and principles for nuclear disaster victims, which are fully in line with international law related to disasters, namely international humanitarian law, human rights law, DRR law, and environmental law.

But before proposing such a normative model, this Title first explores important precedents which have been established on the national level following some of the major nuclear catastrophes in human history: Hiroshima and Nagasaki atomic bombing and the Chernobyl accident. The protection schemes formulated after these disasters, which were also challenged at court and evolved through jurisprudence (for the first case), often present an alternative model or a counterexample to the Fukushima protection scheme which reflects the international nuclear regulation framework. With that in mind, the first chapter investigates the Japanese and former Soviet laws and jurisprudence established after past major disasters, including the court cases that reviewed the Fukushima status, and which would provide valuable ideas for the formulation of revised or new nuclear disaster protection norms (Chapter 1). Based on these national precedents and legal challenges posed by international normative regimes analysed in the previous Title, the final chapter then proposes a set of norms, minimum standards, and principles that would be adequate and adapted for the protection of persons affected – the displaced and the “trapped” – by nuclear disasters (Chapter 2).



## Chapter 1: Challenges from National Laws and Jurisprudences

The current nuclear disaster protection norms are not only in dissonance with several branches of international law but also inconsistent with some national protection schemes established in past nuclear disasters.

Most of these precedents are found in Japan, the country that fell victim to both military and civil use of atomic energy: Hiroshima/Nagasaki atomic bombing and Fukushima nuclear accident. The victims of the first disaster are generally called *hibakusha* – those exposed to the bombs. *Hibakusha* is also a legal status recognised under specific conditions, which entitles the status-holders to a special assistance scheme. Though the status had been specifically designed for atomic bomb survivors, it contains several measures that are extremely pertinent and instructive for the protection of nuclear accident victims since both are, first and foremost, the victims of radiation exposure. As such, the first section of the chapter explores legislative acts and policies adopted by the Japanese government to assist and protect these victims/survivors and court rulings of civil lawsuits brought by these victims, challenging the validity and adequacy of these laws and policies, which led to some revisions and extensions (Section 1). It also examines in detail an alternative post-Fukushima law which was enacted in 2012 to rectify the government's policy but to no avail, and court decisions on Fukushima group lawsuits which contested the post-accident policies including the adoption of the 20 mSv/year reference dose.

Secondly, this chapter investigates another important precedent, the Chernobyl nuclear power plant accident which occurred in 1986 in the former Soviet Union (Section 2). It examines the laws and policies adopted by the USSR authorities following the accident and implemented by three newly independent countries, Belarus, Ukraine and the Russian Federation. The most important of all was the so-called Chernobyl Concept and Laws, adopted

in 1991 which defined the status of victims and affected territories as well as the scope of assistance and compensation for the victims. Although the implementation of these laws in the field faced many difficulties, the basic idea, the dose criteria, and the proposed support package established by the Chernobyl Concept and Laws were regarded as an important precedent and repeatedly referred to by the Fukushima accident victims, Japanese legal expert associations, lawmakers, and legal councillors who represented plaintiffs in Fukushima group lawsuits at courts.

In addition to the Chernobyl example, this second section of the chapter also sheds light on the legal notion of ‘prejudice of anxiety’ which has been developed through jurisprudence in France since 2010. Initially instituted to provide financial compensation to asbestos workers, the prejudice can today be recognised, in theory, for all workers who were exposed to ‘harmful and toxic substances’ engendering a high risk of developing a serious pathology. The fear for one’s future health or life after having been exposed to highly toxic substances is precisely what many nuclear disaster victims suffer over a long period of time, which is not recognised by any existing nuclear liability instruments, both international and national. The thesis thus examines the concept, the conditions, and the scope of such prejudice elaborated by court decisions with a view to adapt and apply them in the context of nuclear disasters.

The analysis of these legislative precedents and jurisprudence on the national level will feed into the proposal of adequate nuclear disaster protection norms, which will be presented in the following chapter.



## **Section 1: Hiroshima/Nagasaki and Fukushima Laws and Jurisprudence**

This first section is dedicated to the analysis of the Japanese precedents. First, it examines the status of *hibakusha* established for the survivors of A-bombs dropped in Hiroshima and Nagasaki in 1945 (§1). It probes the different categories of the *hibakusha* status, the conditions and criteria of recognition, and the content of assistance established by the Japanese government. The section then analyses the evolution of the status through litigation cases where many survivors contested the established criteria for the status recognition. In this analysis, the thesis attempts to identify the points of contention between the government and the victims themselves as to what constitutes *hibakusha*.

Secondly, the section explores the second precedent of radiation disasters in Japan: the Fukushima nuclear accident (§2). In this analysis, the focus is placed on a specific law enacted after the Fukushima accident which aimed at protecting the out-of-zone residents, particularly children, with a view to fill the protection gap left by the government policies, and the court rulings on Fukushima group lawsuits where victims contested the Fukushima protection status established by the government. The latter probe especially allows the thesis to identify the discrepancies of the Fukushima post-accident policies vis-à-vis existing laws and provisions of the Japanese Constitution.

These lessons learned from two nuclear disasters in Japan will then inspire the formulation of the rights-based nuclear disaster protection norms in the following chapter.

### **§1: Hiroshima/Nagasaki *Hibakusha* Status and Lawsuits**

The Fukushima nuclear accident is not the first major nuclear disaster that Japan has faced in its history and certainly not the first time that victims of radiation exposure struggled to have their suffering recognised by the state. The atomic bombs dropped in Hiroshima and

Nagasaki by the US in 1945 took the lives of 210,000 persons within the first four months and 600,000 more later due to the exposure to residual radiation emitted by the bombs.<sup>1552</sup> So-called *hibakusha* ('person exposed to atomic bomb' in English), the survivors are first and foremost the victims of radiation exposure caused by the bombs. However, as Hiroko Takahashi and Yasuo Nakagawa, the historians specialised in atomic bombs and radiation protection, have amply elucidated, residual radiation effects of atomic bombs have long been denied by the US military, a position largely upheld by the Japanese government.<sup>1553</sup>

A nuclear bomb not only emits radiation at the time of detonation, lasting about a minute (initial radiation), but also produces radioactive fallout, the plume containing weapon debris and fission products, which spreads by winds and rainfalls affecting the environment for long periods of time (residual radiation). The US military and the Atomic Bomb Casualty Commission (ABCC), established in Hiroshima to study the effect of atomic bombs on the survivors in 1946, have insisted that the deaths and injuries in Hiroshima and Nagasaki were caused by the blast wave, thermal pulse, and initial radiation from the detonations only, denying the existence of residual radiation. The particularity of these direct detonation effects is that the force of their impact and lethality lasts only a short time and graduates with distance from the epicentre in radius, in contrast to residual radiation which travels afar unevenly from the epicentre and its effect lasts for decades.

As Takahashi has demonstrated in her study, this was part of the overall US military strategy at the time with a view to conducting more nuclear tests in the Bikini islands as well

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<sup>1552</sup> Source: Hiroshima and Nagasaki cities' websites, and also Tatsujiro Suzuki, *Kakuheiki to genpatsu: nihon ga kakaeru "kaku" no jirenma (Atomic Weapons and Nuclear Power: "Atomic" Dilemma of Japan)* (Kodansha Gendai Shinsho 2017), 25. Suzuki is former Vice-Chairman of Japan Atomic Energy Commission of the Cabinet Office and currently the Director of Research Center for Nuclear Weapons Abolition at Nagasaki University.

<sup>1553</sup> Takahashi, 封印されたヒロシマ・ナガサキ：米核実験と民間防衛計画 (*The Classified Hiroshima and Nagasaki: The US Atomic Bomb Tests and the Civilian Defense Plan*) (n 152); Nakagawa (n 78); Hiroko Takahashi, 'One Minute after the Detonation of the Atomic Bomb: The Erased Effects of Residual Radiation' (2009) 19 *Historia Scientiarum: International Journal of the History of Science Society of Japan* 146.

as in the US mainland without stirring public opposition.<sup>1554</sup> The military needed to show that the effects of atomic bombs were short-lived and controllable. The Japanese government initially followed this US position in defining the status of *hibakusha*, using the biomedical standard set by the US military-controlled ABCC and the succeeding Radiation Effects Research Foundation (RERF). Though it has evolved over the years through litigation cases, the major criteria for *hibakusha* status recognition had long been the exposure at the distance of 2 km radius from the hypocentre – the zone of direct effects from the bomb detonation.

This paragraph examines the development of the *hibakusha* status in Japan, especially as to how the first victims of radiation exposure in Japan have been protected, however inadequate it may be, by the government policies and laws (A), and how the status has been contested over the years by the survivors through collective legal actions (B). In this study, the thesis aims to learn lessons from the struggles of the *hibakusha* in Japan, exploring ways to protect people affected by radiation disasters.

### **A. The *Hibakusha* Status and the “Atomic Bomb Disease” Certification**

Like the word “refugee”, the *hibakusha* is not only a term to describe the survivors of atomic bombs but also a legal status in Japan. The category of *hibakusha* was constructed and has evolved over time, changing the political implications as well as survivors’ identities.<sup>1555</sup> It is thus vital to understand what *hibakusha* exactly means before exploring the status of *hibakusha* because ‘how to call a victim is closely linked to how to determine the damage incurred to him/her’.<sup>1556</sup> In Japanese, *hibakusha* can mean either “the exposed to bomb” or “the

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<sup>1554</sup> Takahashi, 封印されたヒロシマ・ナガサキ：米核実験と民間防衛計画 (*The Classified Hiroshima and Nagasaki: The US Atomic Bomb Tests and the Civilian Defense Plan*) (n 152).

<sup>1555</sup> Akiko Naono, ‘The Origins of “Hibakusha” as a Scientific and Political Classification of the Survivor’ (2019) 39(3) *Japanese Studies* 333.

<sup>1556</sup> Akiko Naono, 被ばくと補償：広島、長崎、そして福島 (*Radiation Exposure and Compensation: Hiroshima, Nagasaki, and Fukushima*) (Heibonsha, 2011) 73. Translation by R. Hasegawa

exposed to radiation” depending on the Chinese character for “*baku*”. There is a reason why the survivors of atomic bombs in Japan are originally described as “the exposed *to bomb*”, not “the exposed *to radiation*”. As explained earlier, the existence of residual radiation – the radioactive fallout from bomb explosion – had long been denied by the US, which was initially followed by the Japanese government. But today the term *hibakusha* is largely understood and regarded as those who suffer from radiation effects of the atomic bombs.

This is also why the Japanese government is adamant in avoiding the term *hibakusha* (the exposed to radiation) to describe the victims of the Fukushima nuclear accident and instead calling them *hisaisha* (the affected by disaster), a more neutral term. As shown in the Part One case study, the government also tried to avoid evoking the issue of radiation exposure among the Fukushima victims in the compensation scheme by excluding specifically the prejudice of anxiety related to radiation exposure from the compensation items upon the insistence from the Nuclear Regulation Authority.

The status of *hibakusha* was first established by the Atomic Bomb Survivors Medical Care Act<sup>1557</sup> enacted in 1957 (the Medical Care Act, hereafter), which has not been changed much until today. This is the first time when the government officially recognised the survivors, with certain conditions, as the victims of atomic bombs in need of special care and support, *12 years* after the bombing. Before the enactment of the law, atomic bomb survivors had been called *genbaku hisaisha* (the affected by atomic bombs), *hibaku seizonsha* (exposed survivor), *genbaku shogaisha* (the disabled by atomic bombs), *genbakusho kanja* (atomic bomb disease patient), *genbaku higaisha* (atomic bomb victim) and *hibakusha* interchangeably.<sup>1558</sup>

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<sup>1557</sup> Act No.41 of 31 March 1957. The translation of 原子力爆弾被爆者の医療に関する法律 by R. Hasegawa.

<sup>1558</sup> Naono (n 1556). Translation of the term by R. Hasegawa

The legal criteria for the status fixed by the Act consist of the following four conditions:<sup>1559</sup>

- 1) those who were in Hiroshima city and the specified environ (the zone of about 5 km radius from the hypocentre) or Nagasaki city and the specified environ (the zone of about 5 km radius from the hypocentre except the southern area which extends to 12 km from the hypocentre) at the time of the bombing (this first category is called the “direct *hibakusha*”);
- 2) those who entered in the zone of 2 km radius from the hypocentre within two weeks following the bombing (the second category is called the “entrant *hibakusha*”);
- 3) those who do not fall under one of the above conditions but were exposed to deleterious effects of radiation emitted by the bomb at the time of the bombing or afterwards (the third category is called the “rescue *hibakusha*”);
- 4) those who were *in utero* of persons who fall under one of the above three situations (the fourth category is called the “*in utero hibakusha*”).

The above criteria in fact show that the decisive factor for recognising *hibakusha* is not only the distance from the hypocentre but also the radiation exposure from the bombs, *de facto* including ‘those who were only possibly affected by residual radiation’.<sup>1560</sup> Indeed, the second category of *hibakusha* are those who entered the 2 km radius zone for relief operations within two weeks from the bombing, thus long after the immediate radiation effect from the bomb (initial radiation), which can only be explained that they were exposed to residual radiation of the area. The third category of *hibakusha* are often those who were exposed to high doses of radiation by attending to irradiated relatives or handling the disposal of irradiated bodies even though they were outside of the defined area and time frame.

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<sup>1559</sup> The 1957 Atomic Bomb Survivors Medical Care Act (cited above); the Cabinet Order for the Enforcement of the Atomic Bomb Survivors Medical Care Act (Cabinet Order No.75 of 25 April 1957)

<sup>1560</sup> Naono (n 1555).

However, obtaining the *hibakusha* status alone does not accord the survivor comprehensive assistance. Upon recognition, *hibakusha* are entitled to the atomic bomb survivor's certificate (so-called *hibakusha* health book) and free medical check-ups twice a year. Only when a *hibakusha* is diagnosed with illnesses that are recognised as radiation-induced by the Ministry of Health, Labour, and Welfare (MHLW) or with other illnesses related to weakened health owing to radiation exposure from the bomb, s/he is provided with a full medical treatment at designated hospitals and monthly welfare allowance. In order to obtain the latter support, *hibakusha* has to apply for the "atomic bomb disease certification" at the MHLW.<sup>1561</sup> However, the reality is that the number of *hibakusha* awarded with the disease certification, so-called "certified *hibakusha*", represented only 0.9% of total *hibakusha*.<sup>1562</sup> This meant that the majority of *hibakusha* did not have access to comprehensive medical and welfare support. This led to many *hibakusha* lawsuits which the thesis will analyse in detail in the following sub-paragraph (B). Interestingly, this recalls the Fukushima case where only a small proportion of victims were recognised as legitimate ones eligible for comprehensive compensation while the majority were excluded from it by the adoption of a very stringent criterion.

The Medical Care Act was thus largely insufficient to provide proper relief to the A-bomb survivors who instead demanded State compensation, better medical assistance, and income support. The Tokyo District Court's ruling (7 December 1963) on the legal action brought against the state by five bomb survivors, so-called "Shimoda case", affirmed such claim of survivors by stating:

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<sup>1561</sup> In reality, the examination and the decision on the A-bomb disease certification are executed by the designated municipalities and prefectures under a subcontract agreement with the MHLW, as the thesis will see later in the Paragraph.

<sup>1562</sup> Manaka Amako, '原爆被爆者援護の現状と課題 (The Current Status and the Issues Concerning Atomic Bomb Survivors Support)' (2008) 283 立法と調査 (Legislation and Research) 70.

It is clear that the (the Medical Care Act) is far from providing necessary relief and support for the victims of atomic bombs. The state, by the war that it had started under its authority and responsibility, had led many nationals to deaths, injuries, and unstable lives. Moreover, the magnitude of its damage is incomparable to any regular disasters. It goes without saying that the defendant (the state) shall establish an adequate relief programme (for the victims) considering these facts.<sup>1563</sup>

As a result, the Act had been amended so many times afterwards, gradually enlarging the scope of *hibakusha* and improving the content of assistance. Initially registered as 200,000 in 1957, the number of recognised *hibakusha* reached 370,000 in 1980. However, the real number of *hibakusha* is thought to be much higher since certain survivors are still excluded from the status due to the criteria fixed by the State (whose lawsuits will be examined in the following sub-paragraph). There are also survivors who wish not to be recognised as *hibakusha* from fear of discrimination in the society.<sup>1564</sup>

The problem resulting from the repeated amendments of the Medical Care Act was that it created multiple categories of *hibakusha* with different entitlements, depending on the zones (the distance from the hypocentre in radius), the conditions of radiation exposure, and atomic illness criteria fixed by the MHLW (see Table 18 below). Indeed, this recalls again the case of the Fukushima status for accident victims established by the government after the nuclear accident.

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<sup>1563</sup> *Shimoda et al. v. the State* (Tokyo District Court, 7 December 1963) Hanrei Jiho 355, 17 (the original ruling in Japanese). Translation by R. Hasegawa from the original ruling.

<sup>1564</sup> Naono (n 1556); Kenichi Okubo, 'About the Atomic Bomb Disease Recognition Trials' (Japan Association of Lawyers Against Nuclear Arms (JALANA) 2007) <[https://www.hankaku-j.org/data/06/002\\_en.html](https://www.hankaku-j.org/data/06/002_en.html)> accessed 21 April 2022.

Table 18: Categories of Hibakusha Status (until 1974)

Status	Category	Conditions
General <i>Hibakusha</i>	(1) Direct <i>Hibakusha</i>	Those exposed within 5 km radius from the hypocentre
	(2) Entrant <i>Hibakusha</i>	Those who entered within 2 km radius from the hypocentre within 2 weeks
	(3) Rescue <i>Hibakusha</i>	Those under the condition of exposing themselves to radiation effects of the bomb at the time of the bombing or afterwards
	(4) In utero <i>Hibakusha</i>	Those who were <i>in utero</i> of the above three categories of <i>hibakusha</i>
Special <i>Hibakusha</i>	(1) Direct <i>Hibakusha</i> with “More Exposure”	Those exposed within 3 km radius from the hypocentre and those <i>in utero</i>
	(2) Certified <i>Hibakusha</i>	Those diagnosed with illness recognised as ‘atomic bomb sickness’ by the MHLW
	(3) Special Impediment <i>Hibakusha</i>	Direct or Entrant <i>Hibakusha</i> with “special impediments” recognised by the MHLW
	(4) Entrant <i>Hibakusha</i> with “More Exposure”	Those who entered within 2 km radius within 3 days and those <i>in utero</i>
	(5) “Black Rain” <i>Hibakusha</i>	Those exposed to “black rain” in the ‘Special Zone for Health Check-up’

As shown in the above Table, the government had created another group of *hibakusha* called “Special *Hibakusha*” in addition to the original “General *Hibakusha*” group during 1960-1974. By then, the *hibakusha* status consisted of nine categories. The Special *Hibakusha* group had five different categories including the above mentioned “certified *hibakusha*”, those exposed to the bomb within the 3 km radius zone at the time of bombing (including *in utero*), those diagnosed with one of the eleven “specific impediments” recognised by the MHLW (different from ‘A-bomb illness’ for “certified *hibakusha*”),<sup>1565</sup> those entered within the 2 km

<sup>1565</sup> The “specific impediments” (特定障害 in Japanese) are also illnesses but differentiated from “atomic bomb illnesses” (原爆症 in Japanese). The MHLW had separate lists for the former and the latter. For example, the list



radius zone within *three days* from the bombing (different from ‘within two weeks’ for “entrant *hibakusha*” of the general group), and those exposed to so-called “black rain”, the radioactive plume from the bomb reached the ground via rainfall. Once recognised, they were entitled to complementary medical assistance (the part not covered by national health insurance) and some allowances on certain conditions. This “special *hibakusha*” status was finally abolished in 1974 where all the *hibakusha* were entitled to the same assistance except the “certified *hibakusha*”.

Around the same time as the abolition of the “special *hibakusha*” status, the Japanese authorities created another type of assistance scheme in 1979: the second-generation *hibakusha* scheme for the children of *hibakusha*. Once recognised as the second-generation *hibakusha*, they are provided with free annual medical check-ups. Unlike the *hibakusha* status, the second-generation scheme is in fact not a legal status established by a law, but an administrative service provided by prefectural governments and financed by the state. Moreover, the scheme does not provide any medical assistance in cases where these second generations fall ill with the exception of a few prefectural governments such as the Tokyo metropolitan government which offers support for medical expenses in addition to medical check-ups. Although the Japanese authorities do not officially recognise the possibility of radiation hereditary effects among victims, the fact of creating this second-generation support scheme to follow up on their health does indicate that they do not completely deny such effects among the second generations.

Ultimately, the Atomic Bomb Survivors’ Support Act<sup>1566</sup> enacted in 1994 finalised the status of *hibakusha*, incorporating both the Medical Care Act of 1957 as amended and the Act

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of specific impediments includes diabetes, cerebral stroke, hypertensive heart disease, stomach ulcer, arthritis...etc., while that of “atomic bomb diseases” entails solid cancer, leukaemia, radiation myocardial infarction, radiation cataract, radiation chronic hepatitis...etc.

<sup>1566</sup> Act No. 117 of 16 December 1994. The translation of 原子爆弾被爆者に対する援護に関する法律 by R. Hasegawa.

on Special Measures for Atomic Bomb Survivors of 1968<sup>1567</sup> as amended. The *hibakusha* criteria remain the same from the one fixed by the Medical Care Act above but the entitlement has changed by this new Act. A *hibakusha*, once s/he obtains the status, is entitled to the *hibakusha* certificate (health book), free medical check-ups (twice a year, and two more on demand), and complementary medical support (the part not covered by national health insurance) for all illnesses. If a *hibakusha* fills certain criteria, s/he is also entitled to the full medical treatment (only for the certified *hibakusha*) and eight different allowances seen in Table 19 below.

Table 19: The List of *Hibakusha* Allowances (as of 2006)<sup>1568</sup>

Type of Allowance	Eligible Persons	Amount in euros (equiv)/month	No. of Beneficiary
Medical Special Allowance	Certified <i>Hibakusha</i> with radiation-related illness	1,000	2,215
Special Allowance	Certified <i>Hibakusha</i> in convalescent	380	1,104
Atomic Bomb Microcephaly Allowance	<i>Hibakusha</i> suffering from radiation microcephaly	340	22
Health Management Allowance	<i>Hibakusha</i> with one of 11 specific impediments	250	218,446
Health Care Allowance	<i>Hibakusha</i> within 2 km radius from hypocentre including <i>in utero</i>	122 or 250	8,154
Nursing Allowance	<i>Hibakusha</i> who needs and employs nursing helpers	500 or 750	18,049
Family Nursing Allowance	<i>Hibakusha</i> who is in nursing care provided by his/her family	160	25,403
Funeral Allowance	The family of a deceased <i>hibakusha</i>	1,500(lumpsum)	8,039

<sup>1567</sup> Act No. 53 of 20 May 1968. The translation of 原子爆弾被爆者に対する特別措置に関する法律 by R. Hasegawa. The Act established the system of allowances for *hibakusha* (only the Certified *Hibakusha* and Special *Hibakusha*) for the first time

<sup>1568</sup> Amako (n 1562) 70. The amount was calculated from Japanese yen to euro by R. Hasegawa. The original source of the information is the MHLW.

As shown in the above table, the criteria used to recognise the abolished status of “special *hibakusha*” are utilised to determine different allowances. From the number of beneficiaries for each allowance, one can observe that 87% of all *hibakusha* (251,834 as registered in MHLW)<sup>1569</sup> suffer from various illnesses recognised only as “specific impediments” by the government, receiving the allowance (Health Management Allowance) of 250 euros/month. In contrast, the *certified* *hibakusha* with so-called “A-bomb illnesses” receives the allowance of 1,000 euros/month (Special Medical Allowance) but it represents only 0.9% of all *hibakusha*.<sup>1570</sup>

Just like for Fukushima nuclear accident victims, multiple categories of *hibakusha* status (and allowances) created by the government resulted in dividing the bomb survivors and pitting one category of *hibakusha* against another.<sup>1571</sup> The stringent and multi-layered conditions for each category differentiate one *hibakusha* category from another by a laser-thin margin: the difference of a few metres from the designated zone or a day later from the fixed time frame in entering the city. Most of all, the MHLW criteria established for “A-bomb illness” are so stringent that many *hibakusha* suffering from different illnesses are excluded from the status and left without adequate assistance from the government. This led to multiple lawsuits, both individual and group actions, against the state, demanding the recognition of their illnesses as radiation-related and the access to assistance.

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<sup>1569</sup> The source: the website of MHLW at <[https://www.mhlw.go.jp/stf/newpage\\_13419.html](https://www.mhlw.go.jp/stf/newpage_13419.html)>, consulted 20 April 2022.

<sup>1570</sup> Amako (n 1562) 70.

<sup>1571</sup> Naono (n 1556).

## B. Hiroshima/Nagasaki *Hibakusha* Lawsuits

What the A-bomb survivors have demanded all along is the state's recognition of its responsibility for the war, which led to the two atomic bombs in Hiroshima and Nagasaki.<sup>1572</sup> Contending that the A-bomb victims are “the sacrificed” of the war which was launched and pursued by the state, the survivors have asked for state compensation for their injuries and suffering.<sup>1573</sup> Since Japan renounced the right of the state and its nationals to claim war damages against the Allied Powers in the Treaty of Peace with Japan<sup>1574</sup> (article 19(a)) signed in 1951 at San Francisco, *hibakusha* have demanded the state to assume its part of responsibility. Indeed, the Japanese government has never paid compensation for deaths and injuries of non-combatants including A-bomb victims except for some high-ranking military personnel and war-time cabinet members.<sup>1575</sup> The *hibakusha* status and its support scheme is largely focused on the survivors who suffer radiation illnesses and does not address psychological trauma and suffering of the survivors who witnessed atrocities, lost parents or siblings, lived in economic destitution due to their poor health, constantly worried about their future health and their children, or experienced discrimination owing to their status.<sup>1576</sup>

The *hibakusha* legal actions can be grouped largely in two according to the claim. The first group is the lawsuits related to the status of *hibakusha* (1) and the second one is related to the “atomic bomb sickness certification” – the status of “certified *hibakusha*” (2). Both actions challenged the stringent criteria set up by the government in recognising these statuses, which

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<sup>1572</sup> Naoko Ito, Chieko Tabe and Shigenori Nakagawa, 被爆者はなぜ原爆症認定を求めるのか (*Why Do Hibakusha Demand 'Atomic Bomb Disease Certification'?*) (Iwanami Shoten 2006); Naono (n 1556).

<sup>1573</sup> Naono (n 1556) 119.

<sup>1574</sup> Treaty of Peace with Japan (adopted 8 September 1951, entered into force 28 April 1952) 1832 UNTS 44

<sup>1575</sup> Masayoshi Naito, 'The Trials for Recognition of A-Bomb Injuries and the Feelings of Hibakusha' (Japan Association of Lawyers Against Nuclear Arms (JALANA) 2013) <[http://www.hankaku-j.org/data/07/oslo\\_201305\\_004.pdf](http://www.hankaku-j.org/data/07/oslo_201305_004.pdf)>; NHK article on the NHK Special programme, 忘れられた戦後補償 (The Forgotten Post-War Compensation (translation by R. Hasegawa) broadcasted on 15 August 2020 (22 October 2020) at <<https://www.nhk.or.jp/special/plus/articles/20201021/index.html>>, consulted 24 April 2022

<sup>1576</sup> Naono (n 1556); Naito (n 1575).

were largely based on the circle distance from the hypocentre and a specific view on radiation risk, notably the threshold dose of 100 mSv. These criteria largely ignored the factor of residual radiation and internal exposure to radiation, the latter of which was also the case with the post-Fukushima policy which solely focused on external exposure doses to assess risk.

### 1. The “*Hibakusha* Status” Action

The lawsuits for the status of *hibakusha* comprise the “third-category *hibakusha*” action, the “black rain” action (Hiroshima), and the *hibaku-taikensha* action (Nagasaki). The main points of contention in these actions are the government’s disregard for internal exposure doses of the survivors as well as the fallout exposure due to “black rain” in the *hibakusha* status determination.

The “third-category *hibakusha*” action in fact challenged the government’s criteria which ignore survivors’ internal exposure doses to radiation. The suit was filed against Hiroshima city, which processes the *hibakusha* status application. In fact, the MHLW generally delegates the task of the status determination to prefectural governments and Hiroshima and Nagasaki cities under subcontractor agreements, who exercise a certain level of discretion in specifying the conditions for recognition. As such, Hiroshima city and the Hiroshima Prefecture established a very peculiar condition to recognise so-called “rescue *hibakusha*”, the third category *hibakusha* who entered the city after the bombing to rescue the affected population (see Table 18 above). The condition was that the applicant must have attended to, transported, or disposed of at least 10 irradiated patients or bodies *per day* within two weeks from the bombing in order to be granted the status.<sup>1577</sup> Seven survivors whose application had been rejected by the city on the above ground filed a complaint to the Hiroshima District Court in

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<sup>1577</sup> Naono (n 1556) 130.

2005. The court ruling on 25 March 2009 dismissed the city's condition as arbitrary, not based on science, and instructed the city to grant all seven the status of *hibakusha*. By doing so, the court clearly recognised the risk related to internal radiation exposure by stating that if one spent some time in an environment where many irradiated persons were concentrated, such as first-aid stations, 'it is undeniable that such a person who ingested radioactive substances produced by the atomic bomb detonation [...] has more risk of developing physical injuries due to radiation-induced genetic mutations such as cancer than a person who did not enter the first-aid centres'.<sup>1578</sup> Hiroshima city decided not to appeal the decision, thus making it the final judgement of the case. This ruling became one of important jurisprudence recognising the serious health risk related to internal exposure to radiation.

The other two actions, the "black rain" action (Hiroshima) and the *hibaku-taikensha* action (Nagasaki), both challenged the government's neglect of radioactive fallout exposure among the survivors via the "black rain". In 1976, the government created the fifth category of the "special *hibakusha*" status for those who were exposed to so-called "black rain" after the bombing, which contained radioactive materials emitted from the bombs. By creating this new status, the government has *de facto* acknowledged the existence of radioactive fallout affecting a much wider area than a few kilometres around the hypocentre. Once recognised, the "black rain" special *hibakusha* was eligible for free health check-ups twice a year and, if diagnosed with one of the "special impediments" established by the MHLW, s/he received complementary medical support. However, the problem was the definition of such a "black rain" zone by the government. In fact, the MHLW only recognised the zone affected by "heavy rain" according to the survey conducted by the local meteorologists in 1953 (so-called *Uda* Rain Map), ignoring

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<sup>1578</sup> Hajime Kikima, '広島救護被爆者手帳交付訴訟の地裁判決についての談話 (About the District Court Decision Concerning the Issuance of Rescue Hibakusha Health Book Legal Action in Hiroshima)' (Japan Federation of Democratic Medical Institutions (Min-Iren) 2009) Statement on 31 March 2009 <<https://www.min-iren.gr.jp/?p=683>> accessed 22 February 2023. Translation the court decision by R. Hasegawa.

other areas affected by small to medium rain.<sup>1579</sup> A survey conducted by Fukushima city and the Fukushima Prefecture in 2008 indeed showed that the black rain affected area was six times larger than the “Special Zone for Health Check-Up” – the black rain area defined by the government.<sup>1580</sup>

In 2005, 88 survivors in Hiroshima who claimed to have been exposed to black rain outside the recognised “Special Zone” and suffered from various illnesses filed a joint complaint to Hiroshima District Court, demanding the recognition of their illness as atomic bomb-induced and the status of *hibakusha*. The court ruling on 29 July 2020 recognised the *hibakusha* status for all the 84 plaintiffs (another four plaintiffs died during the process) by affirming that they had effectively been exposed to black rain and thus to deleterious radiation effects.<sup>1581</sup> The decision also stated that the zone affected by black rain was much larger than the Special Zone defined by the government and that all people who were exposed to black rain shall be granted the status of *hibakusha* regardless of the manifestation of illnesses. These opinions were reaffirmed by the Hiroshima High Court ruling rendered on 14 July 2021.<sup>1582</sup> The high court judges went even further to state that the status of *hibakusha* (the third category) shall be granted not only to those exposed to black rain but also to those under the circumstance of being exposed to ‘internal radiation by sucking up radioactive microparticles in the air or drinking the water or consuming vegetables containing these microparticles reached on the

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<sup>1579</sup> Naono (n 1556). The survey was conducted by the team of meteorologists led by Mr. Michitaka Uda.

<sup>1580</sup> Source: Hiroshima Prefecture website <<https://www.pref.hiroshima.lg.jp/uploaded/attachment/3889.pdf>> and <<https://www.pref.hiroshima.lg.jp/uploaded/attachment/409796.pdf>> , consulted 23 April 2022; Asahi Shimbun, 黒い雨、疾病あれば被爆認定 判決に政治的解決求める声 (Black rain, recognised as *hibakusha* in case of sickness, a demand for political solution upon the ruling (translation by R. Hasegawa), 29 July 2020 <<https://www.asahi.com/articles/ASN7Y761TN7WPTIL02Q.html>>, consulted 23 April 2022

<sup>1581</sup> Hiroshima District Court, 29 July 2020, the summary of the ruling is available on the website of the Association for the Support of “Black Rain” Lawsuits (黒い雨訴訟を支援する会) at <[blackrain1.jimdofree.com/](http://blackrain1.jimdofree.com/)>, consulted 23 April 2022.

<sup>1582</sup> Hiroshima High Court, 14 July 2021, the summary of the ruling is available on the website of the Association for the Support of “Black Rain” Lawsuits (黒い雨訴訟を支援する会) at <[blackrain1.jimdofree.com/](http://blackrain1.jimdofree.com/)>, consulted 23 April 2022.

ground'.<sup>1583</sup> These rulings thus enlarged the criteria of *hibakusha*, declaring in effect the inadequacy of the government's *hibakusha* criteria.

Similarly, 22 survivors in Nagasaki filed a joint lawsuit in 2007, alleging the exposure to black rain outside the "Special Zone for Health Check-up" and claiming the *hibakusha* status. The action became a series of joint lawsuits involving 539 plaintiffs in the end.<sup>1584</sup> These suits are called the *hibaku-taikensha* ('those who experienced the bomb') action because the government had created the "Second Special Zone for Health Check-Up" only in Nagasaki, the area outside the original "Special Zone", where the residents at the time of the bombing are recognised with the status of *hibaku-taikensha*. However, *hibaku-taikensha* are not the *hibakusha* status and thus are not entitled to the *hibakusha* certificate (health book) nor medical support when they fall ill. In fact, the government considers them as victims of psychological trauma from experiencing the bomb but not radiation exposure from the bomb. In contrast to the Black Rain joint suits in Hiroshima, two *hibaku-taikensha* joint actions have been dismissed at the Supreme Court on 18 December 2017 and 21 November 2019 respectively.

## 2. The "Atomic-Bomb Illness Certification" Action

The "atomic-bomb illness certification" action has become a nationwide *hibakusha* legal movement since the first joint suit was launched in 2003. There are 17 group actions filed all over Japan, involving more than 300 plaintiffs.<sup>1585</sup> As of March 2010, 15 joint actions have won the case at district courts, five of which have also won at high courts.<sup>1586</sup>

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<sup>1583</sup> *ibid*

<sup>1584</sup> Naono (n 1556).

<sup>1585</sup> Tetsuro Miyahara, 'NPT 2010 Review Conference Report: Facts Revealed by Joint Suits for Certification of Atomic Bomb Sickness' (Japan Association of Lawyers Against Nuclear Arms (JALANA) 2010) <[https://www.hankaku-j.org/data/07/npt\\_005\\_en.html](https://www.hankaku-j.org/data/07/npt_005_en.html)> accessed 20 April 2022.

<sup>1586</sup> *ibid*.



The event which first triggered the nationwide action was the publication of the MHLW's new guidance on the atomic-bomb illness certification in May 2001.<sup>1587</sup> The guidance was compiled following the Supreme Court decision on the *Matsuya vs. the State* case (18 July 2000), which dismissed the state appeal and concluded the case in favour of the plaintiff.<sup>1588</sup> Ms Matsuya was exposed to the bomb at 2.45 km from the hypocentre at the age of three and injured in the head by the object blown by the bomb blast, which made her hemiparesis. Following the exposure, she also suffered severe diarrhoea, loss of hair, and seizures from the head injury. The MHLW had repeatedly refused to recognise her hemiparesis as "atomic-bomb illness", failing to grant her the status of the "certified *hibakusha*".

The main argument of the defendant (the state) is that only those exposed to the bomb within 2 km radius from the hypocentre, thus considered as having received an initial radiation of 100 mSv and more, were subject to the *harmful* effect of radiation from the bombs.<sup>1589</sup> According to the government's official stance, those who were beyond the 2 km radius zone at the time of explosion, those who entered the city a few days later ("entrant *hibakusha*"), or those who did not enter the city ("rescue *hibakusha*") cannot possibly be affected by deleterious radiation effects.<sup>1590</sup> This view was formed from the fact that the government uses a particular calculation method called Dosimetry System 1986 (DS86), originally invented by the US military and used by the ABCC (then the RERF), to estimate the exposed dose of A-bomb survivors and determine the causality between the illness of an applicant and atomic bombs.<sup>1591</sup>

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<sup>1587</sup> Ito, Tabe and Nakagawa (n 1572).

<sup>1588</sup> Source: the website of the Japan Confederation of A-and H-Bomb Sufferers Organizations (so-called "*Hidankyo*" in Japanese) at <http://www.ne.jp/asahi/hidankyo/nihon/NewFiles/matsuya.htm> <https://www.antiatom.org/GSKY/en/hbksh/matuya.htm>, consulted 20 April 2022. The *Hidankyo* is a nationwide representative organisation for the cause of *hibakusha* founded by *hibakusha* themselves in 1956.; The first instance decision (Nagasaki District Court, 26 May 1993) dismissed the defendant's argument and recognised Ms Matsuya's hemiparesis as "atomic bomb sickness", which was reaffirmed by the high court ruling (Fukuoka high court, 11 November 1997).

<sup>1589</sup> Naito (n 1575).

<sup>1590</sup> Okubo (n 1564).

<sup>1591</sup> Naono (n 1556); Ito, Tabe and Nakagawa (n 1572).

Formerly known as T65D (Tentative 65 Dose), DS86 is a theoretical estimation of doses that a human body directly receives from the bomb detonation during the first minute, calculated based on the data from US bomb tests and computer simulations. It is indeed the estimation of external “initial radiation” exposure doses, ignoring the dose intake from internal exposure and radioactive fallout.<sup>1592</sup> Moreover, despite the term “atomic bomb sickness”, the government only counts injuries from radiation exposure and not those from bomb blast and heat (as was the case with Ms Matsuya).

Despite the Supreme Court verdict on the Matsuya case, the MHLW’s new guideline for the “atomic bomb sickness” which came out following the verdict in 2001 contained even more stringent criteria than the previous guidelines. As a matter of fact, according to the new guideline, Ms Matsuya’s case would certainly not have been recognised as “atomic bomb sickness”. This state attitude of defiance against the Supreme Court decision triggered the indignation of *hibakusha*, which led to a surge of joint lawsuits all over Japan.

The court rulings on these joint actions resulted in expanding the criteria for “atomic bomb illness”, recognising more “certified *hibakusha*”, and refuting some of the government positions on radiation risk. First, the courts successively rejected the government’s argument that only close-range direct exposure led to harmful radiation effects, and recognised “A-bomb illness” among those who were exposed outside the 2 km radius zone as well as those who entered the city later.<sup>1593</sup> Just like the ruling on the *hibakusha* status lawsuits, courts affirmed the existence of residual radiation and internal radiation exposure which have seriously affected the health of survivors. Some court rulings also dismissed the government’s claim of the DS86 as the scientifically reliable method by stating that the DS86 only captured exposure doses from

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<sup>1592</sup> Ito, Tabe and Nakagawa (n 1572).

<sup>1593</sup> For example, the Osaka District Court ruling on 12 may 2006 and the Hiroshima District Court decision on 4 August 2006. Naono (n 1556); Naito (n 1575).

initial radiation, representing only one of many factors to consider, and thus shall not be systematically applied to determine A-bomb related illnesses.<sup>1594</sup> Instead, the courts recommended to ‘make an overall evaluation of applicant’s life circumstance and health conditions prior to the bombing as well as her/his exposure circumstance, movements, and actions after the bombing’.<sup>1595</sup> Secondly, the rulings enlarged the list of A-bomb injuries or illnesses.<sup>1596</sup> Prior to the launch of these joint actions, the government had recognised only specific malignant tumours (solid cancers and leukaemia), hyperparathyroidism and cataracts as A-bomb illnesses. The courts, on the other hand, have acknowledged a wide range of non-cancerous illnesses such as heart attacks, strokes, liver dysfunction, and hypothyroidism as A-bomb related injuries.

After a series of court case losses, the government has successively revised the MHLW guideline for A-bomb illness. As a result, the number of annual A-bomb illness recognition jumped from less than 200 cases a year (before 2007) to more than 2,000 cases in 2008 and 2009.<sup>1597</sup> However, the easing of criteria has also been accompanied by the addition of new conditions by the MHLW, thus showing the limit of court rulings’ influence on government policy.

From these *hibakusha* legal actions and jurisprudence, one can observe a pattern of the Japanese government’s decision-making and policies toward radiation victims, which is identifiable with the post-Fukushima policies. Indeed, it consists of creating multiple categories of victim status with very stringent and inflexible conditions, mainly based on the radial

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<sup>1594</sup> Naono (n 1556).

<sup>1595</sup> The Osaka District Court ruling (12 may 2006), cited by *ibid* 162.

<sup>1596</sup> Naito (n 1575).

<sup>1597</sup> MHLW, ‘原爆症認定審査の現状について (The Current Situation of Atomic Bomb Illness Certification Assessment)’ (Ministry of Health, Labour and Welfare 2011) Support Doc No2 submitted to the Fifth Study Group Meeting on the Atomic Bomb Sickness Certification System (15 July 2011).

distance from the epicentre and the external exposure dose threshold at 100 mSv. In both cases, victims struggled to obtain needed assistance and compensation under the heavy burden of proof against the government expert opinions which underestimate radiation risk, and which is backed by the norms of international nuclear institutions.

The jurisprudence from the *hibakusha* actions, both for the status and the A-bomb illness certification, provides important precedents for the future litigations of Fukushima accident victims and other nuclear disaster victims. The jurisprudence notably established that incorporating internal exposure doses and making an overall assessment of an individual's life circumstance, health conditions, exposure situation, movements, and actions during and after the exposure is essential in estimating the individual's exposed doses and needed assistance. Moreover, the list of recognised radiation illnesses enlarged by the *hibakusha* jurisprudence also plays a vital role in cases where a Fukushima victim or any nuclear disaster victim falls ill after several years or decades and asks for compensation for their injuries. The *hibakusha* cases notably recognised that radiation exposure causes sustained internal inflammation and immunological deterioration which will affect the general health condition of the exposed over a long period of time, which could lead to not only well-known malignant tumours such as solid cancer and leukaemia but also non-cancerous disorders such as myocardial infarction, hyperparathyroidism, and liver dysfunction.<sup>1598</sup>

## §2: Fukushima Laws and Lawsuits

Following the accident, the Japanese Diet enacted numerous laws to face its consequences: to name a few, the Decontamination Act<sup>1599</sup>, the Reconstruction Act<sup>1600</sup> the

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<sup>1598</sup> Naito (n 1575).

<sup>1599</sup> The Act on Special Measures Concerning the Handling of Environmental Pollution by Radioactive Materials Discharged by the Nuclear Power Station Accident Associated with the Tohoku District-Off the Pacific Ocean Earthquake that Occurred on March 11, 2011 (2011), cited above

<sup>1600</sup> The Act on Special Measures for the Reconstruction and Revitalization of Fukushima (2012), cited above

Corporation Act<sup>1601</sup>. As examined earlier in the Title II of Part One, these Acts formalised the overall government post-accident policy based on the 20 mSv/year threshold dose and the salvage of TEPCO by *de facto* nationalisation. Also, they largely follow the pre-accident policy orientation premised on the pursuit of civil nuclear energy and industry protection. Notwithstanding, there was another type of post-Fukushima law adopted in the sequel, which stands apart from all of the above.

It is the Nuclear Accident Victims and Children Support Act (the Children Support Law, hereafter)<sup>1602</sup>, enacted in June 2012, which aimed at providing relief and protection specifically to the affected residents, especially children, living in (or evacuated from) the areas outside official evacuation zones. In contrast to the other post-Fukushima laws, the Act was a private member's bill brought by a bi-partisan group of Diet members, not a government bill introduced by the executive, and had a quality of rectifying, rather than reinforcing, the post-accident policies installed by the government. In essence, the Act expanded the notion of accident victims as well as the scope of assistance, focusing attention on those victims who had been largely ignored in the government's recovery programme and in effect, questioning the adequacy of the post-accident policy determined by the executive. The said law thus provides an interesting counterpoint to what had been established as the Fukushima protection model by the Japanese authorities and serves as an important reference for the new model of nuclear disaster protection norms which will be proposed in the following chapter. The first half of the paragraph is thus dedicated to examining the content and the legal sources of this Act (A).

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<sup>1601</sup> The Nuclear Damage Compensation Facilitation Corporation Act (2011), cited above.

<sup>1602</sup> The Act on Promotion of Support Measures for the Lives of Disaster Victims to Protect and Support Children and Other Residents Suffering Damage due to Tokyo Electric Power Company's Nuclear Accident (2012), cited above.

The Fukushima policy and compensation scheme were also challenged at courts in Japan. Nationwide civil legal actions were brought against TEPCO and the state by multiple groups of victims contesting the validity, the fairness, and the sufficiency of the government-instituted Fukushima protection status. The court decisions on these actions indeed revealed, though in a subtle manner, the inadequacies and inconsistencies of the post-accident schemes in terms of existing laws, constitutional rights, and even international radiological protection norms. The second half of this paragraph thus investigates the court decisions from the Fukushima lawsuits, which resulted in enlarging both the notion and the scope of nuclear damage, thus complementing the compensation to a certain degree (B). The result of this analysis will again be used for the reflection of the final chapter.

### **A. The Children Support Law and the Concept of “the Right to Avoid Radiation Exposure”**

As shown in the Fukushima case study (Part One, Title II), the government post-accident programme focused on the affected residents from mandatory evacuation zones delineated by the reference dose of 20 mSv/year. The other residents affected by radiation fallout but living outside these zones were thus given neither a proper recognition as victims nor adequate compensations. To rectify the situation, a group of lawmakers pushed through a bill at the Diet in June 2012, which aimed at supporting both “voluntary” evacuees and stayers (including the trapped) in these out-of-zone areas. The enactment of the Nuclear Accident Victims and Children Support Act thus brought many hopes to these victims.

This sub-paragraph first presents the novelties and the limitations of this Children Support Law (1), followed by the analysis of the legal basis and concepts which constituted the Law (2).

## 1. The Child Support Law to Protect “Voluntary” Evacuees and (Trapped) Stayers in the Out-of-Zone Areas

The Nuclear Accident Victims and Children Support Act is different from all other post-Fukushima laws and policies. First, it provided new definitions of “Disaster Victims” and “Support Target Areas”, distinct from those specified by the compensation guideline of the MEXT’s Reconciliation Committee.<sup>1603</sup> According to the Law, Disaster Victims are ‘people who reside or did reside in areas where measured radiation doses exceed *a certain level*, those who were forced to evacuate under orders for evacuation issued by the national government, and *those equivalent thereto*’ (Article 1).<sup>1604</sup> By this provision, the Law recognises evacuees from both evacuation zones and out-of-zone areas, returnees, and stayers in the contaminated territories, all on an equal footing, *de facto* disregarding the 20 mSv/year dose criteria set up by the government which had differentiated and divided the victims.

In the same vein, the “Support Target Area” is defined as ‘areas where radiation doses are below the level that requires the national government to issue orders for evacuation but exceed *a certain level*’ (Article 8), thus expanding the scope to include out-of-zone affected areas.<sup>1605</sup> However, it left to the government to determine “a certain level” of radiation between 1-20 mSv/year, in other words, the exact contour of this “Support Target Area”. By these redefinitions, the Law indeed rectified the disproportionality of the government support and compensation placed on the evacuation zones and recognised the legitimacy of out-of-zone evacuees and residents to access a proper support.

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<sup>1603</sup> In the MEXT’s compensation scheme, “Target Areas” were defined as those areas under government evacuation/sheltering instructions. “Eligible Person” were defined as those who were removed from the “Target Area” for emergency evacuation and those who were outside of the “Target Area” at the time of the accident despite having their principal residence within the Area and could not return home due to evacuation orders.

<sup>1604</sup> Emphasis added.

<sup>1605</sup> Emphasis added.

Another novelty of the Law is that it clearly acknowledged the responsibility of the government in relation to the nuclear accident. It states that the government owed ‘its social responsibility arising from having proactively promoted its nuclear energy policy’ and a duty to establish and implement comprehensive support measures for Disaster Victims (Article 3). This provision indeed establishes the State as duty-bearer and the victims as right-holders, aligning the Law with the basic principle of the human rights-based approach (HRBA).

As a matter of fact, the Law’s provisions strongly evoke certain principles of international human rights law and the Guiding Principles on Internal Displacement. For example, Article 2(2) states that support measures ‘must be implemented so as to enable each Disaster Victim to *make a voluntary choice* as to whether to reside in an area under the support measures set forth in Article 8 [...], to relocate to another area, or to return to the area they lived in prior to relocation, while ensuring that appropriate support is offered *irrespective of their choices*’.<sup>1606</sup> By this, the Act not only ensures the right of individuals to choose, on her/his free will, from three mobility options – remain, relocate (evacuate), or return – in/from/to the contaminated territories, but most importantly, requires the government to allocate equitable means and facilitate the realisation of their respective choices. It then lists the measures which shall be established to achieve this goal. They include housing support, schooling support, medical care, employment facilitation, food safety measures, radiation dose reduction measures, rest-and-recreation (R&R) trips in nature, and separated children (from one of their parents) support (Article 8-11). The rights-based consideration is also found in Article 2(4)(5) which instructs competent authorities to design the support measures so as not to ‘generate unreasonable discrimination’ against Disaster Victims and to provide special care for vulnerable groups such as children and pregnant women. These provisions represent a completely new

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<sup>1606</sup> Emphasis added.



approach which in effect runs counter to some of the government policies which rather promote returning and remaining of residents in the contaminated territories and largely ignore those who have evacuated and resettled elsewhere.

Article 2(2) effectively recalls Principles 14, 15, 28 and 29 of the Guiding Principles on Internal Displacement, which guarantee the right of displaced persons ‘to return voluntarily, in safety and with dignity, to their homes or places of habitual residence, or to resettle voluntarily in another part of the country’ (Principle 28) without discrimination and assign the primary responsibility to competent authorities to facilitate the realisation of their respective choices by establishing appropriate conditions and providing adequate means. Ryoichi Yoshimura, a Japanese jurist in environmental law, argues that this Act in fact guarantees the five essential rights to which an individual is entitled in the event of nuclear accidents: the right to evacuation, the right to remaining, the right to resettlement, the right to long-term relocation (in waiting for repatriation), and the right to return.<sup>1607</sup>

Also, the Act takes a more cautious approach to radiation risk. Notably, it recognises that radiation effect on human health has not yet been fully elucidated by science (Article 1) and urges to take protection measures based on precaution. This again runs counter to the government’s stance on radiation risk which considers radiation doses below 100 mSv as having little to no health effect. Furthermore, the Act acknowledges that radiation effects continue for a long period of time, thus prescribing the implementation of these protection measures ‘as long as there is a need for Disaster Victims’ (Article 2(6)). In view of this, the Law provides children among Disaster Victims at the time of the accident with free regular health check-ups ‘throughout their lifetime’ (Article 13(2)), acknowledging that children are more sensitive to

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<sup>1607</sup> Yoshimura, ‘「自主的避難者（区域外避難者）」と「滞在者」の損害 (Damages Related to “Self (Out-of-Zone) Evacuees” and “Stayers”)’ (n 878).

radiation (Article 2(5)). Also, the Act requires the state to cover medical expenses for radiation-induced injuries among children and pregnant women though it specifically excludes injuries that are not attributable to radiation exposure (Article 13(3)). This provision also separates the Act from the Fukushima compensation scheme which shied away from addressing the damage related to radiation exposure.

Despite these novelties, the Act finally did not bring about much hoped change in the government policy toward out-of-zone victims or on radiation risk. The government, seemingly in an act of defiance, initially did not take any action to implement the law. For a newly legislated Act to be effective, the government usually adopts cabinet orders, ministerial ordinances, or other policy documents to elaborate implementation modalities and provide precisions to the contents. Article 5 of the Children Support Law specifically requires the government to establish the “Basic Framework” which would set up basic strategies, define “Target Support Area”, and elaborate support measures. However, the responsible ministry – Reconstruction Agency – had not drawn such Basic Framework more than a year following the law’s enactment and it only did so when a group of victims finally decided to file a complaint at court for the government’s inaction to the Act.<sup>1608</sup> The Basic Framework was finally published in October 2013, 16 months after the enactment of the Act, but it fell largely short of what the Act had originally intended.<sup>1609</sup>

First, the Basic Framework was adopted without much input from the victims. For the preparation of the Framework, the Act specifically instructs the government to consult and reflect the opinions and concerns of the victims (Article 5(3)). The only public consultation the

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<sup>1608</sup> Fukuda and Kawasaki (n 50).

<sup>1609</sup> Reconstruction Agency, ‘the Basic Framework on the Promotion of Support Measures for the Lives of Disaster Victims’ (October 2013) at <<https://www.reconstruction.go.jp/topics/main-cat2/20131011honbun.pdf>> (only in Japanese), consulted 6 April 2022

government organised was the creation of a public comment space on the website for a period of two weeks and the holding of two “explanation meetings” in Fukushima and Tokyo.<sup>1610</sup> Despite the short time frame fixed for public comments, the Reconstruction Agency had received about 5,000 comments on the draft Framework. Notwithstanding, the final version of the Framework did not reflect most of these comments nor the proposals made by victim associations and NGOs.<sup>1611</sup>

Secondly, the Framework adopted a very restrictive interpretation of the Support Target Area: it consisted of only 32 municipalities outside the evacuation zones, all in the Fukushima Prefecture. By comparison, the Ministry of Environment had designated a total of 104 municipalities spreading over eight prefectures as radiation affected areas – the area with doses between 1 to 20 mSv/year – eligible for decontamination. Though the Framework mentions a possibility of recognising other municipalities as “quasi-Support Target Area”, it fell short of providing any precisions or criteria. In fact, all the designated 32 municipalities are the ones which had already been recognised as “Area subject to Voluntary Evacuation” by the compensation guidelines of the Reconciliation Committee or by TEPCO and thus already entitled to some compensation.<sup>1612</sup> Most critically, the Framework did not provide any definitions for “a certain level” of radiation dose (Article 8) which would have determined the lowest dose threshold to delineate the Target Support Area. This specifically allowed the government to stick to the original 20 mSv/year reference dose, thus keeping its policies as they were in place.

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<sup>1610</sup> Fukuda and Kawasaki (n 50).

<sup>1611</sup> *ibid.*

<sup>1612</sup> The First Supplement to Interim Compensation Guideline (December 2011) listed 23 municipalities of *Naka-dori* and *Hama-dori* regions as “Areas subject to Voluntary Evacuation, etc.” and eligible for compensation. After a plea made by affected residents from other municipalities, TEPCO decided to partially compensate the residents living in additional 10 municipalities. Nine out of the 10 are located in the *Naka-dori* region of Fukushima prefecture and one municipality is situated in Miyagi prefecture. So, the Support Target Area defined by the Basic Policy was the combination of the two areas except one municipality located in Miyagi prefecture.

Ultimately, the Basic Framework was a restatement of already-existing measures, containing very few new measures for the out-of-zone victims.<sup>1613</sup> As such, the Japan Federation of Bar Associations (JFBA) even contended that the said Framework did not constitute “the Basic Framework” prescribed in Article 5 of the Law.<sup>1614</sup> In the end, the government’s Framework *de facto* served to “neutralise” the effect of the Law on its post-accident policy, allowing the executive to continue its course of action without very little modifications.

Nevertheless, the Fukushima Children Support Law offers an inspiring example of protection principles for nuclear disaster victims, which will guide the final reflection of the thesis in the following chapter.

## 2. Legal Foundations of the Children Support Law: “the Right to Evacuation” and “the Right to Avoid Radiation Exposure”

According to Kenji Fukuda and Kenichiro Kawasaki, two main lawyers who established the Save Fukushima Children Lawyers’ Network (SAFLAN)<sup>1615</sup>, the core legal notion which forms the basis of the above Nuclear Accident Victims and Children Support Act is “the right to avoid radiation exposure”<sup>1616</sup> (or “the right to be free of threats from radiation exposure”).<sup>1617</sup> The recognition and the incorporation of such a right into the Basic Framework

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<sup>1613</sup> Fukuda and Kawasaki (n 50); JFBA, ‘「被災者生活支援等施策の推進に関する基本的な方針（案）」に関する会長声明 (President’s Statement Regarding “The (Draft) Basic Framework Regarding the Promotion of Disaster Victims Life Support Measures”)’ (n 34).

<sup>1614</sup> JFBA, ‘「原子力災害による被災者支援施策パッケージ～子どもをはじめとする自主避難者等の支援の拡充に向けて～」に関する会長声明 (President’s Statement Regarding “The Package of Support Measures for Nuclear Disaster Victims: For the Purpose of Widening the Support for Self-Evacuees Including Children”)’ (Japan Federation of Bar Associations 2013) 22 March 2013.

<sup>1615</sup> The SAFLAN is a network of lawyers founded in July 2011 with an aim to support the residents who have remained, evacuated, and returned to areas outside the government-instructed Evacuation Zones under the government’s order.

<sup>1616</sup> The translation of “被ばくを避ける権利” by R. Hasegawa

<sup>1617</sup> Fukuda and Kawasaki (n 50); Fukuda (n 1139).

of the Law were also advocated by the JFBA.<sup>1618</sup> Fukuda and Kawasaki conceptualised the notion by seeking ways to protect the affected population living in out-of-zone areas: “voluntary” evacuees and “trapped” populations.<sup>1619</sup> As examined above, the Act guarantees people’s right to remain in, relocate from, or return (after evacuation) to areas affected by radiation. The two legal counsellors propound that the right to avoid radiation exposure is in fact composed of “the right to evacuation”<sup>1620</sup> and “the right to avoid radiation exposure *in one’s daily life*” (or “to avoid radiation exposure *in situ*”)<sup>1621</sup>, both of which constitute the most essential rights to be guaranteed after a nuclear accident. According to them, there are two ways to be protected from radiation exposure. The most straightforward way is to relocate to another area, in which case “the right to evacuation” is crucial. When that is not feasible for whatever reasons or an individual chooses to stay in radiation-affected areas, s/he shall also be protected from radiation exposure as much as possible in his/her daily life through the establishment of radiation control and protection measures, which would translate into “the right to avoid radiation exposure *in situ*”.

As the legal basis for these rights, they cite certain provisions of the Japanese Constitution and international human rights conventions such as the ICESCR and the Convention on the Rights of the Child (CRC), and legal principles of international environmental law.<sup>1622</sup> In the Constitution, they particularly refer to the Preamble which acknowledges ‘the right to live in peace, free from fear and want’, Article 13 which recognises

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<sup>1618</sup> JFBA, ‘原発事故子ども・被災者支援法に基づく基本方針に関する意見 (Opinion on the Basic Framework Related to the Nuclear Accident Victims and Children Support Law)’ (Japan Federation of Bar Associations 2012) 20 December 2012.

<sup>1619</sup> Fukuda (n 1139); Fukuda and Kawasaki (n 50).

<sup>1620</sup> The translation of “避難する権利” by R. Hasegawa

<sup>1621</sup> The translation of “日常生活における被ばくを避ける権利” by R. Hasegawa

<sup>1622</sup> The same legal basis was also evoked by the JFBA. See JFBA, ‘原発事故子ども・被災者支援法に基づく基本方針に関する意見 (Opinion on the Basic Framework Related to the Nuclear Accident Victims and Children Support Law)’ (n 1618).

‘(the) right to life, liberty, and the pursuit of happiness’ to be ‘the supreme consideration in legislation and in other governmental affairs’, and Article 25 which ensures ‘the right to maintain the minimum standards of wholesome and cultured living’.<sup>1623</sup> With respect to international human rights instruments, the right of everyone to the enjoyment of the highest attainable standard of physical and mental health, guaranteed by Article 12 of the ICESCR and Article 24 of the CRC, was pointed out as reference. The authors also associate the rights with the precautionary principle of international environmental law precisely because radiation effects have not yet been scientifically elucidated especially at low dose exposure.

Most importantly, Fukuda and Kawasaki argue that “the right to evacuation” is not simply the right to freedom of movement or choice of movement but the right to adequate assistance necessary to realise the choice of evacuation/relocation under the threat to life or health. This notion effectively evokes Principle 28 of the Guiding Principles on Internal Displacement and the positive obligation of states under the rights to life (Article 6 of the ICCPR and Article 2 of the ECHR) and to private and family life (Article 8 of the ECHR) established by the CCPR and the ECtHR decisions. As illustrated in the case study of the Fukushima accident, many residents were “trapped” in the radiation-affected areas outside evacuation zones due to lack of government assistance for evacuation. In this case, the right to freedom of movement guaranteed under the Japanese Constitution (Article 22) alone was not enough to protect these residents. In the event of environmental disasters such as a nuclear accident, guaranteeing the right to evacuation/relocation and the right to protection from exposure to harmful and toxic substances *in situ* may entail the positive obligation of state under the right to life (and/or to private and family life under the ECHR). To avoid radiation exposure

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<sup>1623</sup> Translation by Japanese Law Translation (<https://www.japaneselawtranslation.go.jp>) of the Japanese Ministry of Justice.

in order to protect one's life or health is in effect a human right which 'shall not be sacrificed for the collective integrity of the state or a community'.<sup>1624</sup>

Meanwhile, the concept of "the right to evacuation", put in the forced migration terminology, *the right to displacement* (which encompasses evacuation and relocation/resettlement), gives rise to a new reflection in the protection of individuals in disasters, especially natural and environmental disasters. The international normative framework relative to refugees and forced migration has traditionally evolved around the protection against arbitrary displacement. "The right to displacement" indeed represents a notion which has been somewhat overlooked by the forced migration framework because the origin of the framework is anchored in international humanitarian law which tries to protect those forcibly displaced by wars or the perpetrators. The right to displacement thus calls for a paradigm shift in the existing norms on the issue of forced migration.

Nevertheless, a question of dose threshold remains. From which dose level, competent authorities shall instruct evacuation (or relocation) or let affected individuals to choose between evacuation (relocation), remaining and returning? The thesis will deliberate on it in detail in the following chapter.

## **B. Fukushima Civil Lawsuits and Jurisprudence**

As examined in the case study conducted in Part One (Title II), the post-Fukushima government policies and compensation scheme brought tensions and divisions among the affected population and left many with feelings of injustice, abandonment, and indignation. This led to a surge of legal actions against TEPCO and the state filed by accident victims all over Japan. In addition to civil suits, a criminal case against three former executives of TEPCO,

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<sup>1624</sup> Fukuda and Kawasaki (n 50) 217.

ex-CEO and two former vice-presidents, was also brought to the Tokyo District Court in June 2017. The first and second instance courts in Tokyo acquitted the three defendants in September 2019 and January 2023 respectively and the case is now appealed at the Supreme Court.<sup>1625</sup>

However, the most striking illustration of the Fukushima victims' ills toward the government-instituted scheme is the nationwide collective legal movement organised by accident victims, consisting of at least 31 group actions which involved 12,000 plaintiffs filing complaints at courts all over Japan.<sup>1626</sup> These actions demanded a total of 114 billion yen (1 billion euros) as compensation for various forms of damage.<sup>1627</sup> Half of the actions' plaintiffs are composed of those from official evacuation zones while the other half are those from out-of-zone areas. The court decisions on these cases indeed demonstrated the insufficiency and the disparity of the government-fixed compensation scheme, resulting in expanding the scope of nuclear damage and rectifying the shortfalls and inequalities, to a certain degree, by supplementing the amount of compensation. Notwithstanding, these decisions did not fundamentally change or refute the core philosophy of government policies in the end, leaving the 20 mSv/year dose threshold intact as a justification for all the government policies.

This second half of the paragraph thus presents the current overview of these group actions (1), followed by the close examination of the court rulings, focusing on the main claims of plaintiffs, the newly recognised or adjusted nuclear damages, and the legal justifications used in those judgements (2).

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<sup>1625</sup> Source: The TEPCO Criminal Suit Plaintiff Team website (<https://shien-dan.org/>).

<sup>1626</sup> Tsuchie (n 52).

<sup>1627</sup> *ibid.*



## 1. The Overview of Fukushima Lawsuits

Most group actions accuse both TEPCO and the state (or TEPCO alone) of being liable for the nuclear accident, demanding an appropriate damage compensation which had not been, in their view, adequately assessed by the MEXT's Reconciliation Committee. Some of the actions also request a revocation of particular government post-accident decisions, notably the reference dose of 20 mSv/year, and ask for damage compensation for unnecessary radiation exposure and psychological distress.

As of June 2022, 25 out of 31 group actions have already received decisions of the first instance (District Court),<sup>1628</sup> of which seven have reached conclusions at the second instance (High Court).<sup>1629</sup> TEPCO was judged liable in all cases. In March 2022, the appeals lodged by TEPCO have all been rejected by the Supreme Court, thereby confirming all the seven High Court decisions.<sup>1630</sup> Among the 25 judged cases at district courts, 19 groups also sought the state's responsibility for the accident, of which nine, about half, won the cause.<sup>1631</sup> In effect, court's view as regards the state liability for the accident is divided. For example, the

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<sup>1628</sup> Minpo Newspaper, '国の賠償責任を認めない判決 原発事故集団訴訟の上告審 (Judgment Not Recognising State Liability for Damages at Appeal Trial of Nuclear Power Plant Accident Group Action Lawsuit)' *Fukushima Minpo Newspaper* (18 June 2022) <<https://www.minpo.jp/news/moredetail/2022061898030>> accessed 23 February 2023. These decisions include the Gunma group action (Maebashi District Court, 17 March 2017, Hanrei Jihou (2017) No.2339), the Chiba group action (Chiba District Court, 22 September 2017, LEX/DB25449077), the Fukushima *Nariwai* (Livelihood) group action (Fukushima District Court, 10 October 2017), the Odaka group action (Tokyo District Court, 7 February 2018, LEX/DB 25549758), the Kyoto group action (Kyoto District Court, 15 March 2018, Hanrei Jiho (2018) No.2375/2376, 14), the Shutoken group action (Tokyo District Court, 16 March 2018, not registered in court casebook), and the Hama-dori (Iwaki Evacuee) group action (Fukushima District Court (Iwaki branch), 22 March 2018, the judgement can be obtained from the website of the action's legal team <[www.kanzen-baisho.com/untitled](http://www.kanzen-baisho.com/untitled)> consulted 23 February 2023.

<sup>1629</sup> They are the Fukushima *Nariwai* (Livelihood) group action (Sendai High Court, 30 September 2020, LEX/DB25571153), Gunma group action (Tokyo High Court, 21 January 2021, not registered in court casebook), and Chiba group actions (Tokyo High Court, 19 February 2021, not registered in court casebook), Ehime Group Action (Takamatsu High Court, 29 September 2021), Hama-dori Evacuees Group Action (Sendai High Court, 12 March 2020, LEX/DB25565316), To-Live-in-Odaka Group Action (Tokyo High Court, 17 March 2020, LEX/DB25570904), Naka-dori Group Action (Sendai High Court, 26 January 2021)

<sup>1630</sup> Fukushima *Nariwai* (Livelihood) group action, Gunma group action, and Chiba group actions (Supreme Court, 2 March 2022), Ehime Group Action (Supreme Court, 30 March 2022), Hama-dori Evacuees Group Action, To-Live-in-Odaka Group Action, Naka-dori Group Action (Supreme Court, 7 March 2022)

<sup>1631</sup> Minpo Newspaper (n 1628).

Tokyo High Court inconsistently reversed two of these first instance decisions on state responsibility. The High Court recognised the state responsibility in the decision of 21 January 2021, which was initially dismissed by the Gunma District Court decision, while the same court dismissed the state responsibility in the decision of 19 February 2021, which had been previously recognised by the Chiba District Court decision. However, the Supreme Court decision on four high court cases finally dismissed the state responsibility in June 2022, with one of four judges dissenting.<sup>1632</sup>

As for damage claims, most rulings expanded both the notion and the scope of nuclear damage, well beyond what had been defined by the Interim Compensation Guidelines of the Reconciliation Committee, ordering TEPCO to make additional compensation payments to the plaintiffs. On the other hand, judges were quite dubious of the question of radiation risk, especially the 20 mSv/year reference dose which has determined and guided nearly all the government post-accident policies including compensation. This ambiguous stance led to a dismissal of the plaintiff's demand in the 20 mSv/year dose revocation case and a low estimation of additional compensation amount for the out-of-zone evacuees and residents.

The details of the recognised and dismissed claims by courts and their legal grounds are examined as follows.

## 2. The Violated Rights and the Damages Recognised by Court Decisions

Initially, many legal teams of plaintiff presented the main infringed rights of victims as “the right to peaceful life”<sup>1633</sup> and “the right to personal development (or personal

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<sup>1632</sup> *ibid.*

<sup>1633</sup> 平穩生活權 in Japanese (translation by R. Hasegawa)

integrity)”<sup>1634</sup> which have been established in the specific court precedents.<sup>1635</sup> The first was acknowledged in the case related to environmental threats and nuisances and the latter was established in the case of leprosy patients litigations. But as court proceedings developed, the teams focused its claim on “the right to peaceful life as in enjoying the benefits of life as a whole”<sup>1636</sup>, the notion conceptualised by a Japanese jurist in public and environmental law, Takehisa Awaji. Having observed that the nuclear accident had caused loss of one’s whole life rooted in the communities as well as loss of one’s peaceful “normal” lives (family life, life in a community, professional life, etc), Awaji translated such loss into a legal notion as the infringement of “the right to peaceful life as in enjoying the benefits of life as a whole” (“the right to enjoy the benefits of life as a whole”, hereafter).<sup>1637</sup>

This right is slightly different from the original, “the right to peaceful life”, which is based on “the right to personal life”<sup>1638</sup>, usually applied in cases where psychological peace is disrupted due to noise or other nuisances as well as physical integrity is threatened by a risk of contamination from waste treatment facilities and biological hazard laboratories. In contrast, this expanded version of the right encompasses the benefit of life as a whole, leading a peaceful “normal” life consisting of private, family, professional and communal lives. Such a right obviously comprehends *inter alia* the rights to life, liberty, private and family life, housing, personal life (both physical and mental) and property, which all contribute to life in peace and

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<sup>1634</sup> 人格発達権 in Japanese (translation by R. Hasegawa)

<sup>1635</sup> Ryoichi Yoshimura, ‘福島原発事故賠償訴訟における「損害論」— 集団訴訟七判決の比較検討 (The “Damage Theory” at Fukushima Nuclear Accident Compensation Lawsuits: Comparative Analysis of Seven Group Action Rulings)’ (2018) 2375/2376 Hanrei Jiho 252.

<sup>1636</sup> 包括的生活利益としての平穏生活権 in Japanese (translation by R. Hasegawa).

<sup>1637</sup> Awaji, ‘「包括的生活利益」の侵害と損害 (Violation of “Comprehensive Life Benefit” and Its Damage)’ (n 935).

<sup>1638</sup> It is called 人格権 (*jinkaku-ken*) in Japanese. *Jinkaku-ken* is often translated and used as personality rights, the right of publicity or intellectual property, in relation to the commercial use of one’s identity and image, etc. But in Japan, it is also used as the right to personal life as in pursuing one’s happiness, enjoying the benefits of life indispensable to a person’s existence in society and personal life. The latter sense of the right has been notably established in the leprosy patients litigation cases in Japan. The concept was derived from Article 13 of the Japanese Constitution which guarantees the right to life, liberty, and the pursuit of happiness.

harmony.<sup>1639</sup> One of the legal achievements from the Fukushima group lawsuits is the establishment of this new notion of right in assessing nuclear accident damages.<sup>1640</sup> In recognising this right, court judges often based their legal arguments on Article 13 and 22(1) of the Constitution. Some jurists also suggested that the right was also based on Article 25 of the Constitution.<sup>1641</sup> Article 13 guarantees the respect of every individual, his/her right to life, liberty, and the pursuit of happiness, and Article 22(1) ensures the right to choose and change his/her residence and to choose his/her occupation. Article 25 is generally said to correspond to the right to an adequate standard of living (Article 11 of the ICESCR), which states ‘(a)ll people shall have the right to maintain the minimum standards of wholesome and cultured living’.<sup>1642</sup>

By recognising “the right to enjoy the benefits of life as a whole” as the basic infringed right of accident victims, courts enlarged the scope of psychological damage and established a new notion of damage, the “loss of hometown”<sup>1643</sup>. This second half of sub-paragraph (B) thus examines three major nuclear damages recognised or reassessed by court decisions,<sup>1644</sup> which

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<sup>1639</sup> Awaji, ‘「包括的生活利益」の侵害と損害 (Violation of “Comprehensive Life Benefit” and Its Damage)’ (n 935); cited by Yokemoto, ‘「ふるさとの喪失」被害とその回復措置 (The Damage Related to “Loss of Hometown” and Its Remedy Measures)’ (n 988).

<sup>1640</sup> Fumihito Nagano, ‘福島原発事故と損害論 (責任内容論) —平穏生活権侵害による損害賠償に限定して (Fukushima Nuclear Accident and Damage Theory (Liability Content Theory): On Damage Compensation for the Infringement of the Right to Peaceful Existence)’ (2021) 93(3) *Horitsu Jiho* 11.: Examples of the ruling include the Chiba District Court ruling of the Chiba action (22 September 2017), the Tokyo District Court ruling of the Odaka action (7 February 2018), the Kyoto District Court ruling of the Kyoko action (15 March 2018), the Sendai high court decision of the Hama-dori (Iwaki Evacuee) action (12 March 2020), the Sendai high court ruling of the Fukushima *Nariwai* action (30 September 2020), and the Tokyo high court decision of the Gunma action.

<sup>1641</sup> Shiomi, ‘損害算定の考え方 (View on Damage Assessment)’ (n 967); Yoshimura, ‘福島原発事故賠償訴訟における「損害論」—集団訴訟七判決の比較検討 (The “Damage Theory” at Fukushima Nuclear Accident Compensation Lawsuits: Comparative Analysis of Seven Group Action Rulings)’ (n 1635).

<sup>1642</sup> Article 25 of the Japanese Constitution. Translation by Japanese Law Translation (<https://www.japaneselawtranslation.go.jp>). The English translation of the Constitution can be found at <[http://www.japaneselawtranslation.go.jp/en/laws/view/174#je\\_ch3at16](http://www.japaneselawtranslation.go.jp/en/laws/view/174#je_ch3at16)> consulted 5 April 2022

<sup>1643</sup> The original term in Japanese, *kokyō-sōshitsu* “故郷喪失”, translated by R. Hasegawa

<sup>1644</sup> Takehisa Awaji, ‘10 Years since the Accident: Infringed Interests and Harm from Hometown Loss and Transformation as Seen in the Appellate Court Decisions in the Lawsuits Seeking Compensation for the Fukushima Accident’ (2021) 51(1) *Research on Environmental Disruption* 9; Ryoichi Yoshimura, ‘福島原発事故賠償訴訟のいま—事故から10年を経過して (The Current Status of Fukushima Nuclear Accident Compensation Lawsuits: 10 Years after the Accident) Translation by R. Hasegawa’ (2021) 93(3) *Horitsu Jiho* 4;

had been either ignored or underestimated by the government compensation scheme: namely, the expanded notion of psychological damage (a), the “loss of hometown” damage (b), and the legitimacy (or reasonableness) of “voluntary” evacuation (c). In addition, it analyses the courts’ assessment on the key government policy of 20 mSv/year reference dose (d).

#### a. The Expanded Scope of Psychological Damage

The Fukushima compensation guideline initially recognised psychological damage only related to evacuation, as to ‘the disruption of a normal day-to-day life over an extended period of time’.<sup>1645</sup> This was applied only to those who evacuated from official evacuation zones, excluding those who evacuated from out-of-zone affected areas. Later in the First Supplement to the guideline, the Reconciliation Committee also acknowledged the prejudice relative to ‘fear and unease about exposure to radiation’ for the out-of-zone residents who remained or are “trapped” in the radiation-affected territories.<sup>1646</sup> But the compensation amount awarded was so small compared to the evacuation-related psychological damage that the recognition of such prejudice seemed to have only a nominal value.

By contrast, several court rulings have recognised three types of psychological damage suffered by the victims: 1) the one related to evacuation, as to having faced a real threat from serious radiation injury and having suddenly lost their habitual lives, 2) the one related to being constrained to a prolonged evacuation life, and 3) the one related to having lost his/her hometown. The first damage related to evacuation, though the name is the same, is in fact

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Tadashi Otsuka, ‘福島原発訴訟判決における権利侵害・過失及びリスク論について (The Infringed Rights, the Negligence, and the Risk Theory in Fukushima Nuclear Suits Case-laws) Translation by R.Hasegawa’ (2021) 93(3) *Horitsu Jiho* 11; Nagano (n 1604).

<sup>1645</sup> Dispute Reconciliation Committee for Nuclear Damage Compensation, ‘東京電力株式会社福島第一、第二原子力発電所事故による原子力損害の範囲の判定等に関する中間指針 (Interim Guidelines on Determination of the Scope of Nuclear Damage resulting from the Accident at the Tokyo Electric Power Company Fukushima Daiichi and Daini Nuclear Power Plants)’ (n 944) 18.

<sup>1646</sup> For the first time, the Reconciliation Committee organised a hearing inviting one lawyer and two local NGOs representing the voice of evacuees/residents in out-of-zone areas.

different from the one defined by the Reconciliation Committee. For example, the Sendai High Court ruling on the Hama-dori group action explained that such prejudice was caused by having ‘faced a real risk of serious radiation injuries’ following ‘a grave accident which released an enormous amount of radioactive materials’ and ‘having been cut or interrupted from one’s social relationship based in a community, professional life, continuous education, or family integrity’.<sup>1647</sup> The Kyoto District Court and the Sapporo District Court rulings have also recognised the fear related to the accident (radiation) and the prejudice of anxiety associated with radiation exposure.<sup>1648</sup> As shown in the Fukushima accident case study, the prejudice of anxiety associated with radiation exposure had been purposefully excluded from the compensation guideline following a strong opposition made by a member of the Committee, the chairman of the Nuclear Regulatory Authority.<sup>1649</sup> The courts in effect rectified it by filling such a loophole of the compensation guideline.

As for the second psychological damage relative to prolonged evacuation, the government compensation scheme has also integrated it in the Fourth Supplement of the guideline, but only for evacuees from the Red (Difficult-to-Return) Zone. The court decisions extended the scope of application to include those from the other evacuation zones – Green and Yellow Zones – as well as evacuees from out-of-zone areas depending on the individual situation.<sup>1650</sup>

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<sup>1647</sup> The Hama-dori Evacuees Group Action (Sendai High Court, 12 March 2020, LEX/DB25565316)

<sup>1648</sup> Nagano (n 1640). The Kyoto District Court decision of the Kyoto action (15 March 2018) acknowledged the first prejudice and the Sapporo District Court ruling of the Hokkaido action (10 March 2020) recognised both.

<sup>1649</sup> Otsuka, ‘福島第一原子力発電所事故による損害賠償 (Damage Compensation Related to Fukushima Daiichi Nuclear Power Plant Accident)’ (n 947); cited by Yokemoto, ‘避難者の「ふるさとの喪失」は償われているか (Is the Evacuees’ “Loss of Hometown” Compensated?)’ (n 947).

<sup>1650</sup> For example, see the Tokyo high court ruling on the Chiba Group Action (Tokyo High Court, 19 February 2021, not registered in court casebook), cited by Awaji, ‘10 Years since the Accident: Infringed Interests and Harm from Hometown Loss and Transformation as Seen in the Appellate Court Decisions in the Lawsuits Seeking Compensation for the Fukushima Accident’ (n 1644).

The third damage related to “loss of hometown” in fact constitutes an original new concept of nuclear damage established by Fukushima litigation cases, which does not exist in the Japanese nuclear damage liability law or any international nuclear liability instrument. It will be examined in detail in the following paragraph (b).

By these extensions of psychological damage, court judges have clearly established that radiation released from the accident had caused a serious life or physical threat to individuals, as a result of which they suffered the prejudice of psychological distress from facing such a threat and worrying about future radiation effects on their health. These aspects of psychological damage were in effect largely ignored by the government compensation policy. The court’s acknowledgement of this particular prejudice also led to a reassessment of the damage related to out-of-zone “trapped” population, which will be analysed in the paragraph below (c).

#### b. The Novelty of the “Loss of Hometown” Damage

The solatium payment for “loss of hometown” was first recognised by the judge of Chiba District Court in September 2017, the first instance decision of the Chiba group action filed against TEPCO and the state.<sup>1651</sup> Since then, it has been acknowledged by the first instance ruling of the Hama-dori action (Iwaki District Court, 22 March 2018), which was confirmed by the second instance decision (Sendai High Court, 12 March 2020), the first instance decision of the Odaka action (Tokyo District Court, 7 February 2018) reaffirmed by the second instance (Tokyo High Court, 17 March 2020), and the second instance ruling of the Fukushima *Nariwai* action (Sendai High Court, 30 September 2020).<sup>1652</sup> The notion of “loss

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<sup>1651</sup> Chiba District Court, 22 September 2017, LEX/DB25449077

<sup>1652</sup> Masafumi Yokemoto, ‘福島原発事故による「ふるさとの喪失」をどう償うべきか—司法に問われる役割 (How to Compensate “Loss of Hometown” Caused by Fukushima Nuclear Accident: The Role of the Justice in Question)’ (2018) 2375/2376 *Hanrei Jiho* 241; Nagano (n 1640).

of hometown”, in the sense of *being uprooted*, was proposed and elaborated by an environmental economist, Masafumi Yokemoto.<sup>1653</sup> According to him, the “loss of hometown” means losing social relationships woven among residents through community activities and local businesses, as well as local culture and traditions built over generations, which had been maintained through shared history, climate, economic activities, religious events, local festivals, and the surrounding ecosystem.<sup>1654</sup> By the “loss of hometown”, people also lose essential conditions for their lives – housing, private property such as agricultural land, basic infrastructure, economic and social relations, safe environment, and natural resources – which all sustain life of a person in these communities. Some scholars simply described it as being equivalent to losing the whole life of a person.<sup>1655</sup> In legal terms, Yokemoto argued that loss of hometown would amount to a violation of “the right to enjoy the benefit of communal or community life”<sup>1656</sup>, which forms an important part of “the right to peaceful life as in enjoying the benefits of life as a whole”, propounded by Awaji.<sup>1657</sup> According to Yokemoto, the right to enjoy the benefits of communal life include *inter alia* food self-sufficiency and exchange, mutual help and welfare, participation in communal administrative functions, personal development through communal events and relationships, and collective protection of the environment.<sup>1658</sup>

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<sup>1653</sup> Yokemoto, *原発賠償を問う—曖昧な責任、翻弄される避難者 (Questioning the Nuclear Compensation: Obscured Liability and Tossed Around Evacuees)* (n 919); Yokemoto, ‘避難者の「ふるさとの喪失」は償われているか (Is the Evacuees’ “Loss of Hometown” Compensated?)’ (n 947); Yokemoto, ‘「ふるさとの喪失」被害とその回復措置 (The Damage Related to “Loss of Hometown” and Its Remedy Measures)’ (n 988) and others.

<sup>1654</sup> Yokemoto, ‘「ふるさとの喪失」被害とその回復措置 (The Damage Related to “Loss of Hometown” and Its Remedy Measures)’ (n 988).

<sup>1655</sup> Yamashita, Ichimura and Sato (n 787).

<sup>1656</sup> Translation of 地域生活を享受する権利 (地域生活享受権) by R. Hasegawa

<sup>1657</sup> Yokemoto, ‘福島原発事故による「ふるさとの喪失」をどう償うべきか—司法に問われる役割 (How to Compensate “Loss of Hometown” Caused by Fukushima Nuclear Accident: The Role of the Justice in Question)’ (n 1652); Awaji, ‘「包括的生活利益」の侵害と損害 (Violation of “Comprehensive Life Benefit” and Its Damage)’ (n 935).

<sup>1658</sup> Awaji, ‘「包括的生活利益」の侵害と損害 (Violation of “Comprehensive Life Benefit” and Its Damage)’ (n 935).



The destruction and sudden loss of these community-life benefits incurred a significant distress and a deep sense of uprootedness among the affected, especially the elderly.<sup>1659</sup> The court rulings that have well grasped and elaborated such prejudice was probably the Sendai High Court ruling of the Hama-dori action in March 2020.<sup>1660</sup> It defined “hometown” as representing the entirety of a particular natural and social environment which forms the foundation of inhabitants’ life in the community, and judged that its loss had caused not only psychological damage but also tangible and intangible prejudices to the plaintiffs.<sup>1661</sup> The same ruling also added that this loss encompassed the transformation or the change of “hometown”, their habitual communal life, due to the accident and the subsequent evacuation of residents.

Despite this development in case-laws, the prejudice related to loss of hometown is accorded relatively a small amount of compensation. The first Chiba ruling granted between 500,000 and 3,000,000 yen (equivalent of 3,500-21,000 euros) per person.<sup>1662</sup> Even the ground-breaking Sendai High Court decision of Hama-dori action added only a small extra to the already-received TEPCO compensation. Ultimately, the plaintiff won between 700,000 and 1,500,000 yen (equivalent of 5,000-11,000 euros) per person for the damage related to the loss of hometown.<sup>1663</sup>

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<sup>1659</sup> *ibid*; Kanbe Hidehiko, ‘原発避難者の自死と損害賠償請求：川俣・浪江・飯館の3事件に寄せて (The Actions for Damages from the Suicides of the Refugees caused by the Accident of Nuclear Power Plant: in Relation to the 3 Cases; Kawamata, Namie, Iitate in Fukushima)’ (2018) 69(2) 法と政治 (The journal of law & politics) 231(659). According to Awaji, the ruling of the Fukushima District Court (26 August 2014) on the suicide of a Fukushima evacuee in Kawamata town clearly established that the distress of losing her hometown, the life rooted in the community, led to her decision of taking her life.

<sup>1660</sup> Hama-dori Evacuees Group Action (Sendai High Court, 12 March 2020, LEX/DB25565316)

<sup>1661</sup> Awaji, ‘10 Years since the Accident: Infringed Interests and Harm from Hometown Loss and Transformation as Seen in the Appellate Court Decisions in the Lawsuits Seeking Compensation for the Fukushima Accident’ (n 1644) 10.

<sup>1662</sup> Yokemoto, ‘福島原発事故による「ふるさとの喪失」をどう償うべきか—司法に問われる役割 (How to Compensate “Loss of Hometown” Caused by Fukushima Nuclear Accident: The Role of the Justice in Question)’ (n 1652).

<sup>1663</sup> *ibid*.

### c. The Reasonableness of “Voluntary” Evacuation

Another major development from Fukushima litigation cases is the reassessment of the damage incurred to residents living in out-of-zone areas, notably “voluntary” evacuees and stayers. The First Supplement of the Interim Compensation Guideline recognised some damage, but it was restricted in the terms of the areas, the time frame, and the amount of compensation. The recognised damage for these areas notably comprised the cost and the psychological distress related to evacuation for “voluntary” evacuees, and the cost related to radiation protection actions and the prejudice of anxiety associated with radiation exposure for stayers. Most notably, the amount of compensation established for these damages was extremely low: a lump sum payment of 80,000 yen (600 euro) per person and 400,000 yen (3,000 euro) per child and pregnant woman for all the damage. These amounts hardly reflected the actual cost of evacuation, the cost of remaining with radiation protection measures, nor the psychological distress inflicted on the out-of-zone residents. This thus became the main motive for the out-of-zone affected residents to file claims at court.

The court decisions on these cases have indeed expanded the extent of the concerned area and increased the amount of compensation to some extent. The court judges assessed the reasonableness of the out-of-zone evacuation based on a causality test used in tort law and the international radiation protection norms. This rationality test indeed became the courts’ appraisal of the 20 mSv/year reference dose chosen by the government. The court decisions which elaborated the notion of reasonableness and formed specific opinions on the question are the first instance rulings on the Gunma and Kyoto actions (Maebashi District Court and Kyoto District Court rulings respectively).

The decision of the Maebashi District Court on the Gunma action (17 March 2017) notably analysed that ‘health effects from radiation include cancer which, once it occurs, could be difficult to cure and may lead to death’ and therefore it is understandable that people took the threat from radioactive materials released by this accident more seriously than a mere anxiety or fear.<sup>1664</sup> In this context, ‘it is considered the reasonable action of a regular person to evacuate on his/her own account when one learned about the radiation release from this accident and did not have any information on the amount of the release or the effective exposure doses’.<sup>1665</sup> It continued to state that ‘worrying about the health effect from low-dose radiation, even if it is below the state’s fixed norm of 20 mSv/year, cannot be judged scientifically unwarranted’ and the reasonableness of (self-)evacuation shall be realistically assessed ‘on the circumstance of each plaintiff’ instead of being based on the conventional wisdom (i.e., the government’s view).<sup>1666</sup> The court also identified the infringed right of these evacuees as the right to peaceful life (not the enlarged version proposed by Awaji), especially “the right to self-determination for the purpose of personal fulfilment”.<sup>1667</sup>

By this judgement, the court expressed a nuanced disagreement with the government’s post-accident policy based on the 20 mSv/year benchmark in view of scientific data, accident circumstances, and constitutional provisions. Furthermore, its reasoning hints at an adoption of precautionary principle as a base, without using the term itself, especially at the statement warranting out-of-zone evacuation in connection with cancer risk that is serious and irreversible.

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<sup>1664</sup> Maebashi District Court, 17 March 2017, Hanrei Jihou (2017) No.2339; The quote of the decision is cited by Ryoichi Yoshimura, ‘福島原発事故賠償集団訴訟群馬判決の検討 (A Study on the Gunma Court Decision in the Collective Lawsuit for Fukushima Nuclear Accident Compensation)’ (2017) 46(4) 環境と公害 (Research on Environmental Disruption) 59, 62–63.

<sup>1665</sup> The quote of the decision cited by Yoshimura, ‘福島原発事故賠償訴訟における「損害論」—集団訴訟七判決の比較検討 (The “Damage Theory” at Fukushima Nuclear Accident Compensation Lawsuits: Comparative Analysis of Seven Group Action Rulings)’ (n 1635) 261.

<sup>1666</sup> *ibid* 253, 261.

<sup>1667</sup> *ibid* 253.

Many legal scholars indeed argued for or endorsed an adoption of the precautionary principle in justifying out-of-zone evacuation or radiation damage in general in the context of nuclear disasters.<sup>1668</sup>

The other ruling, the Kyoto District Court decision on Kyoto group action (15 March 2018), is also of a particular importance because the plaintiff was almost entirely composed of out-of-zone evacuees (172 out-of-zone and 2 in-zone evacuees).<sup>1669</sup> After examining different scientific views presented by public and independent experts, the judge affirmed that the government-set dose criteria for issuing evacuation orders – 20 mSv/year – cannot become the criteria for judging the rationality of (self-)evacuation because ‘the ICRP dose norm does not represent neither safe nor dangerous dose level’ for humans and thus ‘it cannot be said that doses under this level are considered safe from the scientific point of view’.<sup>1670</sup> Considering these facts, the court concluded that out-of-zone evacuation ‘could be deemed justified in terms of conventional wisdom while the degree of legitimacy would depend on the attribute and the circumstance of every individual’.<sup>1671</sup> The court also recognised the main infringed right of these evacuees as “the right to enjoy peaceful life at the place where the life is based”, reflecting

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<sup>1668</sup> See for example, Yoshimura, ‘「自主的避難者（区域外避難者）」と「滞在者」の損害 (Damages Related to “Self (Out-of-Zone) Evacuees” and “Stayers”)’ (n 878); Hajime Nakajima, *原発賠償 中間指針の考え方 (Interim Guidelines on the Determination of the Scope of Nuclear Damage)* (Shojihomu 2013); Shiomi, ‘中島肇著「原発賠償 中間指針の考え方」を読んで (Book Review: Interim Guidelines on the Determination of the Scope of Nuclear Damage, Written by Hajime Nakajima)’ (n 950); Shiomi, ‘福島原発賠償に関する中間指針等を踏まえた損害賠償法理の構築 (Construction of Damage Compensation Legal Principles Based on the Interim Guidelines and Other Instructions Related to Fukushima Nuclear Damage Compensation)’ (n 995); Yoshida Kunihiko, ‘チェルノブイリ原発事故調査からの「居住福祉法（民法）」的示唆—福島第一原発問題との決定的な相違 (The Suggestion from the “Residential Welfare Act (Public Law)” of the Chernobyl Nuclear Accident Survey: The Definitive Difference with the Issues of the Fukushima Dai-ichi Nuclear Accident)’ (2014) 1026 NBL 33; Tsutomu Yonekura, ‘「福島原発避難者訴訟」における損害論 (Damage Theory at “Fukushima Nuclear Accident Evacuees Lawsuits”)’ (2013) 43(2) 環境と公害 (Research on Environmental Disruption) 36.; Hajime Nakajima was a member of the Reconciliation Committee between 2011-2021.

<sup>1669</sup> Kyoto District Court, 15 March 2018, Hanrei Jiho (2018) No.2375/2376, 14

<sup>1670</sup> Kyoto District Court, ‘東京電力福島第一原発京都訴訟第一審判決 (The Decision of the First Instance on the TEPCO Fukushima Daiichi Nuclear Accident Kyoto Lawsuit)’ (2018) 2375/2376 Hanrei Jiho 14, 65.

<sup>1671</sup> *ibid.*

on the plaintiff's claim for the "right to peaceful life as in enjoying the benefits of life as a whole".<sup>1672</sup>

But the Kyoto ruling stood apart from all other decisions in one particular aspect. In fact, it proposed a set of its own criteria to assess the rationality of each out-of-zone evacuation. The criteria consist of: 1) the evacuation of pregnant women or children before 1 April 2012 (during the first year from the accident) and 2) the evacuation of family members (the spouse of the evacuated pregnant woman or the parent of the evacuated children) within two years from the evacuation of pregnant woman or children. The ruling explains that as a principle, they apply to those who evacuated from the "area subject to voluntary evacuation", the out-of-zone area recognised by the compensation guideline (23 municipalities in Fukushima prefecture), but can also apply to those evacuated from other areas if they meet the above criteria and in view of the following factors: the distance from the Fukushima nuclear power plant, evacuation zones, and the "area subject to voluntary evacuation"; the information available on radiological situation at the time; the timing of evacuation; the frequency of self-evacuation in town; and the existence of children or other vulnerable persons sensitive to radiation effects within the family. Following these criteria, the court recognised 127 out of 143 plaintiffs from the "area subject to voluntary evacuation" and 20 out of 29 plaintiffs from outside that area as victims eligible for compensation. The novelty of the Kyoto ruling lies in having established the radio-sensitivity of children and pregnant women (foetus) as a primary consideration for recognising nuclear damage and warranting protective actions.

Like the Gunma (Maebashi) ruling, the Kyoto decision is extremely instructive as it delved into the scientific controversy on radiation risk, reassessing the government dose criteria

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<sup>1672</sup> Yoshimura, '福島原発事故賠償訴訟における「損害論」—集団訴訟七判決の比較検討 (The "Damage Theory" at Fukushima Nuclear Accident Compensation Lawsuits: Comparative Analysis of Seven Group Action Rulings)' (n 1635) 258–259.

of 20 mSv/year and forming its own opinion by convening independent scientists as expert witnesses to the trial. As a result, the Kyoto ruling also refuted the government view on radiation risk to some degree. On that point, the Chiba District Court ruling (22 September 2017) is also worthy of note. The judge reacted to the government view according to which the doses below 100 mSv can be deemed nearly harmless<sup>1673</sup> by stating that such view ‘had not been scientifically elucidated’ and recognised the rationality of (self-)evacuation for those who resided in the “area subject to voluntary evacuation” recognised by the compensation guidelines and beyond based on individual circumstances.<sup>1674</sup>

Notwithstanding, the Fukushima litigation court rulings finally did not go far enough to bring about fundamental change in post-accident policy for out-of-zone victims. The court decisions also showed a significant timidity in reassessing the state policies which would have considerable economic consequences. First, restraint can be observed in the awarded compensation amount. Despite the elaborate reasoning developed to warrant “voluntary” evacuation, the reassessed amount was very small, hardly comparable to the amount accorded to evacuees from evacuation zones. If one takes the psychological damage compensation alone, courts did not add much to the amount that these evacuees had already received from the First Supplement of the guideline. The above Kyoto and Chiba first instance rulings awarded 300,000 yen (2,200 euros equivalent) per adult (excluding pregnant women) and 600,000 yen (4,400 euros equivalent) per child and pregnant woman.<sup>1675</sup> And this applied only to those who

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<sup>1673</sup> The Working Group on Risk Management of Exposure to Low-Dose Radiation commissioned by the Cabinet notably concluded that the ‘risk of cancer development from radiation at levels of 100 mSv or lower is considered so slight according to international consensus that such risk is concealed by carcinogenic effects from other causes (e.g. smoking, obesity, unbalanced diet...etc.)’. See Cabinet Secretariat (n 36) 5.

<sup>1674</sup> Yoshimura, ‘福島原発事故賠償訴訟における「損害論」—集団訴訟七判決の比較検討 (The “Damage Theory” at Fukushima Nuclear Accident Compensation Lawsuits: Comparative Analysis of Seven Group Action Rulings)’ (n 1635).

<sup>1675</sup> Nagano (n 1640).; In the government compensation scheme, an adult received 80,000 yen (600 euros) and children and pregnant women received 400,000 yen (3,000 euro equivalent)/person. So the court increased the amount only for adults.

evacuated from the government-recognised area for “voluntary” evacuation. For other out-of-zone evacuees, the courts halved the amount to 150,000 yen (1,100 euros) per adult (excluding pregnant women) and 300,000 yen (2,200 euros) per child and pregnant woman.

The alignment with government defined criteria was also seen in the time limit imposed for compensation. The Kyoto decision, for example, fixed the eligible period for “voluntary” evacuation until 1 April 2012, one year following the accident. This means that pregnant women and children who decided to evacuate after that period would not be recognised as legitimate victims except in some exceptional circumstances. The time limit was also placed on family reunification. The spouse of an evacuated pregnant woman or the parent of evacuated children must join them within two years from their evacuation to be eligible for compensation. For the legal basis of such temporal limits, the judge referred to the government declaration of the “cold shutdown” of troubled reactors on 16 December 2011 as well as the government reorganisation of evacuation zones on 1 April 2012.<sup>1676</sup> The courts incorporated these government announcements without questioning their scientific validity or verifying the radiological situation of the concerned out-of-zone areas.

In summary, Fukushima litigation cases enlarged the eligibility criteria and the scope of damage related to out-of-zone evacuation to a certain degree. At the same time, they also illustrated government policies influencing the decisions of the judges, particularly in their assessment of the gravity of damage in monetary terms. In the end, instead of reducing the existing compensation gap, court decisions have rather maintained the divide between in-zone and out-of-zone evacuees. It was also quite startling to observe the quasi-total absence of reference made to the Children Support Law in the court rulings. This shows that court judges,

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<sup>1676</sup> Kanbe Hidehiko, ‘福島原発事故避難者訴訟京都地裁判決の検討：避難の相当性・権利侵害・損害を中心として’ [2018] *Studies in Disaster Recovery and Revitalization* 81.

despite their statement on the independence of court decisions vis-à-vis government policy, finally followed the overall frame of compensation fixed by the government committee. According to Kunihiro Yoshida, a jurist in public law, this is an indication of the weak independence of the Japanese justice system against the executive branch of the government as well as a lack of genuine empathy toward the plight of out-of-zone evacuees.<sup>1677</sup>

For these reasons, despite having won most of these cases, Fukushima victims were left with the feeling that their suffering had not been adequately recognised or evaluated by their last recourse, the judicial system.

#### d. The Unresolved 20 mSv/year Reference Dose

Although Fukushima litigation court rulings recognised the legitimacy of the majority of evacuations from the areas outside evacuation zones – areas with doses below 20 mSv/year–, their views on the 20 mSv reference dose, or dose standards in general, remained quite ambiguous. In almost all cases, the plaintiff demanded the 1 mSv/year dose level be the benchmark dose warranting protective actions, including evacuation/relocation, and that it guides all post-accident policies in accordance with existing law on public dose limit in Japan. To this claim, while acknowledging such a dose limit, the courts did not provide a clear answer and instead gave a contradictory statement: it cannot be said that dose levels under the 20 mSv/year are “safe” from the scientific point of view but at the same time, all cases of evacuation from the areas with doses between 1-20 mSv/year cannot be warranted. Ultimately, court decisions did not provide any specific dose levels which would be deemed adequate or

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<sup>1677</sup> Yoshida, ‘福島原発放射能問題と災害復興—福島原賠訴訟の法政策学的考察 (Fukushima Nuclear Accident Radiation Problems and Disaster Recovery: The Legal and Political Analysis of Fukushima Nuclear Damage Compensation Lawsuits)’ (n 951).



reasonable to justify protective actions. Here, one can observe the courts' hesitance around clearly pronouncing on the radiation protection norms fixed by the government.

By contrast, there were a few court rulings which clearly validated the 20 mSv/year reference dose. For example, the first instance ruling of Fukushima District Court on the Group Action "Against Radiation Exposure of Children" affirmed the consistency of government's policy to apply the 20 mSv/year reference dose for school children in accordance with the ICRP's recommendations.<sup>1678</sup> In this ruling, the court judge incorporated the defendant (the state)'s claim almost entirely without making its own assessment. The appeal suit filed by the plaintiff was denied by Sendai High Court on 1 February 2023. Another first instance decision by Tokyo District Court on the Group Action for the "Revocation of the 20 mSv/year Criteria" also validated the government decision to lift radiation hotspots designations using the 20 mSv/year reference level.<sup>1679</sup> The plaintiff claimed that such a decision forced them to return to the areas where their life and health would be threatened and demanded the application of 1 mSv/year for hotspots lifting in accordance with existing laws. The court judge did not respond directly to these claims, thus not pronouncing on the validity of the 20 mSv/year dose itself. It simply stated that the retraction (or designation) of hotspots was a recommendation and did not constitute an administrative order obliging the plaintiff to return to the original place of

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<sup>1678</sup> Fukushima District Court, 1 March 2021. The judgement can be obtained from the website of the action's legal team <[https://fukushima-sokaisaiban.blogspot.com/2021/03/202131\\_8.html](https://fukushima-sokaisaiban.blogspot.com/2021/03/202131_8.html)>, consulted 10 May 2022.; The suit was brought by 201 parents living in Fukushima prefecture against the State, Fukushima Prefecture, and seven municipalities located in out-of-zone areas in August 2014. The plaintiff alleged that the defendants had failed to ensure the right of children to receive education in an environment free of threat from radiation exposure and their negligence led to unnecessarily radiation exposure of children. To base such claim, the group challenged the legality of the reference dose of 20 mSv/year applied to children in view of Japanese laws related to public exposure dose limit (1 mSv/year) as well as the Radiation Controlled Area (5 mSv/year).

<sup>1679</sup> Tokyo District Court, 12 July 2021, the judgement can be obtained from the website of the action's legal team <[http://minamisouma.blogspot.com/p/blog-page\\_89.html](http://minamisouma.blogspot.com/p/blog-page_89.html)> consulted 10 May 2022.; The suit was brought by 534 residents of Minamisouma city in April 2015. The plaintiff demanded the retraction of a government's decision to discontinue the hotspots designation in the city by using the 20 mSv/year dose criteria. The group contested the validity of using such reference dose and claimed the right to financial assistance for continued evacuation or relocation.

residence (or evacuate), thus there was no illegality of such a government decision. This ruling again indicates the unease of court judges to directly pronounce a view on radiation protection norms or government decisions.

As such, Fukushima litigation cases gave a mixed picture as regards the validity of applying the 20 mSv/year dose reference to “protect” the citizens from nuclear disaster effects.

## Section 2: The Chernobyl Laws and the Notion of “Prejudice of Anxiety” in French Jurisprudence

The second section of this chapter studies another important precedent from past disasters – the Chernobyl accident – and a legal concept developed in a national jurisdiction, French courts, which would be extremely instructive for the protection of radiation disaster victims – prejudice of anxiety. As mentioned earlier, the so-called “Chernobyl Laws” adopted by the former Soviet government and then by three newly independent states became an important reference point for Fukushima victims, NGOs, and the plaintiff’s legal teams of Fukushima group actions to refute the Japanese post-accident policies, especially the chosen 20 mSv/year reference dose. This section thus investigates the status of victims, the definition of target areas, the dose criteria, and the protective measures defined by the post-Chernobyl protection scheme established by the USSR government (§1).

After the Chernobyl case study, the thesis slightly shifts focus and examines a case in France where a particular notion of damage has been developed through jurisprudence to provide relief to the victims of toxic substance exposures (§2).<sup>1680</sup> The prejudice of anxiety was first recognised by the decision of the Court of Cassation (the French highest court)<sup>1681</sup> in an asbestos litigation case in 2010. Since then, the scope of damage has evolved and further articulated by the successive decisions of the Court. The concept of such prejudice, though it is only applied in the case of professional exposure situations in France, could become extremely

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<sup>1680</sup> In the United States, there is a similar concept, the Negligent Infliction of Emotional Distress (NIED), established through case-laws. The criteria for recognising such NIED consist of: (1) the plaintiff must have been exposed to toxic substances, (2) the fear of a certain disease must be a result of a present injury (but many courts have abolished this strict physical impact rule), (3) the fear must be reasonable, and (4) the fear must be causally related to the defendant’s negligence. See Dyke (n 115).

<sup>1681</sup> The French judicial system is divided into two orders: judicial and administrative. The Court of Cassation (*Cour de cassation*) is the supreme court of judicial order (*ordre judiciaire*) which handles private law matters, i.e., criminal, civil, commercial, and labour law cases. For administrative order, the Council of State (*Conseil d’Etat*) is the supreme court which handles public law matters involving national or local governments, State-owned companies, public investments, public servants, etc.

useful for the design of the adequate compensation scheme for the victims of nuclear disasters involving radiation exposure.

### **§1. The Chernobyl Accident and the Protection Status for Nuclear Victims**

The accident at the reactor No. 4 of the Chernobyl Nuclear Power Plant, officially the Vladimir Ilyich Lenin Nuclear Power Plant, occurred on 26 April 1986. The plant was located near the town of Prip'yat, 120 km north of Kiev, in Ukraine and is about 15 km south of the border with Belarus. At the time, Ukraine was part of the Soviet Union (USSR) and thus the accident was handled by the Soviet authorities from Moscow. In the beginning, the Soviet administration attempted to conceal the facts of the accident: it took the authorities three days before making a short statement about the accident on state television and 18 days before they admitted significant radiation release, which came only after Sweden detected and alerted on an unusually high level of radiation in the atmosphere.<sup>1682</sup> Meanwhile, the same authorities had already mobilised firefighters, police officers, military personnel, power plant staff, and others to deal with the fire and clean-up operations on the ground. Initially involving 350,000 persons, the total number of “liquidators” rose to 600,000 among which 240,000 are said to have engaged in the major mitigation activities at the reactor and within the 30-km zone from the reactor, later known as Exclusion Zone.<sup>1683</sup> According to the UNSCEAR’s report published in 2000, acute radiation sickness was confirmed in 134 of those emergency workers, among which 30 died within a few days or weeks following the exposure to high doses.<sup>1684</sup>

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<sup>1682</sup> Mikhail V Malko, ‘Social Aspects of the Chernobyl Activity in Belarus’ in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998); Adriana Petryna, *Life Exposed: Biological Citizens after Chernobyl* (The 2013 Edition, Princeton University Press 2013).

<sup>1683</sup> UNSCEAR, ‘Sources and Effects of Ionizing Radiation’ (n 5).

<sup>1684</sup> *ibid.*

Classified as an INES level 7 accident, Chernobyl is by far the largest civil nuclear accident to date in the world, closely followed by Fukushima. Radioactive materials released from the crippled reactor are estimated to have reached 1,000-8,000 petabecquerels (PBq),<sup>1685</sup> said to represent 500 times the radioactivity emitted from an A-bomb.<sup>1686</sup> An area of about 150,000 km<sup>2</sup> (about 27% of Metropolitan France) was affected with Caesium 137 (Cs-137) contamination of density greater than 37,000 Bq/m<sup>2</sup>,<sup>1687</sup> thus designated as “contaminated areas”, spread over Belarus, Ukraine and the Russian Federation, as far as 500 km from the power plant.<sup>1688</sup> Seven million people are said to have resided in those territories.<sup>1689</sup> Some 70% of the radioactive fallout from the accident fell in Belarus, making the country the worst affected of the three countries.<sup>1690</sup> 23% of the Belarussian territories are said to be impacted by radiation contamination.<sup>1691</sup> The fallout also reached North-Western European countries, affecting in particular Sweden, Norway, Finland, Austria and Bulgaria. The accident triggered a mandatory evacuation of 118,400 persons living within 30 km radius from the power plant and a relocation of another 231,000 from the affected area of the three countries.<sup>1692</sup> Moreover, about 4.5 million people have remained living in these contaminated territories.<sup>1693</sup> According to the study conducted by sociologists, the number of remaining/“trapped” population hovers around 8 or 9 million, which led the authors to conclude that Chernobyl was ‘not an event or

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<sup>1685</sup> *ibid* 519.

<sup>1686</sup> Hanqin (n 6) 22.

<sup>1687</sup> The Soviet authorities designated the area where the average Cs-137 ground deposition density exceeded 37,000 Bq/m<sup>2</sup> where the estimated individual effective dose may exceed 0.5 mSv/year, as the “contaminated areas”. This definition of “contaminated areas” was also used in the 2000 UNSCEAR report on the Chernobyl accident. For comparison, the Radiation Controlled Area (RCA) is also designated for the area with a surface density of radioactivity of more than 40,000 Bq/m<sup>2</sup> in Japan.

<sup>1688</sup> UNSCEAR, ‘Sources and Effects of Ionizing Radiation’ (n 5) 515.

<sup>1689</sup> OCHA (n 10).

<sup>1690</sup> *ibid*.

<sup>1691</sup> UNDP and UNICEF (n 10).

<sup>1692</sup> *ibid*.

<sup>1693</sup> The number concerning Chernobyl is drawn from the report, *ibid*.

accident but rather a new human condition where millions of survivors are condemned to live in durably contaminated territories'.<sup>1694</sup>

Despite these data reported by UN agencies, the true scale of impact on the population, especially health effects, is still largely unknown.<sup>1695</sup> This is mainly due to two factors. First, when the accident occurred in 1986, the Soviet Union was going through a profound political and economic turmoil, which led eventually to the dissolution of the USSR in 1991. As a result, the handling of the accident's consequences instituted by the Soviet authorities was abruptly interrupted, and had to be taken over by three new independent countries of a very fragile political and economic status. This greatly contributed to the disruption of data collection and post-accident protection measures. Also, the initial attempt of the Soviet regime to conceal the facts or restrict the information of the accident added to the difficulty in gathering accurate initial data on radiological situation and exposure doses of the population.<sup>1696</sup>

Secondly, the Chernobyl health effects reported by the UN agencies, mainly IAEA, UNSCEAR and WHO, have been accused of playing down the radiological consequences of the accident and underestimating the health impacts of the affected population.<sup>1697</sup> Keith

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<sup>1694</sup> Grandazzi and Lemarchand (n 11) 7.

<sup>1695</sup> Petryna (n 1682).

<sup>1696</sup> Alla Yaroshinskaya, 'Impact of Radiation on the Population during the First Weeks and Months after the Chernobyl Accident and Health State of the Population 10 Years Later' in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998).

<sup>1697</sup> For example, Keith Baverstock and Dillwyn Williams, 'The Chernobyl Accident 20 Years On: An Assessment of the Health Consequences and the International Response' (2006) 114 *Environmental Health Perspectives* 1312; Dmytro Grodzinsky, 'General Situation of the Radiological Consequences of the Chernobyl Accident in Ukraine' in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998); Tetsuji Imanaka, 'Research Activities of the Nuclear Safety Research Group of KURRI with Belarussian, Russian and Ukrainian Colleagues about the Chernobyl Accident' in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998); Mikhail V Malko, 'Chernobyl Accident: The Crisis of the International Radiation Community' in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998).

Baverstock, a British radiobiologist and a former head of the WHO's regional office in Europe who participated in a UN fact-finding mission to Chernobyl, asserts that IAEA was hostile to acknowledging the increased carcinogenic risk from the accident in view of its mandate to promote the civil use of nuclear technology and its close links to the nuclear industry.<sup>1698</sup> And WHO seemed to have followed this position by acknowledging that the IAEA 'has the dominant role in the investigation of health effects of nuclear accidents'.<sup>1699</sup> Moreover, international Chernobyl projects organised by IAEA, WHO, and the European Commission (EC) were funded by major nuclear powers such as the US, France, Japan, UK and Germany who all promote nuclear energy for civil, military or both purposes.<sup>1700</sup> This IAEA hesitance coincided with the USSR government's wish at the time, which led IAEA to become, in the words of Mikhail V. Malko, a physicist of the National Academy of Sciences of Belarus, 'an advocate of the USSR government' in playing down the accident's consequences.<sup>1701</sup>

Notwithstanding, the Soviet government also instituted an "ambitious" social protection programme for affected residents by adopting a series of post-Chernobyl policies and laws.<sup>1702</sup> It is reported that the Soviet Union – and the Russian Federation after the collapse of the Union – spent 18 billion US dollars on Chernobyl rehabilitation between 1986 and 1991, of which 35% went to "social assistance to affected people" and 17% on resettlement (52% in total).<sup>1703</sup> In comparison, some 60-70% of the post-Fukushima rehabilitation budget was

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<sup>1698</sup> Baverstock and Williams (n 1697).

<sup>1699</sup> *ibid*; Mark Peplow, 'Special Report: Counting the Dead' (2006) 440 *Nature* 982; The same analysis was made by Michel Fernex, 'La santé : état des lieux vingt ans après' in Galia Ackerman, Guillaume Grandazzi and Frédéric Lemarchand (eds), *Les silences de Tchernobyl* (Autrement 2006).

<sup>1700</sup> John W Gofman, 'Beware the Data Diddlers' (2015) 49(4) *Bulletin of the Atomic Scientists* 40.

<sup>1701</sup> Malko (n 1697) 5; Also, see Alla Yaroshinskaya, *Chernobyl: The Forbidden Truth* (Bison Books 1995).

<sup>1702</sup> IAEA and others, 'Chernobyl's Legacy: Health, Environmental and Socio-Economic Impacts and Recommendations to the Governments of Belarus, the Russian Federation and Ukraine: The Chernobyl Forum 2003-2005' (The Chernobyl Forum 2006) Second Revised Version.; According to this IAEA-led report, the post-Chernobyl protection programme established by the Soviet government was too generous, extensive, and inefficient, causing 'un unsustainable fiscal burden' and draining 'resources away from other areas of public spending'.

<sup>1703</sup> UNDP and UNICEF (n 10).

allocated to decontamination and infrastructure projects and only around 10% was spent for victims' rehabilitation assistance.<sup>1704</sup> The most decisive policy of all was undoubtedly the adoption of the so-called Chernobyl Concept and its two implementing acts, Chernobyl Laws, by the Soviet authorities in 1991, five years after the accident. These laws established specific dose norms and defined the status of affected territories and victims. The "Chernobyl status" defined by these laws reached seven million persons receiving or eligible for pensions, social allowances, health benefits, and compensations.<sup>1705</sup>

This Chernobyl status was much invoked and studied in Japan following the Fukushima accident by the victims, citizen associations, lawmakers, and legal teams of the plaintiff in civil lawsuits as an exemplary model for the protection of nuclear accident victims. This paragraph first presents the accident's consequences reported by international nuclear institutions such as IAEA, WHO, and UNSCEAR (A) and makes in-depth analysis of the Chernobyl Concept and Laws adopted by the Soviet authorities (B). This brief case study serves as an important reference for the final proposal of protection norms in the following chapter.

### **A. The UN Chernobyl Reports and the Controversy**

Today the most widely diffused and referred account of the Chernobyl accident derives from the reports produced by the UN, essentially the following three agencies: UNSCEAR, IAEA and WHO.<sup>1706</sup> The UNSCEAR report in 2000 notably declared that there was 'no evidence of a major public health impact related to ionising radiation 14 years after the

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<sup>1704</sup> Fujiwara and Yokemoto (n 815).

<sup>1705</sup> IAEA, 'Chernobyl: The True Scale of the Accident' *IAEA Press Release* (5 September 2005) <<https://www.iaea.org/newscenter/pressreleases/chernobyl-true-scale-accident>> accessed 26 April 2023.

<sup>1706</sup> IAEA and others, 'Chernobyl's Legacy' (n 1702); UNSCEAR, 'Sources and Effects of Ionizing Radiation' (n 5); UNSCEAR, 'Sources and Effects of Ionizing Radiation: UNSCEAR 2008 Report to the General Assembly with Scientific Annexes. Volume II: Effects. Annex D (Health Effects Due to Radiation from the Chernobyl Accident)' (UN Scientific Committee on the Effects of Atomic Radiation 2008); WHO, 'Health Effects of the Chernobyl Accident and Special Health Care Programmes' (n 198).



Chernobyl accident' except radiation injuries among clean-up workers, so-called "liquidators", and thyroid cancers among children.<sup>1707</sup> The WHO report backed up that conclusion in 2005, confirming that fewer than 50 radiation-caused deaths among liquidators and 4,000 thyroid cancer cases among children are the only significant health impact of the accident.<sup>1708</sup> The report concluded that Chernobyl's public health effects 'were not nearly as substantial as had at first been feared'.<sup>1709</sup> Upon the release of these reports, the *Economist* wrote an article entitled 'Little to fear but fear itself', suggesting that the biggest health problem caused by the accident is in fact the mental anguish of the affected population, unwarranted "paralysing fear" of radiation.<sup>1710</sup> The report of the Chernobyl Forum led by IAEA indeed lamented in 2005 that persistent 'misperceptions and myths about the threat of radiation' have resulted in "paralysing fatalism" among residents which led to 'both *excessively* cautious behaviour (constant anxiety about health) and reckless conduct (consumption of mushrooms, berries and game from areas of high contamination)'.<sup>1711</sup> And these mental health problems pose a far greater threat to the affected population than does radiation exposure according to the report.

This Chernobyl Forum report, published by the IAEA in cooperation with seven other UN-affiliated agencies, indeed criticises the Soviet's post-accident protection measures and even blames the victims for their own health problems. The Chernobyl Forum complains that many affected residents 'neglect the role of personal behaviour in maintaining health' by unreasonably consuming mushrooms and berries from contaminated forests and abusing

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<sup>1707</sup> UNSCEAR, 'Sources and Effects of Ionizing Radiation' (n 5) 516.

<sup>1708</sup> WHO, 'Health Effects of the Chernobyl Accident and Special Health Care Programmes' (n 198); This 'subjugated' position of the WHO vis-à-vis IAEA derives from the WHA 12-40 agreement signed between the two agencies in 1959 according to Fernex (n 1699).

<sup>1709</sup> WHO, 'Chernobyl: the true scale of the accident' (5 September 2005) WHO Joint News Release <<https://www.who.int/news/item/05-09-2005-chernobyl-the-true-scale-of-the-accident>> consulted on 12 December 2020.

<sup>1710</sup> The Economist, 'Little to Fear but Fear Itself' (2005) (8 September 2005) *The Economist* <<https://www.economist.com/science-and-technology/2005/09/08/little-to-fear-but-fear-itself>> accessed 26 April 2022.

<sup>1711</sup> IAEA and others, 'Chernobyl's Legacy' (n 1702) 41.

alcohol and tobacco.<sup>1712</sup> And it points to the Soviet government’s “far-reaching” social protection policies set on “a very low threshold” level of radiation, which resulted in creating “a sense of victimization and dependency” among the affected, undermining “the capacity of the individuals and communities concerned to tackle their own economic and social problems”.<sup>1713</sup>

Furthermore, the IAEA-led report asserts that the affected population have developed ‘an exaggerated sense of the dangers to health of exposure to radiation’ despite the dissemination of “*accurate* information” from the local authorities and the international community, and that parents are ‘transferring their anxiety to their children through example and *excessively* protective care’.<sup>1714</sup> In fact, these comments strongly recall what has been said by the Japanese authorities and international nuclear institutions following the Fukushima disaster. Interestingly, the similitude of remarks is also observed when the report dismisses the Soviet’s policy of relocating or resettling a large number of the affected population to reduce their exposure doses as counterproductive to the well-being of many victims. The Chernobyl Forum claims that these relocations were deeply traumatic for the residents, many of whom now wish to return to their native villages.<sup>1715</sup> However, this account completely contradicts the report from a national expert, for example, in Belarus where the desire of the inhabitants for a resettlement in the contaminated villages was so strong that even the party leaders of Belarus had begun to support the resettlement ‘on a scale much greater than the one foreseen in Moscow’.<sup>1716</sup>

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<sup>1712</sup> *ibid* 37.

<sup>1713</sup> *ibid* 37.

<sup>1714</sup> *ibid* 36, 41 (emphasis added).

<sup>1715</sup> *ibid* 36.

<sup>1716</sup> Malko (n 1682) 248–249.

These authoritative reports of the UN generally contradicted the result of many studies conducted by Belarusian, Ukrainian, and Russian doctors and scientists.<sup>1717</sup> They were also contested by many international scientists and medical professionals.<sup>1718</sup> For example, John W. Gofman, a biophysicist at the University of California Berkeley who had also participated in the Manhattan Project, estimated that the accident would cause between 634,200 and 951,000 total cases of radiation-induced cancer and between 13,100 and 19,500 cases of radiation-induced leukemia, calling the UNSCEAR numbers at least 16 to 25 times too low.<sup>1719</sup> The only UN report which took a slightly different tone was the one from the Office for the Coordination of Humanitarian Affairs (OCHA) published in 2000<sup>1720</sup> and the view expressed by the former Secretary General Kofi Annan<sup>1721</sup>. As such, the editor of the renowned medical journal *The*

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<sup>1717</sup> To cite a few whose articles were written or translated in English, Alexey V Yablokov, Vassily B Nesterenko and Alexey V Nesterenko, 'Chernobyl: Consequences of the Catastrophe for People and the Environment' (2009) 1181 *Annals of the New York Academy of Sciences*; GS Bandazhevskaya and others, 'Relationship between Caesium (137Cs) Load, Cardiovascular Symptoms, and Source of Food in "Chernobyl" Children -- Preliminary Observations after Intake of Oral Apple Pectin' (2004) 134 *Swiss Medical Weekly* 725; YI Bandazhevsky, 'Chronic Cs-137 Incorporation in Children's Organs' (2003) 133 *Swiss Medical Weekly* 488; Grodzinsky (n 1697); Malko (n 1697).; The latter report of a collaborative research project among the physicists and scientists from Japan, Belarus, Ukraine and the Russian Federation, edited by the Japanese physicist (Kyoto University), Tetsuji Imanaka, is of particular interest since it is rather rare to be able to access research articles written by local experts and scientists on the Chernobyl consequences.

<sup>1718</sup> To cite a few, Gofman (n 9); Baverstock and Williams (n 1697); Fernex (n 1699); IPPNW and GFS, 'Health Effects of Chernobyl: 25 Years after the Reactor Catastrophe' (International Physicians for the Prevention of Nuclear War and Gesellschaft fur Strahlenschutz 2011); Jean Claude Zerbib, 'Tchernobyl, effets sanitaires et environnementaux' (2015) 37 *Les cahiers de GLOBAL CHANCE* 42; Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998).

<sup>1719</sup> Gofman (n 9).

<sup>1720</sup> OCHA (n 10).; The report notably acknowledges that 'there is some controversy about the findings of the various research projects addressing the environmental and health effects of Chernobyl' (p.8) and reports the number of thyroid cases to be 11,000 when the WHO report published six year later reported only 4,000 cases. But the OCHA report is essentially a document of appeal to donor countries for more support on the Chernobyl assistance projects and not an assessment of the accident impacts.

<sup>1721</sup> UN (n 7). In the speech, Kofi Annan mentions that close to 9 million in Belarus, Ukraine, and the Russian Federation have been affected by radiation from the accident and suffer 'acute economic difficulties and chronic health problems, especially among children', whose picture is much graver than what had been described by the reports of IAEA, UNSCEAR, and WHO.

*Lancet* also wrote in 2014 that ‘[...] when it comes to Chernobyl and Fukushima and the threat of radioactive contamination, the truth may not have been fully told’.<sup>1722</sup>

What it is also striking from these UN reports is the lack of humanitarian and human rights perspectives as well as the voices of the affected. Most of them were compiled from one-shot field missions conducted by international experts and scientists who were from the fields of nuclear physics, radiation protection, health, ecology, psychosocial and economy. There were no legal or protection-minded specialists in these teams. Moreover, no studies have been conducted by the UN as regards the phenomenon of displacement and forced immobility as a result of the Chernobyl accident, apart from the statistical data and the partial analysis conducted by IAEA, UNSCEAR, and IOM. IOM in fact published a report in 1997 entitled ‘Ecological Migrants in Belarus: Returning Home after Chernobyl?’ but the study is very limited in scope: it only dealt with the situation in Belarus, focusing on the return of population to contaminated territories, of which the report acknowledged knowing neither the scale nor characteristic (!).<sup>1723</sup> Since it was an industrial accident, not a war or a natural disaster, there was no involvement or report of UNHCR who usually has the protection expertise for IDPs.

As such, the UN reports written on the Chernobyl accident were far from comprehensive, deeply flawed from human rights perspective and protection expertise, and accompanied by controversies. Also, these reports rarely mentioned the Chernobyl Concept and Laws adopted by the former Soviet authorities.

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<sup>1722</sup> Horton (n 199) 2110.; cited by the *Independent WHO* website (<https://independentwho.org/en/who-and-aiea-agreement/>)

<sup>1723</sup> IOM, ‘Ecological Migrants in Belarus: Returning Home after Chernobyl?’ (International Organization for Migration 1997).

## B. The Chernobyl Status and its Protection Norms

At the time of the accident, the Soviet Union did not have any legislative acts concerning the protection of its citizens in case of nuclear disasters despite the significant number of nuclear installations, both military and civil, operating in its territory.<sup>1724</sup> The country was not a party to any international nuclear liability conventions.<sup>1725</sup> Also, there were no laws regulating external exposure dose of the public except for nuclear plant workers and residents living within a 30 km radius from nuclear plants.<sup>1726</sup> Consequently, the execution and coordination of initial clean-up activities and protection measures were quite chaotic and ineffective because the Soviet authority was simply not prepared for it.<sup>1727</sup> The first protective action undertaken by the Soviet authority was to evacuate the population from a 30 km-radius zone without proper planning on the sixth day from the accident, which later became the Exclusion Zone.<sup>1728</sup> They were often evacuated without being informed about the radiological situation, thus thinking that they would be able to come back within two to three weeks,<sup>1729</sup> which strongly resembles the experience of Fukushima victims following the TEPCO accident.

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<sup>1724</sup> Alla Yaroshinskaya, 'Problems of Social Assistance to the Chernobyl Sufferers in Russia' in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998).

<sup>1725</sup> Pelzer, 'Learning the Hard Way: Did the Lessons Taught by the Chernobyl Nuclear Accident Contribute to Improving Nuclear Law' (n 419).

<sup>1726</sup> Before the accident, the 'Norms of Radiation Safety' (NRS-76) was regulating the permissible concentrations of radionuclides in food, water, and inhaled air, and the 'Principal Sanitarian Rules of Working with Radioactive Substances and Other Ionizing Radiation Sources' (PSR-72/80) was regulating the nuclear facilities. See Igor A Ryabzev and Tetsuji Imanaka, 'Legislation and Research Activity in Russia about the Radiological Consequences of the Chernobyl Accident' in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998); Olga Kuchinskaya, *The Politics of Invisibility: Public Knowledge about Radiation Health Effects after Chernobyl* (MIT Press 2014).

<sup>1727</sup> Yaroshinskaya, 'Problems of Social Assistance to the Chernobyl Sufferers in Russia' (n 1724).

<sup>1728</sup> R Omatsu, *3.11 とチェルノブイリ法：再建への知恵を受け継ぐ* (3.11 and Chernobyl Law: To Succeed the Wisdom for Reconstruction) (Toyo Shoten 2013).

<sup>1729</sup> Yaroshinskaya, 'Problems of Social Assistance to the Chernobyl Sufferers in Russia' (n 1724).

As such, 116,000 residents were evacuated during the first few months and 220,000 more were relocated in subsequent years.<sup>1730</sup> During the first five years, various decrees had been adopted by the Central Committee of the CPSU (Communist Party of the Soviet Union) – the Soviet supreme authority – and the Council of Ministers of the USSR (the executive body) in an ad hoc manner to deal with the accident consequences, which were all made in secret, but no specific law for the Chernobyl disaster was enacted by the Supreme Soviet of the USSR (the legislative body) until 1991.<sup>1731</sup>

The most determinant laws and by-laws which firmly established the status of Chernobyl victims, their entitlements and compensations, the demarcation of affected zones, and the definition of dose standards were adopted in 1991, namely the ‘Concept of Living in Districts Affected by the Accident at the Chernobyl NPP (the Concept)’<sup>1732</sup>, the Law ‘On Social Protection of Citizens Exposed to Radiation As a Result of the Accident at the Chernobyl NPP’<sup>1733</sup> and the Law ‘On the Legal Regime of the Territories Exposed to Radioactive

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<sup>1730</sup> UNSCEAR, ‘Sources and Effects of Ionizing Radiation’ (n 5).

<sup>1731</sup> Milan Zgersky, ‘Legal Regime of the Chernobyl Problems in the USSR, Belarus, Russia and the Ukraine’ in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998); Yaroshinskaya, ‘Problems of Social Assistance to the Chernobyl Sufferers in Russia’ (n 1724).

<sup>1732</sup> Adopted by the State Expert Commission of the Council of Ministers of the USSR on 8 April 1991 (N164). The two Soviet Social Republics (SSR) – the Ukrainian SSR and the Belorussian SSR – also adopted similar Concepts. In the Belorussian SSR, ‘Concept of People’s Living in Regions Affected by the Chernobyl NPP Catastrophe’ was adopted on 19 December 1990; in the Ukrainian SSR, ‘Concept of Population Residence on the Territories of Ukrainian SSR with Increased Levels of Radioactive Contamination As a Result of the Chernobyl Accident’ adopted on 27 February 1991. See Yaroshinskaya, ‘Impact of Radiation on the Population during the First Weeks and Months after the Chernobyl Accident and Health State of the Population 10 Years Later’ (n 1696); Oleg Nasvit, ‘Legislation in Ukraine about the Radiological Consequences of the Chernobyl Accident’ in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998); Vladimir P Matsko and Tetsuji Imanaka, ‘Legislation and Research Activity in Belarus about the Radiological Consequences of the Chernobyl Accident: Historical Review and Present Situation’ in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998).

<sup>1733</sup> Soviet federal law adopted on 12 May 1991. The affected three Soviet Social Republics (SSR) – the Ukrainian SSR, the Belorussian SSR and the Russian Federation – enacted the corresponding laws respectively. In the Ukrainian SSR, ‘On the Status and Social Protection of Citizens Affected by the Accident at the Chernobyl NPP’ was adopted on 28 February 1991; in the Belorussian SSR, ‘On Social Protection of Citizens Affected by the

Contamination in Consequence of the Catastrophe at the Chernobyl NPP’<sup>1734</sup> (the Chernobyl Laws for the two laws together).

First, the Concept established that the main criterion to determine the status of victims is the exposed dose based on the density of soil contamination. It set the permissible annual effective dose for the affected population as below 1 mSv/year and the permissible lifetime dose as 70 mSv,<sup>1735</sup> requiring the state to intervene with radiation protection measures in areas where additional exposure dose from the accident exceeded 1 mSv/year. Most interestingly, the Concept of the Ukraine Soviet Socialist Republic (SSR) stated that ‘the situation on the contaminated territories demonstrates low effectiveness of countermeasures aimed at eliminating harmful effects of radiation on the health of people’ and therefore ‘evacuation of people from these territories is of particular importance’.<sup>1736</sup> As such, the Concept laid down a principle which guarantees the right of individuals living in the contaminated territories to make an independent decision about whether to continue living or to resettle elsewhere on the basis of the objective information about radiological situation, exposed doses and possible health effects, and not to be economically disadvantaged due to such choice.<sup>1737</sup> Indeed, these

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Catastrophe at the Chernobyl NPP’ on 12 February 1991; and in the Russian Federation, ‘On Social Protection of Citizens Affected by Radiation in Consequence of the Accident at the Chernobyl NPP’ on 15 May 1991 (N1244-1). See Zgersky (n 1731); Nasvit (n 1732); Ryabzev and Imanaka (n 1726); Matsko and Imanaka (n 1732).

<sup>1734</sup> Adopted on 27 February 1991 first by the Ukraine SSR. The Belarusian SSR followed and adopted the law ‘On Legal Regime of the Territories Exposed to Radioactive Contamination in Consequence of the Catastrophe at the Chernobyl NPP’ on 12 November 1991. The Russian Federation adopted an equivalent Government Decree entitled ‘On Regime of Territories Exposed to Radioactive Contamination in Consequence of the Accident at the Chernobyl NPP’ on 25 December 1992. The contents of the Concept and the Laws adopted by three SSRs are slightly different. See Zgersky (n 1731).

<sup>1735</sup> Omatsu (n 1728). According to Omatsu, initially, the National Commission on Radiation Protection of the USSR proposed the lifetime dose of 350 mSv, the annual dose of 5 mSv, as reference level for the affected population in 1988. But upon receiving criticism from the affected municipalities and the public, the Concept finally chose the 70 mSv lifetime dose, the 1 mSv annual dose.

<sup>1736</sup> Nasvit (n 1732) 51.

<sup>1737</sup> Ryabzev and Imanaka (n 1726); Omatsu (n 1728) 87. Principle 11 of the Concept adopted by the USSR Council of Ministers.

protection policies established by the Soviet authorities are, at least on the policy level, much more protective and precautionary than the ones established by the Japanese authorities.

Secondly, the Laws defined four categories of “contaminated areas” with different entitlements for the residents of respective zones (see Table 20 below). The precise division and name of these categories are slightly different among the Laws of Belarus, Ukraine, and the Russian Federation but the thesis presents the principal outline of respective categories.<sup>1738</sup> As a core principle, the areas where the density of soil contamination by Cs-137 exceeds 37,000 Bq per square metre (Bq/m<sup>2</sup>),<sup>1739</sup> where the estimated individual effective equivalent dose may exceed 0.5 mSv/year in excess of the pre-accident level, were designated as “contaminated areas” in need of State interventions.

Table 20: Categories of Contaminated Zones in Chernobyl Accident<sup>1740</sup>

	<b>Zone</b>	<b>Deposition of Cs-137 (Bq)</b>	<b>Calculated exposure dose</b>	<b>Resettlement</b>
1	Exclusion	N/D (30 km radius)	N/D	Mandatory
2	Obligatory Resettlement	> 1,480,000	N/D	Mandatory
		555,000 – 1,480,000	> 5 mSv/year	Optional
3	Voluntary Resettlement	185,000 - 555,000	> 1 mSv/year	Optional
4	Radiation Control	37,000 - 185,000	> 0.5 mSv/year	No

The first category of these areas is the Restricted Zone (or Exclusion Zone) which is the 30 km radius area evacuated during 1986 and subsequent years. The second category is called (Obligatory) Resettlement Zone, the areas with the soil contamination density by Cs-137 exceeding 555,000 Bq/m<sup>2</sup> where the estimated individual effective dose exceeds 5

<sup>1738</sup> Zgersky (n 1731).

<sup>1739</sup> At the time, the former Soviet authorities was using the unit, curie (Ci), instead of becquerel (Bq). Thus, this value (37 kBq/m<sup>2</sup>) was expressed as 1 curie (Ci) per square kilometer (1 Ci/km<sup>2</sup>).

<sup>1740</sup> Source: Zgersky (n 1731); Nasvit (n 1732); Omatsu (n 1728).



mSv/year.<sup>1741</sup> But this Zone is in fact divided into two sub-categories: the one with the soil contamination density of over 1,480,000 Bq/m<sup>2</sup>,<sup>1742</sup> and the other with the contamination level between 555,000 - 1,480,000 Bq/m<sup>2</sup>.<sup>1743</sup> The first sub-zone is designated for compulsory resettlement where the residents are required to resettle to “clean” areas with state support and compensation. This area is prohibited for habitation. The residents living in the second sub-zone can remain in the Zone if they wish, even though resettlement is strongly recommended, with equivalent state support, compensation, and radiation protection measures.

The third zone is called Voluntary Resettlement Zone, or the residence zone with the right for resettlement, with the soil contamination density by Cs-137 exceeding 185,000 Bq/m<sup>2</sup> but less than 555,000 Bq/m<sup>2</sup>, where the estimated individual effective dose is between 1-5 mSv/year. The residents living in this Zone can choose whether to remain or resettle. For those who stay, the state provides health monitoring, radiation protection, compensation and other support measures, and for others who choose relocation, the state provides resettlement support and compensation. The fourth category is named Radiation Control Zone, or the residence zone with privileged social-economic status, with the soil contamination density by Caesium-137 between 37,000 - 185,000 Bq/m<sup>2</sup>, where individual exposure dose is estimated between 0,5 to 1 mSv/year. The residents living in this Zone are entitled to radiation protection and socio-economic support.

Here, one can observe a small discrepancy between the dose criteria set by the Concept and the Laws. The Concept fixed 1 mSv/year as permissible dose limit while the Laws established 0.5 mSv/year as threshold dose for “contaminated areas” which requires state

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<sup>1741</sup> At the time, 555,000 Bq/m<sup>2</sup> was expressed as 15 Ci/km<sup>2</sup>. In fact, the Laws provides the dose criteria for other radioactive materials, namely strontium and plutonium, to define these zones. For example, the area with the soil contamination by strontium which exceeds 111,000 Bq/m<sup>2</sup> (3 Ci/km<sup>2</sup>) or by plutonium of more than 3,700 Bq/m<sup>2</sup> (0.1 Ci/km<sup>2</sup>) is designated as Obligatory Resettlement Zone as well.

<sup>1742</sup> Formerly, 40 Ci/km<sup>2</sup>

<sup>1743</sup> Between 15 Ci/km<sup>2</sup> and 40 Ci/km<sup>2</sup>

interventions. This is mainly due to the fact that it is very difficult to gauge individual exposure doses from the soil contamination level since radioactive materials are not evenly spread within the same zone.<sup>1744</sup> Nevertheless, the most important element of the Chernobyl dose criteria is the reference dose level chosen by the Soviet authorities: 5 mSv/year for compulsory resettlement and 1 mSv/year for optional resettlement. This dose level is four times lower than the Fukushima reference dose fixed by the Japanese government – 20 mSv/year – for compulsory evacuation and 10 times lower – 50 mSv/year – for compulsory resettlement (the Red Zone). In addition, no settlement option was offered to Fukushima victims living in the contaminated areas with doses between 1-20 mSv/year.

Finally, the Chernobyl Laws defined the scope of “affected population” or “victims” who would be the beneficiary of the state support and compensation programme. In the Law of the Russian Federation, 12 categories of victims were set up with corresponding compensations and benefits (Section III, Articles 13-20).<sup>1745</sup> In all three Soviet Socialist Republics (SSRs), the categories are roughly grouped into three: 1) the “liquidators” of the accident, 2) resettlers from the contaminated areas, and 3) stayers in the contaminated areas. Depending on the period of work (liquidators) and the contaminated zones (resettlers and stayers), the amount, the scope and the duration of assistance and compensation were adjusted. Among the recognised victims, there was also a separate category for those who suffer from illnesses and disabilities caused by the accident. For them, a comprehensive assistance and special compensation programme was established. Moreover, children were also categorised as a special group in the Laws, provided

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<sup>1744</sup> Omatsu (n 1728) 90–91.

<sup>1745</sup> Yaroshinskaya, ‘Problems of Social Assistance to the Chernobyl Sufferers in Russia’ (n 1724); The translation of some provisions of the Law (in Japanese) referred to was done by Omatsu (n 1728).; ‘On Social Protection of Citizens Affected by Radiation in Consequence of the Accident at the Chernobyl NPP, the Law of Russian Federation N1244-1 (15 May 1991) as amended.

with specific assistance and compensation schemes.<sup>1746</sup> Acknowledging that children are vulnerable to radiation exposure, minors at the time of the accident and those who were born from the exposed parents (the second generation of the affected) were included in the scheme.

The state support scheme (so-called “benefits” as opposed to “compensation”) was composed of:<sup>1747</sup> health (medical care), recreation (sanatorium and vacations), material aids such as house construction and socio-cultural infrastructure (mainly for the resettlers), subsidies for house rent and utilities, free transportation, income-tax exemption or relief, pension benefits, scholarships for school children and youth, and employment opportunities (for the resettlers). The compensation was mainly two-fold: health damage and loss of property. For the former, the compensation was paid monthly and for the latter, one-time payment.

However, this comprehensive protection scheme established for the Chernobyl victims has never been fully implemented in the end. After the disintegration of the USSR and under the severe economic situation, neither the Soviet authorities nor the three succeeding states have managed to provide their citizens with what had been prescribed by the Chernobyl Law.<sup>1748</sup> House construction and socio-cultural infrastructure came to a halt in the middle and the promised job creation was never realised for the resettled population.<sup>1749</sup> Medical facilities lacked personnel and equipment, and the prescribed medicines were often not available in the pharmacies.<sup>1750</sup> The compensation was delayed and diminished as years passed and thus never fully paid.<sup>1751</sup> The liquidators who often suffered disabilities and illnesses later in life, received

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<sup>1746</sup> Volodymyr Tykhyi, ‘Chernobyl Sufferers in Ukraine and Their Social Problems: Short Outline’ in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998); Omatsu (n 1728).

<sup>1747</sup> Tykhyi (n 1746).

<sup>1748</sup> Yaroshinskaya, ‘Problems of Social Assistance to the Chernobyl Sufferers in Russia’ (n 1724); Zgersky (n 1731); Tykhyi (n 1746).

<sup>1749</sup> Yaroshinskaya, ‘Problems of Social Assistance to the Chernobyl Sufferers in Russia’ (n 1724).

<sup>1750</sup> Tykhyi (n 1746).

<sup>1751</sup> Nasvit (n 1732).

poor medical treatment, meagre pensions and little compensation, not only due to the dire economic circumstance of the newly independent countries but also owing to the fact that many of them could not obtain official records that their conditions had been induced by radiation during their liquidation work within the 30 km zone.<sup>1752</sup> In Ukraine, this created a situation of what Adriana Petryna called “biological citizenship”<sup>1753</sup> where people could only access “citizenship” – social welfare entitlements and compensation – by proving the link between their illness and the accident. Consequently, despite the adoption of robust and effective legislation, millions of people continued to suffer for a long time in these contaminated territories of the Chernobyl accident.

Despite this end-result, the Chernobyl Concept and Laws established for nuclear accident victims provides an inspiring example for the protection norms which the thesis will propose in the following chapter. In effect, they offer an excellent alternative model to the ones recommended by international nuclear institutions such as IAEA and ICRP as well as the one established after the Fukushima accident.

## **§2: The Concept of “Prejudice of Anxiety” Established by the French Jurisprudence**

After examining the national precedents from past disasters, this paragraph looks into a particular legal concept established as a precedent in the national jurisdiction of the French Republic, which could become instructive for the protection of radiation victims. The prejudice of anxiety related to exposure to toxic substances was also recognised by the ECtHR, notably the 2005 *Roche v the UK* case.<sup>1754</sup> In the decision, the court acknowledged that a former soldier

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<sup>1752</sup> Tykhyi (n 1746).

<sup>1753</sup> Petryna (n 1682).

<sup>1754</sup> *Case of Roche v The United Kingdom*, App no. 32555/96 (ECtHR, 19 October 2005)

who had participated in the 1963 chemical weapon's test at Porton Down suffered from 'substantial anxiety and stress' due to the uncertainty as to whether or not he had been put at risk through such a participation (i.e. exposing himself to chemical substances which would threaten his health in the future).<sup>1755</sup>

In France, the prejudice of anxiety was initially instituted through the court rulings in France for the litigation cases of workers who had been exposed to asbestos through their professional activities during the 1970s and 1980s.<sup>1756</sup> Following the "asbestos scandal" which broke out in 1994, the scheme for the early termination of activity for asbestos workers, *l'allocation de cessation anticipée d'activité des travailleurs de l'amiante* (ACAATA, hereafter)<sup>1757</sup>, was instituted by article 41 of the Act of 23 December 1998.<sup>1758</sup> This allowed the exposed workers to stop working before the statutory retirement age and receive an early termination allowance, the amount representing 65% of their salaries, until the system of retirement will take charge. However, this scheme triggered several lawsuits filed by the beneficiaries of the scheme who demanded compensation for the loss of revenues induced by the early termination of their contracts and supplementary compensation for "prejudice of anxiety" associated with 'fear of developing illnesses induced by asbestos and the necessity of having regular health check-ups'.<sup>1759</sup> The decision of the Court of Appeal of Paris (18 September 2008) and that of the Court of Appeal of Bordeaux (7 April 2009) recognised the economic prejudice incurred by the plaintiffs in relation to the early termination of their

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<sup>1755</sup> *Roche v The United Kingdom* (cited above), para 161

<sup>1756</sup> The use of asbestos was prohibited for domestic use in France in 1977 but was still used for public buildings until it was totally banned only in 1994. The government (health authorities) at the time was accused of having delayed the institution of a total ban under the pressure from the industrial lobby. See Denis Durand de Bousingen, 'France Accused over Asbestos Delay' (1996) 348 *The Lancet* 53.

<sup>1757</sup> Allowance for the early termination of activities for asbestos workers (translation by R. Hasegawa)

<sup>1758</sup> Loi n° 98-1194 du 23 décembre 1998 de financement de la sécurité sociale pour 1999 (art 41), JO n° 300 du 27 décembre 1998 ; Décret n°99-247 du 29 mars 1999 relatif à l'allocation de cessation anticipée d'activité prévue à l'article 41 de la loi de financement de la sécurité sociale pour 1999. See Morane Keim-Bagot, 'Préjudice d'anxiété : la Cour de cassation referme la boîte de Pandore' [2015] *Droit Social* 360.

<sup>1759</sup> Laurent Gamet, 'Le préjudice d'anxiété' [2015] *Droit Social* 55, 55.

activities, reasoning that their decision to partake in the scheme was not made freely but rather by default owing to the risk of continuous exposure to asbestos in their work.<sup>1760</sup> In addition, the Bordeaux court acknowledged for the first time the prejudice of anxiety suffered by the plaintiffs.

But the Court of Cassation finally rejected the claim of economic prejudice recognised by these lower courts and acknowledged ‘the existence of a specific prejudice of anxiety’ for ‘the employees, who had worked [...] during a period when asbestos or materials containing asbestos were manufactured or processed, found themselves, because of the employer’s action, in a situation of permanent anxiety about the risk of developing an asbestos-related disease at any time and due to having to undergo regular checks and examinations which reactivates this anxiety’.<sup>1761</sup> The ruling also specified that the reparation for such prejudice could only be claimed by those who had not yet been diagnosed with an asbestos-induced illness.

Since the 2010 judgement, the Court of Cassation has gradually elaborated the conditions of recognition, articulated the covered damages, and expanded the scope of applicable risks. Some of the decisive rulings include the judgement on 25 September 2013 which established that ‘the reparation awarded for the prejudice of anxiety compensates for all psychological disorders, including those related to the disruption of living conditions (*le bouleversement dans les conditions d’existence*)’, the quality of personal, social and family life.<sup>1762</sup> To this, the judgement on 3 March 2015 added the psychological damage related to

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<sup>1760</sup> Paris, 18<sup>e</sup> ch. C, 18 sept 2008, n° 07/00454.; Bordeaux, ch. soc. sect. A, 7 avril 2009, n° 08/04212.

<sup>1761</sup> Cass. Soc., 11 May 2010, n°09-42.241, Bull. civ. V, n°106. The original text of the ruling (in French): ‘les salariés, qui avaient travaillé [...] pendant une période où y étaient fabriqués ou traités l’amiante ou des matériaux contenant de l’amiante, se trouvaient par le fait de l’employeur dans une situation d’inquiétude permanente face au risque de déclaration à tout moment d’une maladie liée à l’amiante et étaient amenés à subir des contrôles et examens réguliers propres à réactiver cette angoisse’

<sup>1762</sup> Cass. Soc., 25 Sep 2013, n°12-12.883, 12-13.307, Bull. civ. V, n°208. ; The original text of the ruling (in French) : ‘l’indemnisation accordée au titre du préjudice d’anxiété répare l’ensemble des troubles psychologiques, y compris ceux liés au bouleversement dans les conditions d’existence’.

“the loss of life expectancy” as part of the prejudice of anxiety.<sup>1763</sup> Here, one can observe the Court’s attempt to group all the extra-patrimonial damages into “the prejudice of anxiety”, thus avoiding the multiplication of reparation.<sup>1764</sup> These rulings, which rather restrained the scope of appreciable damages, drew critical views from several legal specialists.<sup>1765</sup> Laurent Gamet called such a decision perplexing since anxiety is one of the “psychological disorders” and not the other way around.<sup>1766</sup> The disruption of living conditions is in effect rather a result than a cause of “psychological disorders”. Anne Guégan-Lécuyer, a jurist of private law, notably argued that the ruling was made from ‘an amalgam that is not in conformity with the distinction traditionally made between mental suffering and disturbances of living conditions’ and, on concrete terms, it resulted in diminishing by half the compensation amount to be paid.<sup>1767</sup>

By contrast, the scope of applicable risks has gradually expanded beyond asbestos by the development of jurisprudence. Initially limited to the former asbestos workers who are eligible for the ACAATA, the prejudice of anxiety was also recognised by the Labour Courts (*le conseil de prud’hommes*) of Longwy and Forbach for former workers of iron and coal mines in Lorraine in 2015 and 2016.<sup>1768</sup> While these decisions were overturned by the Courts of Appeal of Nancy and Metz respectively,<sup>1769</sup> the Court of Cassation dismissed the decision of the latter (CA Metz) on 11 September 2019 and referred the case back to a Court of Appeal for

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<sup>1763</sup> Cass. Soc., 3 mars 2015, n°13-21.832 ... 13-21.865, Bull. civ. V, n°40.

<sup>1764</sup> Gamet (n 1759).

<sup>1765</sup> For example, *ibid*; Keim-Bagot (n 1758); Anne Guégan-Lécuyer, ‘La Consécration Du Droit à Réparation d’un “Préjudice Spécifique d’anxiété” Globalisé Au Profit Des Salariés Exposés à l’amiante’ (2013) 44(7581) Recueil Dalloz 2954.

<sup>1766</sup> Gamet (n 1759).

<sup>1767</sup> Guégan-Lécuyer (n 1765) 2957. Guégan-Lécuyer notably gave an example, the judgement of the Court of Appeal of Paris dated on 1 December 2011 (n°12-17.667 à 12-17.706, 12-20.912, 12-18.365 à 12-18.401, 12-12.883, 12-13.307) which awarded each 15,000 euros for the prejudice of anxiety and between 12,000-15,000 euros for the disruption of living conditions respectively.

<sup>1768</sup> Cons. Prud’h. Longwy, 6 Feb 2015, n° 13-00174; The court instructed the former employer, Lormines, to pay the compensation of 4,500 euros each for 10 former workers of an iron mine in Lorraine.; Cons.; Prud’h. Forbach, 30 June 2016; The court instructed the former employer, Charbonnages de France, to pay the compensation of 1,000 euros each for more than 750 former workers of a coal mine in Moselle.

<sup>1769</sup> C.A. Nancy, 16 Sep 2016, n° 15/00584; C.A. Metz, 7 July 2017, n° 17/00829, 17/00537, 17/00793

re-examination by clarifying the condition for recognition: ‘an employee who can prove an exposure to a harmful or toxic substance generating a high risk of developing a serious pathology and a prejudice of anxiety personally suffered as a result of such exposure, may bring an action against his employer for the latter’s failure to fulfil its safety obligation’.<sup>1770</sup> Upon such a referral, the Court of Appeal of Douai acknowledged the prejudice of anxiety suffered by 726 former coal miners, awarding each of them financial compensation of 10,000 euros.<sup>1771</sup> Similarly, the prejudice of anxiety has been recognised for those exposed to benzene in 2021.<sup>1772</sup>

While the prejudice in question can now be recognised for other workers than those of asbestos, who have been exposed to ‘a harmful or toxic substance generating a high risk of developing a serious pathology’, five judgements rendered by the Court of Cassation on 13 October 2021 affirmed the conditions for such recognition, restricting somewhat the scope of application.<sup>1773</sup> Notably, the court reiterated that for the prejudice to be recognised, the employee must prove that he or she has personally suffered an anxiety damage as a result of such a risk (the reality and causal link) in addition to proving the fact of exposure to a substance which may endanger his or her life. For the legal reasoning, the court reminded that the prejudice of anxiety, ‘which does not result solely from exposure to the risk created by a harmful or toxic substance, is constituted by the psychological disorders induced upon the knowledge, by the employee, of being at high risk of developing a serious pathology’. This practically means that each person who claims the reparation for the prejudice of anxiety must substantiate the reality of his or her mental suffering through testimonies, medical certificates, personal

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<sup>1770</sup> Cass. Soc., 11 septembre 2019, n°17-24.888; The original text of the ruling in French: ‘le salarié qui justifie d’une exposition à une substance nocive ou toxique générant un risque élevé de développer une pathologie grave et d’un préjudice d’anxiété personnellement subi résultant d’une telle exposition, peut agir contre son employeur pour manquement de ce dernier à son obligation de sécurité.’

<sup>1771</sup> CA Douai, 29 janvier 2021, n° 20/00255

<sup>1772</sup> Cass. Soc., 13 Oct 2021, pourvois n°20-16.584, 20-16.598 et 20-16.599

<sup>1773</sup> Cass. Soc., 13 Oct 2021, pourvois n°20-16.617, 20-16.585, 20-16.584, 20-16.593 et 20-16.583



histories, etc.<sup>1774</sup> According to a legal specialist, this “individualization” of the prejudice mainly serves to ‘exclude vicarious victims and to impose on the judge a case-by-case assessment, not on the principle of anxiety damage but rather on its magnitude’, thus avoiding ‘the pitfall of lump-sum compensation for this prejudice’.<sup>1775</sup> The most recent decision of the Court of Cassation dated on 8 February 2023 extended the recognition of this prejudice to the workers of sub-contractors.<sup>1776</sup> According to this ruling, the sub-contractors who have carried out their tasks at a contracting company which uses toxic substances (asbestos in this case) may claim compensation for prejudice of anxiety from this company, even though it is not their direct employer.

By contrast, the latest decision of the Council of State (*Conseil d’Etat*) on the prejudice of anxiety related to asbestos exposure of former military personnel, rendered on 28 March 2022, backtracked from requiring the proof of psychological disorders in recognising such prejudice.<sup>1777</sup> It notably stated that the prejudice of anxiety would be justified when the person establishes that he or she was exposed to “significant quantities (*quantités importantes*)” of the substance, thus having ‘a high risk of developing a serious pathology and of having his or her life expectancy reduced as a result’, and this ‘without having to provide evidence of psychological disorders’.

Nevertheless, the concept of “the prejudice of anxiety” related to exposure to a ‘toxic substance generating a high risk of developing a serious pathology’ developed in France provides an important avenue for reflection as to how to protect the victims of radiation disasters. As shown in the case of the *hibakusha* and Chernobyl and Fukushima accidents, one

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<sup>1774</sup> Dominique Asquinazi-Bailleux, ‘L’impossible preuve d’un préjudice d’anxiété pour les salariés exposés à des substances toxiques’ (2021) 47 *La Semaine Juridique Social*.

<sup>1775</sup> Laurent Bloch, ‘Le «désamiantage» du préjudice d’anxiété par la chambre sociale’ (2019) 12 *Responsabilité civile et assurances* 7.

<sup>1776</sup> Cass. Soc., 8 févr. 2023, pourvois n° 20-23.312

<sup>1777</sup> CE 2e et 7e ch.-réunies, 28 Mar 2022, n° 453378

of the typical and major damages which radiation victims suffer is mental distress arising from the fear of developing radiation illnesses which may lead to their death or the fear of future radiation effects for their children. However, this prejudice is currently poorly recognised by the authorities, or worse, it is often considered the result of “erroneous” and exaggerated information on radiation risk which needs to be “corrected”. Often, the compensation following a nuclear disaster is focused on patrimonial loss and radiation injuries once a victim is diagnosed with illness. The notion of the prejudice of anxiety as developed in French jurisprudence could fill this compensation gap in theory.

Nevertheless, applying the concept in the form developed by the jurisprudence in France is not an ideal option. It is ultimately a one-time payment which has to be claimed at court and the compensation amount depends on individual circumstances, personal history, sensitivities to radiation risk, and so on. Since radiation effect is said to manifest in several years to decades, or even in the following generations, a long-term compensation (e.g., post-Chernobyl monthly compensation) or allowance scheme (e.g., *hibakusha* monthly allowance) may be more appropriate to address the issue of anxiety damage and other psychological disorders related to radiation exposure.

### **Conclusion of Chapter 1**

The most outspoken Belarusian physicist after the Chernobyl accident, Vassily Nesterenko, once described the fundamental problem of nuclear disaster handlings: ‘The problem is the nature of problem. No government would be able to take adequate measures if faced with a situation like this, where the effort required far exceeds the state’s capacity’.<sup>1778</sup> His view seems to have proved right from the analysis made in this chapter. Radiation victims

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<sup>1778</sup> Kuchinskaya (n 1726) 4.

of both Fukushima and Hiroshima/Nagasaki disasters have been dealt with by the government of world's third-largest economy (the second-largest between 1968-2010) with a strict minimum that raised the eligibility bar or dose criteria so high that only a limited number of victims became fully entitled to proper compensation or assistance. While the simple and objective eligibility criteria is necessary to facilitate the quick identification of victims and smooth implementation of assistance programmes, those established for *hibakusha* and Fukushima victim qualification were extremely restrictive, rigid, and parsimonious which resulted in excluding many from government support and compensation. Those of the Chernobyl accident suffered a similar fate – even though the Soviet authorities had set out to provide a comprehensive support based on the reference dose of 1 mSv/year – because such a programme simply went beyond the capacity of newly independent states to deliver after the disintegration of the Soviet Union. The study of these precedents showed that nuclear disaster victims were most often provided with extremely inadequate assistance and compensation, largely disproportionate to the magnitude of damage they suffered. As such, the majority of victims are largely left to themselves to cope with the consequences and do not have much choice but to stay and live in the contaminated territories.

However, these national precedents also provide many valuable lessons for future nuclear accident protection. *Hibakusha* litigation cases notably established that the government criteria including the reference dose should be taken only as ‘one of many factors to consider’ in victim status determination, affirming the existence of scientific uncertainty with regard to low-dose radiation, and emphasised the importance of making an overall assessment of individual cases taking into account his/her exposure doses including internal exposure and his/her life circumstance, health condition and movement before and after the disaster. The

second-generation *hibakusha* scheme created by the government also suggests the importance of intergenerational protection in the case of radiation disasters.

Fukushima litigation cases corroborated the existence of scientific uncertainty as regards low-dose radiation, thus questioning the infallible validity of the 20 mSv/year reference dose, reinstated the prejudice of anxiety related to radiation exposure, and established a new concept of nuclear damage – loss of hometown. The Fukushima Children Support Law enacted after the accident also provided an inspiring legislative model for nuclear disaster protection based on precautionary principle and international human rights and forced migration norms.

The example of Chernobyl Laws provided an important precedent of fixing the post-accident reference dose at 1 mSv/year, the ICRP's public dose limit, for all post-accident protective actions and the 5 mSv/year reference dose for mandatory relocation. In analogy to the second-generation *hibakusha* scheme and the Fukushima Children Support Law, the post-Chernobyl policy created a special support scheme for children at the time of the accident and the second generation of the exposed, recognising the special vulnerability of children toward radiation effects.

As for the prejudice of anxiety related to radiation exposure, French court cases offer an important reference for the conceptualisation of such prejudice: the damage related to exposure to toxic substances starts from the time of exposure and not from the diagnosis of illness. The reparation of such prejudice thus plays a role as the relay of protection for the incubation period between the exposure and the illness. This concept of prejudice and damage compensation is extremely instructive for the protection of radiation exposure victims.

Notwithstanding, in all the disaster precedents, especially the Japanese cases, the dose criteria were systematically and nearly exclusively used by the authorities to recognise (or

exclude) victims and provide access to assistance and compensation. Would there be other criteria as important as or more important than the dose norms in nuclear disasters? If the dose levels are still used as part of criteria, what levels shall be chosen as protection standards in the event of nuclear disasters?

Keeping these questions in mind, the following final chapter attempts to propose alternative protection norms for nuclear disaster victims which would reflect the above lessons learned from the national precedents.



## **Chapter 2: Proposal of New Protection Norms for Nuclear Disaster Victims**

This doctoral thesis has so far reviewed current protection norms applied in nuclear disasters, especially those implemented in the 2011 Fukushima nuclear accident, and explored other international normative regimes and national practices applicable to nuclear disasters, which would challenge and question the validity and adequacy of the former. These analyses have clearly shown the two following facts.

First, current protection norms established by the international nuclear regime are largely insufficient and ineffective to protect individuals and the environment from nuclear disaster effects. Nuclear disaster response is extremely ambiguous towards the protection of citizens, often marred by other priorities of the state such as territorial survival, economic survival and the future of the nuclear industry. Under the nuclear normative framework, the protection of persons is not a pre-eminent but relative notion hinged upon the protection of nuclear activities. Second, nuclear accidents are a type of environmental human-made disasters to which a number of other international normative frameworks would apply. These are the forced migration/IDPs, human rights, DRR, and environmental law frameworks. The alignment of nuclear disaster response to these normative regimes, especially to the IDP protection framework, was strongly recommended by the UN human rights institutions after the Fukushima accident. In contrast to the nuclear framework, the protection of persons is the primary objective of these frameworks in which the states have the duty and responsibility to respect, protect, and ensure the rights of individuals in managing disasters.

Meanwhile, a large nuclear accident inflicts colossal, irreversible, and enduring damage on human lives and the environment, which would often surpass the capacity of any government to remedy. This effect was well described by the 1996 ICJ opinion which stated

that nuclear disasters would cause “untold human suffering” and “damage to generations to come”.<sup>1779</sup> According to the International Law Commission (ILC), it may also constitute one of the four international crimes described in the 1976 Draft Articles on State Responsibility.<sup>1780</sup> Under these circumstances, how can an individual and the community be genuinely protected in nuclear disasters? What do “universal” protection norms look like?<sup>1781</sup>

The final chapter of this doctoral thesis thus puts forward a new concept of nuclear disaster protection with alternative protection norms, drawn from existing and emerging international disaster protection norms based on humanitarian, human rights, DRR and environmental laws as well as national precedents established in past disasters. First, these alternative norms adopt the rights-based approach, whose primary objective is to respect, protect, and ensure human rights of affected individuals in accordance with principles of forced migration/IDPs, human rights, and environmental laws. Second, the proposed norms also incorporate some new concepts to the conventional disaster protection framework, namely precautionary principle and the right to a safe and healthy environment, which specifically address the protection needs of environmental disaster victims. Finally, this new protection scheme is “de-nuclearised” or de-politicised; in other words, it moves away from nuclear regulation and national interest paradigm and integrates itself into the regular disaster management framework designed for human-made and natural disasters. Apart from some technical expertise on radiation risk, there seems to be no definitive reason as to why nuclear

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<sup>1779</sup> *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Rep 1996, para 35

<sup>1780</sup> According to the 1976 ILC’s Draft Article on State Responsibility, the State’s failure to safeguard and preserve the human environment, such as failing to prevent ‘massive pollution of the atmosphere or of the seas’, would constitute one of international crimes as other crimes: “aggression”, “colonial domination”, “slavery, genocide and apartheid”. See ILC, ‘Draft Articles on State Responsibility’ (1976) (A/CN.4/SER.A/1976/Add.1 (Part 2)) Yearbook of the International Law Commission, vol. II, Part Two para 78, 95-96 (Article 19). While this 1976 Draft Articles was again provisionally adopted by the Commission in 1996, the 2001 Draft Articles, the final version, deleted these definitions of international crime (Article 19).

<sup>1781</sup> The term “universal” protection is used here in contrast to “relative” or “conditional” protection offered by the nuclear regime.



disaster protection (or off-site response) has to be only determined and handled by the nuclear regulatory regime and actors. While the thesis' proposal keeps the overall structure of the nuclear disaster management system composed of protection principles, dose norms, and protective actions divided into preparedness, response and recovery phases, the content is fundamentally redesigned to align itself with the larger international disaster protection regime consisting of humanitarian, refugee and forced migration and DRR frameworks.

Meanwhile, this proposal is neither a convention project nor a draft normative document with a complete set of protection standards. Also, it is not intended to make a policy recommendation which would entail practical and administrative guidance as to how to implement or how to finance certain protection measures. Instead, the main purpose of this proposal is to contribute to a new international norm-making for the protection of persons in nuclear disasters by identifying key protection principles and norms that this study considers indispensable for ensuring a genuine protection of nuclear disaster victims. Ideally, such norm-making shall take place alongside the current policymaking platform for environmentally displaced persons.

To start the proposal, this chapter first attempts to define the term “nuclear disaster victims (NDVs)” with a view to clarify the scope of protection (Section 1). Once the thesis sets out who the NDVs are, it proposes key protection principles and norms for nuclear disasters (Section 2). This second section is divided into two parts: the first will deal with protection principles and measures in disaster management – EPR and recovery – and the other will focus on compensation norms.

## **Section 1: The Definition and Categories of “Nuclear Disaster Victims”**

In order to come up with appropriate protection standards, one first needs to define who “nuclear disaster victims” are. Ultimately, how to call and describe a victim will determine the risk/damage incurred to her/him and subsequently the type of protection/assistance that s/he would need.

This first section of the chapter thus reviews existing definitions and categories of “nuclear disaster victims” established in past disasters and explores potential ones from the perspective of international legal and normative regimes (§1). After this cross-review, the thesis proposes its own definition of NDVs, setting the frame for the protection norms which will be proposed in the following section (§2).

### **§1: Mapping of Existing and Potential Definitions and Categories**

This paragraph makes an inventory of the established definitions from past nuclear disasters (A) as well as those that could be identified as such from international legal and normative regimes examined in this thesis (B). This inventory helps the thesis to formulate its own definition which would guide the path to the new protection norms.

#### **A. Existing Definitions from Past Disasters**

First, the thesis makes an overview of definitions established after the Hiroshima/Nagasaki A-bomb disaster (1), Fukushima nuclear accident (2), and Chernobyl nuclear accident (3), which were examined in the previous chapter.

##### **1. The Definition of Hiroshima/Nagasaki A-Bomb Victims**

The world’s first nuclear disaster, the Hiroshima and Nagasaki atomic bomb catastrophe, was caused by the US in the context of hostility between the US and Japan and

thus its victims have never received compensation for damage from either government. Instead, the Japanese government established an A-bomb survivor assistance scheme – the *hibakusha* status – for those who were exposed to the bombs, more precisely, to the radiation emitted by bombs, suffering from its effect. As analysed in the previous chapter, *hibakusha* are in essence the victims of radiation exposure and therefore their protection status could be instructive for the protection of civil nuclear accident victims.

The status of *hibakusha* has two categories: the general *hibakusha* status and the certified *hibakusha* status. For both statuses, recognition is based on the estimated exposure dose of 100 mSv calculated only from external exposure.<sup>1782</sup> In practice, this estimation was administered by the distance from the hypocentre (a few kilometres radius) and the time frame of exposure (a few days to a few weeks from the explosion). To be granted the certified *hibakusha* status, a *hibakusha* has to suffer from one of the seven specific “A-bomb illnesses” established by the MHLW in addition to being exposed to 100 mSv. All the other illnesses are thus disregarded as non-related to A-bomb exposure and the status application is generally rejected by the Ministry.<sup>1783</sup>

The general *hibakusha* is provided with free annual medical check-ups, medical assistance (the part not covered by state health system), and small monthly allowance (250 euros in equivalent) under certain conditions while the certified *hibakusha* is given full medical support and monthly allowance of about 1,000 euros (in equivalent). The *hibakusha* assistance scheme is centred around medical assistance and has little social and welfare aspects. In both cases, the criteria set up by the Japanese government are so restrictive and stringent that many victims were left out of the scheme and filed a claim at court. *Hibakusha* litigation court rulings

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<sup>1782</sup> Naito (n 1575).

<sup>1783</sup> Other than the seven “A-bomb illnesses”, eleven conditions were recognised as “specific impediments” and granted one fourth of the allowance allocated to “A-bomb illness” certified *hibakusha*.

refuted some of the government criteria and suggested the importance of taking internal exposure doses into account.

Notwithstanding, the *hibakusha* status scheme also offers an valuable example for the protection of radiation exposure victims. Namely, a special assistance scheme created for the second-generation *hibakusha* is particularly instructive. Although it is an administrative measure and differentiated from the *hibakusha* status, the children of *hibakusha* are entitled to free annual check-ups for life and in some prefectures, are provided with medical support in cases when they are diagnosed with one of the 11 illnesses recognised by the MHLW as “special impediments” for *hibakusha*. This measure was most probably instituted based on the precaution against the hereditary effects of radiation although the Japanese authorities have not officially recognised such effects.

This intergenerational protection scheme was also established after the Chernobyl accident by the former Soviet authorities and constitutes one of the key lessons from past disasters for the nuclear disaster protection norms.

## 2. The Definition of Fukushima Accident Victims

The protection scheme from the world’s second-largest nuclear accident, established again by the Japanese government, resembled the set-up of the *hibakusha* scheme: restrictive, stringent, and atomised with multiple categories. The great difference from the previous examples is that the Fukushima victim identification and protection status was determined largely based on the zones defined by the ambient radiation dose of 20 mSv/year, in other words, environmental contamination level of the area instead of estimated exposure doses of individuals. In the Fukushima scheme, “nuclear disaster victims” were ultimately those who *had their habitual residence* in the evacuation zones, regardless of where they actually were at

the time of the accident. This meant that a person could become a legitimate victim of the accident with full entitlements without being exposed to radiation at all. Essentially, the Fukushima protection (compensation) scheme was built as a remedy for the assumed state's violation of "the right not to be displaced" – the protection against arbitrary displacement – instead of the protection of "the right to a non-toxic environment",<sup>1784</sup> the right to life and the right to health of the affected individuals.

The reference dose chosen by the government to define these zones was fixed at 20 mSv/year, 20 times the public dose limit. This dose level determined all Fukushima protective actions, especially for the evacuation and the return of residents. As for the long-term relocation of residents, the government set another reference dose of 50 mSv/year. The areas with ambient radiation doses which exceed 50 mSv/year were thus included in the Red Zone, *de facto* restricted zone where human habitation is prohibited.

This was transposed to the Fukushima compensation policy instituted by the Reconciliation Committee. Fukushima nuclear damage compensation is thus based on the damage incurred by the government protective actions themselves, rather than radiation exposure, the direct consequence of the accident. Accordingly, the two biggest categories of victims created by the compensation scheme are: 1) those under government's evacuation orders, and 2) those who suffered business damage due to various government's restriction orders and "harmful rumours". In both categories, there was little notion of radiation damage. The Fukushima scheme thus established a very politicised and "de-nuclearised" definition of nuclear accident victims by adopting purely administrative criteria which largely ignored individuals' exposure doses and the vulnerability of each affected individuals. Under the

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<sup>1784</sup> UNHRC, 'OHCHR | A/HRC/49/53' (n 123).

scheme, nuclear accident victims seem more like the victims of governmental protective actions rather than the accident itself.

As such, all other accident victims outside these two categories were not properly recognised as “legitimate” victims by the Japanese authorities and relegated to a sub-category of victims. The typical example of this sub-category is those who were living or had their habitual residence in the contaminated areas outside the evacuation zones. They were exposed to radiation fallout from the accident, as much as or sometimes more than those from evacuation zones, but were excluded from the main protection scheme designed by the government.

The Fukushima protection scheme finally produced the following four groups of accident victims:

- Displaced persons under evacuation orders (mandatory evacuees and resettlers)
- Displaced persons without evacuation orders (“voluntary” evacuees and resettlers)
- “Trapped” stayers without evacuation orders in the contaminated areas
- Voluntary stayers with or without evacuation orders in the contaminated areas

Among them, only the first group of victims – mandatory evacuees and resettlers – was recognised as “legitimate” victims of the disaster and the rest were considered sub-category victims and thus provided with meagre assistance. Having purposefully removed the notion of radiation disaster, the Fukushima protection framework set up by the Japanese government was significantly partial, failing to protect a large portion of accident victims exposed to radiation. Reflecting on this example, the model norms shall be designed to equally assist and protect all the above groups of victims.

The Fukushima precedent also provided one inspiring model of nuclear disaster protection: the enactment of the Nuclear Accident Victims and Children Support Act (the

Children Support Law).<sup>1785</sup> The Act notably guarantees the right of individuals to make a voluntary choice among three mobility options – remain, relocate (evacuate), or return – in/from/to the contaminated territories and requires the government to equitably allocate resources to facilitate their respective choices. Also, it provides life-time free medical check-ups for children and women pregnant at the time of the accident. In reality, the Act was not properly implemented by the government, but it created an important precedent for post-accident legislation.

### 3. The Definition of Chernobyl Accident Victims

The protection status created after the world’s largest civil nuclear disaster to date, the Chernobyl accident, was based on the estimated radiation exposure doses of individuals. However, the way to estimate these doses and the level of established dose criteria was significantly different from the ones installed by the Japanese government for atomic bomb survivors and Fukushima nuclear accident victims. The former Soviet government adopted the Chernobyl Concept and Laws in 1991 which established three categories of “affected population” or “victims” who were eligible for state assistance and compensation: 1) the “liquidators” of the accident, 2) resettlers from the contaminated areas, and 3) stayers in the contaminated areas. Most importantly, “the contaminated areas” were defined by the level of soil contamination, not by the distance from the accident site or the ambient dose in the environment, and the reference dose to trigger all the protection actions was set at 1 mSv/year, same as public dose limit in normal situations, a stark difference from the 100 mSv fixed for Hiroshima/Nagasaki survivors and the 20 mSv/year chosen for Fukushima accident victims.

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<sup>1785</sup> The Act on Promotion of Support Measures for the Lives of Disaster Victims to Protect and Support Children and Other Residents Suffering Damage due to Tokyo Electric Power Company’s Nuclear Accident (2012), cited above.

In the Chernobyl scheme, people who were living in the area where estimated radiation exposure doses exceeded 1 mSv/year were entitled to state assistance and compensation regardless of their decision to leave (relocate) or stay. Indeed, the scheme was designed to compensate people's exposure to radiation risk rather than actual injuries due to exposure.<sup>1786</sup> The Chernobyl Law also fixed another reference dose, 5 mSv/year (550,000 Bq/m<sup>2</sup>), for compulsory resettlement of affected populations. The level is 10 times lower than the Fukushima reference dose for compulsory resettlement (50 mSv/year). Subsequently, unlike the Fukushima disaster, there was very little to no phenomenon of "voluntary" evacuation which was considered unwarranted by the authorities.

In terms of protection strategy, the Soviet authorities chose the relocation of residents instead of decontamination and radiation protection of residents *in situ* by acknowledging the relative ineffectiveness of the latter countermeasures in reducing the exposure doses of the population in the contaminated territories.<sup>1787</sup> This is quite a contrast to the post-Fukushima recovery strategy installed by the Japanese government who prioritised the return and the staying of the affected residents in the contaminated territories by a pharaonic decontamination operation and "risk communications" which largely downplayed the radiation risk. Ultimately, the Chernobyl Laws laid down a protection principle which guaranteed the right of individuals living in the contaminated territories to make a voluntary decision as to whether to continue living or to resettle elsewhere based on the objective information about radiological situation and possible health effects, and to be assisted irrespective of such choice.<sup>1788</sup>

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<sup>1786</sup> UNDP and UNICEF (n 10).

<sup>1787</sup> Nasvit (n 1732) 51.

<sup>1788</sup> Ryabzev and Imanaka (n 1726); Omatsu (n 1728) 87. Principle 11 of the Concept adopted by the USSR Council of Ministers.



Another particularity of the Chernobyl victim status is the special categories created for vulnerable populations. Acknowledging that children are more sensitive to radiation effects, the former Soviet authorities created a special assistance programme for minors at the time of the accident and the second generation, those who were born from the exposed parents (“victims”).<sup>1789</sup> The recognition of possible hereditary effects of radiation by the Soviet authorities at the time is quite remarkable in view of the continued denial or non-recognition of such effects by the international nuclear institutions such as UNSCEAR, ICRP, and IAEA to this date. This follows the example established by the Japanese government for the A-bomb *hibakusha* scheme where the second generation is provided with free annual health check-ups and, in some instances, medical assistance.

Though in reality Chernobyl victims struggled to access medical resources, social welfare assistance, and compensation prescribed in the Laws under an economic and political turmoil after the breakup of the Soviet Union and due to endemic corruption in the country,<sup>1790</sup> the protection status, dose criteria, and support scheme established by the former Soviet authorities on the policy level were precautionary, protective, and pragmatic, which makes an inspiring model for nuclear disaster protection.

## **B. Potential Definitions and Categories from International Normative Frameworks**

After reviewing the definitions of NDVs established in past disasters, the thesis now makes an inventory of potential categories and definitions of NDVs drawn from international legal and normative frameworks examined in this thesis. There are indeed six possible descriptions of NDVs: IDPs (1), environmentally displaced and trapped persons (2), radiation

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<sup>1789</sup> Tykhyi (n 1746); Omatsu (n 1728).

<sup>1790</sup> Petryna (n 1682); Brown (n 1009).

exposure victims (3), victims of human rights violations (4), disaster victims (5), and affected people of a nuclear accident (6).

### 1. NDVs as “IDPs”

Nuclear disaster victims often find themselves in the situation of displacement within their national borders. In the event of nuclear emergencies, many people flee their home, either under a government order or on their own judgement, in order to protect themselves and their family members from radiation effects. In many cases, they remain displaced and resettle in other parts of the country due to the continuous risk posed by radiological contamination of their living environment. According to the refugee protection and forced migration regime, they are called internally displaced persons (IDPs) for which the international community adopted numerous normative documents, notably the Guiding Principles on Internal Displacement (GPID)<sup>1791</sup> which is today considered as the international reference for their protection.

In the guideline, the IDP is defined as those ‘who have been forced or obliged to flee or to leave their homes [...] as a result of, or in order to avoid the effects of, armed conflict, [...] or natural or human-made disasters, and who have not crossed an internationally recognised state border’.<sup>1792</sup> Nuclear disasters are identified as one of these “human-made disasters” to which the GPID applies.<sup>1793</sup>

Under the IDP protection framework, all activities are ‘aimed at obtaining full respect for the rights of the individual [...] in accordance with human rights law, international humanitarian law and refugee law’.<sup>1794</sup> And ‘national authorities have the primary duty and

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<sup>1791</sup> UNCHR, ‘Report of the Representative of the Secretary-General, Mr. Francis M. Deng, Submitted Pursuant to Commission Resolution 1997/39 Addendum: Guiding Principles on Internal Displacement’ (n 88).

<sup>1792</sup> GPID, Introduction.

<sup>1793</sup> Cohen (n 91); Nadig (n 1053).

<sup>1794</sup> IASC, ‘Policy Paper: Protection of Internally Displaced Persons’ (n 1083) 4.

responsibility' to ensure such protection.<sup>1795</sup> Some of the key IDP rights guaranteed by the GPID include the rights to seek safety in another part of the country, to be protected against forceful return, to respect of his or her family life, and to an adequate standard of living. Also, special attention must be paid to specific needs of vulnerable populations such as women, children, elderly and sick or disabled persons.

The most important ground rule of this normative framework is that 'the rights, needs and legitimate interests of IDPs should be the primary considerations guiding all policies and decisions'.<sup>1796</sup> This is particularly important in finding durable solutions for IDPs. These solutions are either to 'return voluntarily, in safety and with dignity, to their homes or places of habitual residence', or to 'resettle voluntarily in another part of the country', which shall be achieved based on the free and informed decisions of each IDP. Most of all, competent authorities have the duty to 'establish conditions, as well as provide the means' to facilitate the IDPs' attainment of these durable solutions.<sup>1797</sup> This also corresponds to the notion of positive obligation of states, established by the international human rights instances, in which states are required not only to respect but also to ensure the rights of their nationals.

Also, the right to be protected against forcible return or relocation in any place where their life, safety, liberty and/or health would be at risk (Principle 15 (d)) has a particular importance in the case of nuclear disaster IDPs protection. After the Fukushima nuclear accident, the Japanese authorities promoted the return of evacuees by creating financial incentives, conducting information campaign and progressively cutting off evacuees' assistance. The IDPs guidelines specifically advise against these practices by stating that '(c)onditions at the site of displacement that may push IDPs to accept unsafe return or relocation also need to

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<sup>1795</sup> GPID, Principle 3.

<sup>1796</sup> IASC, 'IASC Framework on Durable Solutions for Internally Displaced Persons' (n 90) 11.

<sup>1797</sup> GPID, Principle 28 (1).

be monitored’<sup>1798</sup> and ‘*under no circumstances* should IDPs be encouraged or compelled to return or relocate to areas where their life, safety, liberty or health would be at risk’.<sup>1799</sup>

## 2. NDVs as “Environmentally Displaced Persons (EDPs)” and “Environmentally ‘Trapped’ Persons (ETPs)”

NDVs are also persons displaced by a specific type of disaster which involve environmental pollution. In this respect, nuclear disaster IDPs are also environmentally displaced persons (EDPs). Protecting people from environmental disasters has to deal with some specific issues which do not exist in other disasters: notably, the notion of “threshold” – how much risk is risky enough – and the role of science in shaping the protection norms. Also, as analysed earlier, nuclear accidents produce an opposite of displacement – forced immobility – where people are “trapped” in the contaminated environment against their will due to lack of means or assistance. As such, NDVs are also environmentally “trapped” persons (ETPs).

International protection norms for EDPs and ETPs are still in the development phase but there have been some concrete and influential initiatives which significantly accelerated the global norm-making process. One of them is the Nansen Initiative (2012-2015), led by the former RSG on the Human Rights of IDPs, Walter Kälin, and another is the Draft Convention on the Status of Environmentally Displaced Person (2008)<sup>1800</sup>, put forward by Professor Michel Prieur and his team of environmental law jurists at the University of Limoges (France). Though these initiatives have not yet developed into an international normative text, the concept of EDPs and the protection norms developed by these initiatives are extremely instructive for the protection of NDVs.

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<sup>1798</sup> IASC, ‘IASC Framework on Durable Solutions for Internally Displaced Persons’ (n 90) 13.

<sup>1799</sup> *ibid* 12. Emphasis added.

<sup>1800</sup> Prieur and others (n 1181) 397.

Kälin proposed an innovative approach to identify, thus differentiate, EDPs from other displaced persons, which helped clarify their specific needs for better protection. In determining who constitutes EDPs, Kälin suggested conducting the “returnability” test of an individual, thus focusing on the question of return, rather than the “well-founded fear” test focusing on the question of the primal motive or the onset cause of one’s displacement. According to him, if the answer to one of the following questions - Is their return lawfully permissible? Is it practically feasible? Is it reasonable from the humanitarian point of view? – is “no”, they are the victims of environmental disaster displacement and thus in need of protection. Under this framework, people should not be expected, let alone compelled, to return to a place where their life or limb would be at risk, or without adequate assistance from the competent authorities enabling them to reconstruct their lives and resume normal lives.

The Draft Convention on the Status of EDPs, on the other hand, defined EDPs as ‘individuals, families, groups and populations facing a sudden or insidious upheaval in their environment that inevitably endangers their living conditions, forcing them to leave, urgently or in the long term, their usual places of life’ (Article 2(2)). In the explanatory note of the Draft, Prier specifically refers to nuclear disaster evacuees as part of the EDPs covered by the Draft Convention.<sup>1801</sup>

One of the innovative aspects of the Convention is the guaranteed rights of EDPs which are divided into those before displacement and those after displacement. As for the pre-displacement rights, the Draft Convention prescribes the right to information and participation (art 9), *the right to travel* (i.e., the right to evacuation/relocation) (art 10), and *the right to refuse travel* (i.e., the right to remain at their own risk) (art 11).<sup>1802</sup> The last two rights are effectively

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<sup>1801</sup> Prier (n 106).

<sup>1802</sup> CRIDEAU-OMIJ (University of Limoges) (n 127).

new concepts of rights which have not been addressed by any normative framework before and are particularly important for the protection of nuclear disaster victims as EDPs and ETPs. In effect, “the right to travel” (or “the right to displacement”)<sup>1803</sup> echoes “the right to evacuation”, the concept advocated by Fukushima victim associations and the Japanese federation of registered lawyers (JFBA) following the Fukushima nuclear accident. In fact, these new concepts of human right directly address the issues of voluntary evacuation and involuntary immobility which typically occur in the event of nuclear disasters.

In view of this, the thesis will use these new concepts of rights to formulate the nuclear disaster protection model in the following section.

### 3. NDVs as “Radiation Exposure Victims”

NDVs are also the victims of radiation exposure or of radiation exposure threats. Exposure to toxic substances implicates a wide range of human rights guaranteed under international human rights instruments, including the rights to life, the highest attainable standard of health, physical integrity, safe water and food, adequate housing and standard of living, a safe and healthy environment, cultural rights and the rights of the child. According to the UN Special Rapporteur on the implications for human rights of the environmentally sound management and disposal of hazardous substances and wastes (Toxics and Human Rights), exposure to hazardous substances affects the most vulnerable of the population such as those living in poverty, minorities, those with disabilities, women and children.<sup>1804</sup> As past disaster experiences showed, this is exactly the case with nuclear disaster victims.

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<sup>1803</sup> In fact, the third version (2013) of the Draft Convention used the term, ‘the right to displacement’, instead of ‘the right to travel’. See CRIDEAU-OMIJ (University of Limoges) (n 124).

<sup>1804</sup> Source: OHCHR Website, <https://www.ohchr.org/en/special-procedures/sr-toxics-and-human-rights/about-toxics-and-human-rights>, consulted 28 June 2022

Radiation exposure victims are also the victims of state's failure to respect environmental law principles such as prevention principle, precautionary principle, substantive environmental rights, and intergenerational equity. According to the Special Rapporteur, 'prevention, precaution and non-discrimination must be the paramount principles in environmental policymaking' and states have a duty to 'pursue zero pollution and the elimination of toxic substances, rather than merely trying to minimize, reduce and mitigate exposure' to hazardous substances.<sup>1805</sup>

More specifically, exposure to radiation implicates a new concept of human right, the right to a safe and healthy environment. Such a right has not yet been prescribed in any international binding instruments but is increasingly recognised by national constitutions and laws, regional instruments, ECtHR case-laws, and the international community. Most recently, the UN General Assembly adopted a resolution (76/300) in August 2022, specifically recognising this right.<sup>1806</sup>

The right to a safe and healthy environment is constituted or paired by "the right to a non-toxic environment"<sup>1807</sup> or "the right to freedom from pollution, environmental degradation and activities that adversely affect the environment, threaten life, health, livelihood, well-being or sustainable development within, across or outside national boundaries".<sup>1808</sup> This is precisely what Fukushima victims and lawyers' associations have demanded, "the right to avoid radiation exposure". The right to avoid radiation exposure is constituted by two rights: the right to evacuation and the right to avoid exposure in one's daily life (e.g. radioprotection measures).<sup>1809</sup> The practical application of the right to a safe and healthy environment in the context of nuclear

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<sup>1805</sup> UNHRC, 'OHCHR | A/HRC/49/53' (n 123) 2.

<sup>1806</sup> UNGA, 'Res 76/300 The Human Right to a Clean, Healthy and Sustainable Environment' (n 121).

<sup>1807</sup> UNHRC, 'OHCHR | A/HRC/49/53' (n 123).

<sup>1808</sup> UNCHR, 'Human Rights and the Environment' (n 1374) Annex I (Principle 2, 5).

<sup>1809</sup> Fukuda and Kawasaki (n 50); Fukuda (n 1139).

disasters would thus mean guaranteeing these rights for the affected by the competent authorities.

Notwithstanding, the implementation of the right to a safe environment, precisely the right to freedom from pollution, is always confronted by the question of “threshold”. This question becomes quite ambiguous and political especially when the substances concerned have high industrial and economic stakes such as tobacco, pesticides, and typically, radiation. And the question of risk for these high-stake issues is, more often than not, accompanied by scientific controversies where ‘the necessary information may largely be in the hands of the party causing or threatening the damage’.<sup>1810</sup>

In this context, how can one come up with safety norms that would be adequately or genuinely “safe”? One way of achieving it is to refer to independent environmental studies conducted by non-institutional scientists, academic scholars, and civil organisations in addition to those published by state-affiliated expert institutions. Secondly, the norm-making process shall involve stakeholders such as civil organisations and third parties such as legal experts (e.g., ombudsman) in addition to institutional experts and scientists.<sup>1811</sup> In this way, the risk would be framed more in terms of threats, rather than by percentages and probabilities, which thus takes into account other elements such as justice and precautionary principles in addition to scientific data.<sup>1812</sup> Indeed, these two elements – independent scientific views and public

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<sup>1810</sup> A quote from the dissenting opinion of Judge Weeramantry in the 1995 reexamination of the *Nuclear Tests* case. See *Request for an Examination of the Situation in Accordance with Paragraph 63 of the Court’s Judgment of 20 December 1974 in the Nuclear Tests (New Zealand v. France) Case (Order)* [1995] ICJ Rep 288 (Dissenting Opinion of Judge Weeramantry 317), 342

<sup>1811</sup> Shirabe, Hasegawa and Fassert (n 829).

<sup>1812</sup> Francis Chateauraynaud and Didier Torny, *Les sombres précurseurs. Une sociologie pragmatique de l’alerte et du risque* (Editions de l’École des hautes études en sciences sociales 2000); Soraya Boudia and Nathalie Jas, *Powerless Science?: Science and Politics in a Toxic World*, vol 2 (Berghahn Books 2014).



participation – will be the key to operationalising the right to a safe and healthy environment in protecting individuals from serious environmental threats such as radiation exposure.

In addition, precautionary principle, one of the core environmental law principles, plays a vital role in ensuring the individual’s right to a non-toxic environment in the context of scientific controversies. According to the principle, protective actions such as the evacuation and resettlement of the affected persons shall not be postponed on the premise of ‘lack of full scientific certainty’ when ‘there are threats of serious or irreversible damage’.<sup>1813</sup> The application of the principle thus becomes crucial in nuclear disaster protection.

Finally, radiation exposure victims often suffer from psychological distress from the fact of being exposed or “contaminated”. For this, the jurisprudence established by French courts provide an interesting reference. The concept of prejudice of anxiety has been developed in France to provide relief to the victims of exposure to ‘a harmful or toxic substance generating a high risk of developing a serious pathology’ who suffer from psychological distress associated with fear of developing illnesses as a result of such exposure.<sup>1814</sup> Typically, Fukushima and Chernobyl nuclear accident victims as well as A-bomb survivors suffered this particular prejudice. The aspect of psychological damage associated with exposure thus forms an important part of protecting radiation victims, which the thesis attempts to address in the proposal of protection norms below.

#### 4. NDVs as “Victims of Human Rights Violations”

As suggested above, NDVs are also the victims of a wide range of human rights violations. Under the human rights regime, the state is the principal duty-bearer who has both

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<sup>1813</sup> UNGA, ‘Report of the United Nations Conference on Environment and Development: Annex I Rio Declaration on Environment and Development’ (n 108) Principle 15.

<sup>1814</sup> Among others, see Cass.Soc., 11 Sep 2019, n°17-24.879 à 17-25.623

positive and negative obligations to respect, protect, and fulfil the human rights of all persons in their jurisdiction.<sup>1815</sup> The state may also be held accountable for human rights violations and abuses committed by non-state actors such as corporations and paramilitary groups if it fails to do everything in its power to prevent them from happening or to protect the population from them. In disaster situations such as nuclear accidents, the ECtHR case-laws clearly established that the state had a positive obligation to take necessary legislative and administrative actions to ‘provide effective deterrence against threats to the right to life’.<sup>1816</sup> In the context of nuclear disasters, this positive obligation could entail taking precautionary protective actions such as evacuation and permanent relocation of the affected population as a way to remove the threats to life posed by radiation exposure.

As the victims of human rights violations, NDVs can file complaints not only at national courts but also at the international human rights review mechanism and regional human rights courts. To the UN review mechanism, individuals can send complaints, called “communications”, to either the special procedures (SPs) of Human Rights Council or the complaint procedures of nine treaty bodies for investigation. The problems with the current international review system are the weak enforceability and the limited accessibility. Indeed, the UN individual complaints procedures produce only non-binding recommendations on States.

Also, individuals can file a complaint to regional human rights courts, notably ECtHR, the most accessible among them for individual complaints,<sup>1817</sup> if the violation implicates one

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<sup>1815</sup> OHCHR Europe (n 1260) 6.

<sup>1816</sup> *Öneryildiz v. Turkey* (cited above) para 89

<sup>1817</sup> Currently there are three regional human rights courts in the world: the ECtHR, the Inter-American Court of Human Rights, and the African Court on Human and People’s Rights. The Inter-American Court does not accept individual complaints directly but may do so through a referral from the American Commission on Human Rights. As for the African Court, individuals and NGO complaints are also channelled through the African Commission for Human and People’s Rights, but some member states accept the Court’s jurisdiction for individual cases (currently, 9 out of 54 member states to the Convention).

of the Member States of the Council of Europe, thus parties to the ECHR.<sup>1818</sup> Unlike the UN review mechanism, the decisions of the ECtHR are legally binding on States, whose implementation is also monitored by the Committee of Ministers of the Council of Europe. The problem is that the ECtHR is not accessible for the victims outside the European region. Typically, the Fukushima accident victims did not have access to the ECtHR but only to the UN review mechanism. As such, as shown in the earlier chapter, the Japanese government did not redress the issues raised by different reports and “communications” published by the UN human rights review mechanisms and faced no punitive consequences.

## 5. NDVs as “Disaster Victims”

NDVs also belong to a larger group of “disaster victims”. According to the international DRR framework, “disaster” is defined as:<sup>1819</sup>

[a] serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts

In the Tampere Convention, it is defined as:<sup>1820</sup>

a serious disruption of the functioning of society, posing a significant, widespread threat to human life, health, property or the environment, whether caused by accident, nature or human activity, and whether developing suddenly or as the result of complex long-term processes

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<sup>1818</sup> There were 46 member-states until the decision of the Committee of Ministers on 16 March 2022 which excluded the Russian Federation from membership. See the Council of Europe website (<https://www.coe.int/en/web/portal/-/the-russian-federation-is-excluded-from-the-council-of-europe>), consulted 29 June 2022

<sup>1819</sup> Source: UN Office for Disaster Risk Reduction (UNDRR), ‘Words Into Action – Disaster Displacement: how to reduce risk, address impacts and strengthen resilience: Annex III: Terminology’ (UNDRR 2019) <[https://www.preventionweb.net/files/58821\\_wiadisasterdisplacement190511webeng.pdf](https://www.preventionweb.net/files/58821_wiadisasterdisplacement190511webeng.pdf)> accessed 25 November 2021.

<sup>1820</sup> Tampere Convention (cited above), Art 1(6)

and also, by the International Law Commission:<sup>1821</sup>

calamitous event or series of events resulting in widespread loss of life, great human suffering and distress, mass displacement, or large-scale material or environmental damage, thereby seriously disrupting the functioning of society

From these definitions, one can safely identify nuclear accidents as “disasters”.

In the UN system, “disaster” generally designates natural and human-made disasters such as industrial accidents, differentiated from conflicts and generalised violence. As such, “disaster” management had long been considered a matter of domestic jurisdiction and been coordinated by the UNDRR framework instead of the UN humanitarian and forced migration framework. Traditionally, the DRR framework is more focused on reinforcing the states’ capacity to prepare for and mitigate disaster impacts and protecting “people on its territory” as well as “infrastructure and other national assets” from disaster effects.<sup>1822</sup> Subsequently, its normative texts have made little reference to human rights protection.

This trend saw a drastic change at the adoption of the 2015 UN Sendai Framework for Disaster Risk Reduction<sup>1823</sup>, the core policy document of the DRR framework, which placed human rights protection at the heart of disaster management. It notably fixed its objective as ‘protecting *persons* and their property, health, livelihoods and productive assets, as well as cultural and environmental assets, while *promoting and protecting all human rights*’.<sup>1824</sup> In the same year, the Human Rights Council corroborated this by stating that disaster ‘rescue, relief and rehabilitation should be compliant with human rights’ obligations of the State in post-

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<sup>1821</sup> ILC, ‘Draft Articles on the Protection of Persons in the Event of Disasters’ (n 1082) Art 3(a).

<sup>1822</sup> UNISDR (n 1319) 4.

<sup>1823</sup> UNDRR (n 1196).

<sup>1824</sup> *ibid* para 19. Emphasis added.

disaster situations.<sup>1825</sup> Finally, the Draft Articles on the Protection of Persons in the Event of Disasters<sup>1826</sup> proposed by the UN International Law Commission (ILC) in 2016 also adopted the same approach, firmly establishing that ‘[p]ersons affected by disasters are entitled to the respect for and protection of their human rights in accordance with international law’ (Article 5).

## 6. NDVs as “Affected People of a Nuclear Accident”

Finally, NDVs are also the “affected people” of nuclear accidents, the typical description used in the nuclear safety and radiation protection regime. As analysed in Part One, ICRP and IAEA have developed over the years a wide range of safety standards, all non-binding in nature, including those specifically related to the protection of populations in the event of nuclear emergencies.

Under the framework, disaster victims are often treated as a mass, described as “people” and “the public” like the old DRR framework. The word “individuals” is used almost exclusively in dealing with radiation exposure. The protection of “the public” is then implemented based on the utilitarian principles of justification and optimisation, which aim at maximising the margin of good over harm by applying cost-benefit analysis and the ALARA principle. The nuclear framework prioritises collective (often state’s) interests over individual rights, ensuring ‘an overall benefit in the broadest sense to society and thus not necessarily to each individual’.<sup>1827</sup> Such policy often results in a situation where the rights of the most

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<sup>1825</sup> UNHRC, ‘Final research-based report of the Human Rights Council Advisory Committee on best practices and main challenges in the promotion and protection of human rights in post-disaster and post-conflict situations’ (UN Human Rights Council 2015) UN Doc A/HRC/28/76 21.

<sup>1826</sup> ILC, ‘Draft Articles on the Protection of Persons in the Event of Disasters’ (n 1082).

<sup>1827</sup> ICRP, ‘The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.’ (n 28) 90.

vulnerable in the society are trampled in the name of the general interest and collective interests. As it happens, its normative texts hardly ever mention or refer to human rights principles.

The protection of human life and health is also a relative, rather than an essential, notion under the nuclear regime. The primary objective of radiation protection is defined as contributing to ‘*an appropriate level of protection for people and the environment*’<sup>1828</sup> without unduly limiting nuclear operations and activities.<sup>1829</sup> It is what this thesis calls an oscillatory or relative system of protection where human life and health is put in constant balance against the pursuit of nuclear activities. As far as human protection is concerned, the regime of nuclear safety and radiation protection is the least protective of all the existing international normative frameworks that would apply for nuclear disasters. As such, the thesis refers to this regime only as a starting point or as a counterpoint to develop model protection norms for nuclear disasters below, largely complementing it with all the other normative frameworks listed above which are based on human rights principles.

## **§2. Proposal of “Nuclear Disaster Victim” Definition**

After reviewing both the existing and potential definitions of NDVs from national and international regimes, this paragraph attempts to propose a definition of NDVs which would guide the formulation of new protection principles and norms in the next section. It first deals with the definition of “nuclear disaster” (A) and then describes what constitutes “nuclear disaster victims” (B).

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<sup>1828</sup> *ibid* 41. Emphasis added.

<sup>1829</sup> IAEA and others, ‘Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards’ (n 77).

## A. Definition of “Nuclear Disaster”

Before exploring the definition of “nuclear disaster victims”, the thesis first needs to define and clarify what a nuclear disaster is. As shown previously, nuclear disasters fit the definition of “disaster” established by the DRR framework. But nuclear disaster is a specific type of “disaster” which needs further precision. First of all, what is the difference between nuclear “incident”, “accident” and “disaster”? What level of disruption in the society or what degree of damage to human and the environment would amount to an “incident”, an “accident”, and an “nuclear disaster”? Is an “accident” always a “disaster”? If not, when does an “accident” become a “disaster”? Second, are nuclear disasters different from other technological or industrial disasters? If so, how?

As introduced earlier in identifying NDVs as “disaster victims”, the definition of “disaster” provided by the above three DRR normative instruments always entails a “disruption of the functioning of society” threatening human life, health, property or the environment, which is caused by “accidents, nature or human activity”<sup>1830</sup>. In this respect, “disaster” is an overreaching term which encompasses “accidents”, not the other way around. In other words, not all the accidents are “disasters” and an accident becomes a “disaster” only when it causes a disruption in the society, impacting human life and/or the environment. In adopting such a definition, nuclear “disaster” encompasses all reactor accidents and bomb explosions as a result of both civil and military uses, which disrupt the functioning of society threatening human life, health, property or the environment.

Meanwhile, the international nuclear regime has established its own terminology and definitions of nuclear disasters, which are quite peculiar from the rest of the international

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<sup>1830</sup> Tampere Convention (cited above), Article 1(6).

normative framework. The Paris and Vienna nuclear liability conventions, for example, use the term nuclear “incident”, instead of “accident” or “disaster”, and provide a platitudinous definition: ‘any occurrence or succession of occurrences having the same origin which causes damage’, arising out of the radioactive properties of “nuclear fuel” or “radioactive products or waste”, or of ionising radiations emitted from a “nuclear installation”.<sup>1831</sup> From this definition, it is not clear what the “incident” really entails other than involving “damage” and emanating from “radioactive properties” and “nuclear installation”.

But by reading other provisions of the Conventions, one realises what is specifically excluded from this definition of “incident”. It indeed excludes nuclear accidents occurring at military installations, at reactors installed in transport vessels and aircrafts, and possibly at radioactive waste disposal sites.<sup>1832</sup> This would mean, for example, that a civil nuclear fuel reprocessing facility operated by a private company but also produces weapons-grade plutonium may well be excluded from coverage.<sup>1833</sup> Also, incidents involving radioactive properties used in hospitals and for industrial and commercial purposes are also not covered by the Conventions. Furthermore, the Conventions fixed an exclusion clause for the “incidents” involving “small quantities” of nuclear material and “low risk” installations, the levels of which shall be determined by the Board of Governors of the IAEA.<sup>1834</sup> In this respect, international nuclear liability instruments provide rather an exclusionary and “sterilised” notion of nuclear

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<sup>1831</sup> Convention on Third Party Liability in the Field of Nuclear Energy (Paris Convention) (adopted 29 July 1960, entered into force 1 April 1968) 956 UNTS 251, Art 1(a)(i); Vienna Convention on civil liability for nuclear damage (adopted on 21 May 1963, entered into force on 12 November 1977) 1063 UNTS 265, Art I.1.(f)(g)(j)(l)

<sup>1832</sup> IAEA, ‘The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage — Explanatory Texts’ (n 1499).

<sup>1833</sup> Currie (n 115).

<sup>1834</sup> While the maximum limits of radioactive materials for the exclusion have been fixed in 2014, the criteria for excludable installations have not yet been established by the Board of Governors as of May 2017. See IAEA, ‘The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage — Explanatory Texts’ (n 1499).



disasters, which does not help this thesis much to come up with a clear definition of nuclear disasters.

A more substantive and quantifiable notion of “nuclear disaster” was in fact made by the International Nuclear and Radiological Event Scale (INES), developed by the IAEA and the OECD/NEA in 1990 to classify nuclear disasters. To be precise, the INES does not use the term “disaster” but instead uses the words “incident” and “accident” to qualify different types of nuclear related events. The main criteria established for such a classification include the quantity of radioactive materials released from the event and the impact of such release on people and the environment among other criteria.<sup>1835</sup>

First, the difference between “incident” and “accident” was made mainly based on the location of the impact: whether radioactive materials are released outside the facility or not, in other words, whether there are off-site impacts or not. Once radioactive materials spread outside the facility, affecting the environment and members of the public, the event is classified as “accident”, therefore not “incident”, triggering some or full off-site countermeasures. A particularity of this evaluation method is that as long as radiation release is contained within the facility, an event will not be classified as “accident” even if a large quantity of radioactivity is released from the reactor core or a worker is exposed to a large, but not lethal, amount of radiation (e.g., burns). For example, a radiological event which causes ‘exposure in excess of ten times the statutory annual limit for workers’ or ‘exposure rates of more than 1 Sv/h in an operating area’ but ‘with a low probability of significant public exposure’ is still classified as “incident” (Level 3: Serious Incident), not “accident”.<sup>1836</sup>

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<sup>1835</sup> The other criteria are ‘radiological barriers and controls’ and ‘defence in depth’.

<sup>1836</sup> IAEA and NEA/OECD (n 4) 3.

Secondly, the difference between “incident” and non-incident – ‘Below Scale/Level 0’ – was determined on the conditions of troubled sites and the dose received by a member of the public. According to the IAEA, events with ‘no safety relevance with respect to radiation or nuclear safety’ are not recognised as “nuclear incident”.<sup>1837</sup> For example, a radiological event which causes radiation exposure to a member of the public but the exposed effective dose does not exceed the public annual dose limit – 1 mSv/year – is considered non-incident.

Once an event is qualified as “incident” or “accident”, the INES further classifies it into different levels depending on the amount of release and the magnitude of the impact. The “incident” is divided into three levels (Level 1-3) – Anomaly, Incident, Serious Incident – and the “accident” is classified in four levels (Level 4-7) – Accident with Local Consequences, Accident with Wider Consequences, Serious Accident, and Major Accident. For example, an “accident” with ‘minor release’ (equivalent to tens to hundreds of terabecquerels of I<sup>131</sup>) and ‘at least one death from radiation’ is defined as Level 4 Accident with Local Consequences. A Level 5 accident is with ‘limited release’ (equivalent of hundreds to thousands of terabecquerels of I<sup>131</sup>) and ‘several deaths from radiation’. A Level 7 accident is a major accident with radiation release of more than several tens of thousands of terabecquerels and with ‘widespread health and environmental effects’.<sup>1838</sup>

However, unlike the Conventions, the INES is not a legally binding document and thus its classifications of nuclear events only have an indicative value. In addition, the IAEA specifically advises not to use the INES classification as generic criteria triggering protective actions in nuclear emergencies. As a result, each nuclear power country has developed its own specific technical criteria (e.g. the degree of damage in the reactor core, the probability of off-

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<sup>1837</sup> *ibid* 1.

<sup>1838</sup> *ibid* 3.

site radiation release, etc) to declare a radiological emergency and to trigger on-site and off-site responses. Notwithstanding, the INES definition of “accident” – events with off-site consequences – roughly corresponds to the definition of “disaster” established by the international DRR framework and thus offers a useful reference point in defining “nuclear disaster”.

In light of the above analysis, this thesis defines “nuclear disaster” as follows:

radiological events which result in a release of radioactive material into the environment (off-site) and/or radiation exposure, or a threat of exposure, of a member of the public to doses which exceed the annual public exposure dose limit (1 mSv/year), seriously disrupting the functioning of a community or a society at any scale and leading to one or more of the following: human, material, economic and environmental losses and impacts

This definition encompasses all radiological accidents, regardless of the purpose of applications, either civil, medical, or military, which cause ‘radiation release into the off-site environment’ and/or ‘radiation exposure of the public’. It critically differs from the definition of “incident” and “accident” established by the international nuclear liability regime and the INES, which specifically exclude events in military applications and facilities.<sup>1839</sup> This exclusion was most probably made by the IAEA and the NEA (OECD) out of their political consideration or under the demands of powerful nuclear Member States,<sup>1840</sup> but the radiological effects of nuclear disasters on the population and the environment do not fundamentally change whether they were caused intentionally or by negligence as well as resulting from civil or military use. Therefore, the protection norms that this thesis proposes shall apply to all nuclear disasters from

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<sup>1839</sup> IAEA and NEA/OECD (n 4). The Manual explains that ‘the scale is only intended for use in civil (non-military) applications’ and ‘is not intended for use in rating security-related events or malicious acts to deliberately expose people to radiation’ (p. 4).

<sup>1840</sup> This was indeed the case at the occasion of the revision of Vienna Convention in 1997. For details, see IAEA, ‘The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage — Explanatory Texts’ (n 1499).

civil and military operations as a principle although they are essentially formulated on a scenario of civil nuclear accidents.

With respect to the second question – how different a nuclear disaster is from other disasters –, this doctoral research has shown that, in addition to the specificities associated with radioactivity as well as the magnitude of damages, nuclear disaster is one of the rare human-made environmental disasters which shake the core of the state programme or ambition, directly or indirectly implicating the responsibility of the state, and thus quickly becomes a matter of extreme political sensitivity. It is the disaster whose stakes are so high not only for the nation's entire economy but also for the national strategy of energy, security, and geopolitical power that politics intervene in every aspect of disaster management. For these reasons, a nuclear disaster is treated quite differently from other industrial disasters and therefore could be distinguished as an anthropogenic environmental disaster of extreme political sensitivity.

### **B. Definition of “Nuclear Disaster Victims (NDVs)”**

Now that the definition of “nuclear disaster” is clarified, the thesis explores the definition of “nuclear disaster victims (NDVs)”. As reviewed above, they are also the victims of displacement, forced immobility, environmental pollution, radiation exposure, human rights violations, and disasters. Taking into account these elements and the above definition of “nuclear disaster”, the thesis defines NDVs as follows:

persons who have been displaced, involuntarily immobilised, or affected by nuclear disaster, having been or threatened to be exposed to radioactive materials released by the disaster, whose doses exceed the annual public dose limit (1 mSv/year), and/or whose life, health, living environment, property, private and family life, or community is put at risk or damaged by the effects of the disaster

A small note of clarification should be made here that “nuclear disaster victims” are not always “radiation exposure victims” although they are at most of the time. Some people could escape exposure by being away from home at the time of an accident or evacuate their home before radioactive plume reaches, but they become the victims of displacement – losing their homes, properties, jobs, school, social relationships and community lives to radiological contamination. The protection norms for NDVs shall first and foremost be premised on those who were exposed, or threatened to be exposed, to radiation release from the disaster but also envisage measures for non-exposed victims.

Also, the thesis shall clarify what constitutes “radiation exposure victims”. Here, the question of dose levels comes in. Though this point will be explored in detail in the following section, the thesis considers all those exposed or threatened to be exposed to effective radiation doses which exceed the public exposure limit of 1 mSv/year from external and internal exposures, excluding natural background and medical exposures, as “radiation exposure victims”. As shown in the chapter on the radiation protection regime, this public dose limit was determined by incorporating scientific knowledge and its uncertainty as well as political compromise and precaution. Accordingly, it represents the current best dose norm operationally and morally viable and adequately protective, which should apply universally in all circumstances, with or without nuclear disasters, in order to protect human health and lives. Also, the thesis emphasises the importance of accounting internal exposure doses into the estimation of individual doses as it often becomes an important pathway of radiation exposure, which was systematically ignored by the Japanese government in the handling of Fukushima victims as well as the A-bomb survivors.

Finally, the thesis needs to address the question of objective and subjective identification of “victims”, what Yannick Barthe called the process of “victimisation” ‘by which

an individual defines him/herself and is defined by others as a “victim”<sup>1841</sup>. From the experiences of Hiroshima/Nagasaki, Chernobyl, and Fukushima disasters, the “nuclear disaster victims” were always identified by the authorities in groups based on the geographical space, delimited by applying the criteria of purely technical (e.g., air-born radiation doses) and administrative (e.g., municipality boundaries) natures. This “sterilised” identification process surely facilitated the rapid recognition and assistance to “victims”, but also left an enormous protection gap for others in need because such “objective” and group identification, which was transposed into laws and government orders, did not often correspond with the subjective and individual identification by the victims themselves.

The self-identification of victims also has certain ambivalence. For example, Barthe showed that French veterans who have participated the atomic bomb tests in the Polynesia were torn between a claim for the recognition of their victim status associated with the negative image of being “victims”, and another claim for the recognition of their sacrifice and service made to France as military veterans, combined with the pride to be part of.<sup>1842</sup> A similar contradiction was observed among the Fukushima disaster victims. Many of them held an ambiguous stance over being recognised as the victims of radiation exposure. The term *hibakusha*, ‘the exposed to radiation’, which was used for the status of A-bomb survivors, was carefully avoided in the identification of Fukushima victims, not only by the authorities, but also disaster victims themselves. Many Fukushima victims did not want to identify themselves as *hibakusha* because of the negative image associated with the term (i.e. being “sentenced” to radiation-induced diseases in the future) and the discrimination which they may suffer as a

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<sup>1841</sup> Yannick Barthe, *Les Retombées du passé: Le paradoxe de la victime* (Seuil 2017) 10.; The original text in French: « le processus par lequel un individu se définit et est défini par d’autres comme victime »

<sup>1842</sup> Barthe (n 1841).

result,<sup>1843</sup> while they also claim damage, especially the prejudice of anxiety, related to radiation exposure.

By taking these into consideration, recognition of victims in nuclear disasters shall be ideally constituted of two steps by competent authorities: the group identification based on zones, doses, and administrative boundaries must be complemented by individualised status determination of victims using the criteria developed in consultation with victims and legal experts. The latter process should be implemented by competent authorities once the accident or emergency situation is resolved or stabilised so that victims do not have to go through litigation, ‘the process of secondary victimisation’<sup>1844</sup> in which victims may become also the victims of non-recognition.

## **Section 2: Proposal of Nuclear Disaster Protection Principles and Norms**

Now that the thesis clarified who the nuclear disaster victims were, it finally proposes how to protect them best from nuclear disasters. As mentioned earlier, this thesis does not try to propose draft provisions for future international legal or non-binding instruments for the protection of NDVs, but rather intends to propose a non-exhaustive list of key protection principles and norms the thesis considers essential in order to ensure the protection of individuals in nuclear disasters.

Most importantly, this proposal does not deal with an obvious but fundamental question which arises in reflecting on the protection norms: the use of nuclear energy itself. Is the use of nuclear energy ethically justifiable in view of the magnitude of consequences that a nuclear disaster causes on humankind and the environment? The magnitude which often

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<sup>1843</sup> During the interviews conducted in Fukushima, many mothers among victims expressed their worries that their daughters would be discriminated against in marriage by the family of the future fiancé due to their status as radiation exposure victims.

<sup>1844</sup> Barthe (n 1841) 107.

exceeds the capacity of any government, or of human agency for that matter, to handle and remedy properly? Aren't there energy alternatives which would not cause such magnitude of destruction? Is nuclear energy worth the risk? If so, for whom? Though these questions become all relevant at the end of this research, the thesis leaves them to other researchers and future research works.<sup>1845</sup>

This doctoral thesis was ultimately born out of a concern that the international community remained rather defenceless against the disaster whose effect has already been known to be extremely destructive to humanity and the environment. Today the world is essentially without any effective legal instrument or robust normative framework to properly deal with nuclear disaster consequences and adequately protect individuals from them. What this thesis hopes to achieve with this normative proposal is to make a small contribution to the titanic task of the international community to address the current international normative gap in protecting persons and the environment from nuclear disasters.

The section is organised in two parts. First, it proposes essential protection principles (§1), followed by key protection measures (§2) divided into before (prevention and preparedness), during (emergency response), and after (recovery and long-term protection) nuclear disasters. The other half of the section is dedicated to the nuclear damage liability scheme (§3), suggesting the essential liability principles and key nuclear damages which should be eligible for compensation.

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<sup>1845</sup> Some of the prominent works already done on these themes include Robert A Dahl, *Controlling Nuclear Weapons: Democracy Versus Guardianship* (Syracuse University Press 1985); Shrader-Frechette (n 303); Anders (n 1).



## **§1: Proposal of Protection Principles**

This doctoral thesis proposes three main protection principles which shall guide all the protective actions in nuclear disaster: human right-based approach (A), precautionary principle (B), and the guaranteed “right to displacement” (C). They are respectively drawn from human rights law, environmental law, and the nexus between the two laws.

### **A. Human Rights-Based Approach (HRBA)**

Apart from the nuclear regime, all the international normative regimes in connection with disasters adopt human rights-based approach (HRBA) and place human rights protection as their primary objective. Also, the UN human rights instances specifically advised the Japanese government to adopt this approach, instead of the nuclear framework, in the Fukushima post-accident response and protection.<sup>1846</sup> It is time for nuclear disaster management to “normalise” and align itself with the rest of the international disaster protection framework.

As listed earlier, nuclear disasters particularly implicate the following human rights: the rights to life, the highest attainable standard of health, physical and mental integrity, private and family life, safe water and food, adequate housing and standard of living, information and participation, a safe and healthy environment, cultural rights, collective rights, and the rights of the child, women, and persons with disabilities. In addition to these classic rights, this thesis proposes a new concept of right, the “right to displacement” (or to move), which plays a crucial role in protecting nuclear disaster victims (see the sub-paragraph C below).

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<sup>1846</sup> UN Committee on Economic, Social and Cultural Rights (n 1195); UNHRC, ‘Report of the Special Rapporteur on the Right of Everyone to the Enjoyment of the Highest Attainable Standard of Physical and Mental Health, Anand Grover. Addendum: Mission to Japan: Comments by the State on the Report of the Special Rapporteur’ (n 1250).

The principle of HRBA proposed by this thesis is supported by five sub-principles as follows: universal protection (1), positive obligation of states (2), the protection of vulnerable groups (3), non-discrimination (4), and information and participation (5).

### 1. Universal (not Relative) Protection

As shown in this doctoral research, the current protection norms applied to nuclear disasters provide only a partial or relative protection to people, conditioned on safeguarding political and economic interests of the State including preserving nuclear activities. As such, the implementation of protective actions hinges on numerous criteria – dose levels, exposure situations, cost-benefit analysis and socio-economic considerations.

By adopting the human rights-based approach, nuclear disaster response and recovery provides universal protection, instead of relative or conditional protection, to all persons affected by a nuclear disaster. Especially, it ensures ‘a protection that does not hinge upon state interests or policies’.<sup>1847</sup>

Human rights are said to have so-called “trumping” effects in our society, pre-empting other interests and preferences that a state acts upon on the premise of common good.<sup>1848</sup> According to Dworkin, some constitutional rights established as fundamental or political rights constitute moral rights against government and ‘a trump over the kind of trade-off argument that normally justifies political action’.<sup>1849</sup> These fundamental rights cannot be sacrificed just to secure an overall benefit to the community or the society, and ‘the society should bear the collective costs that arise from it’.<sup>1850</sup> The element of human rights being moral or alienable

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<sup>1847</sup> Quénivet and Lopes (n 1204) 204.

<sup>1848</sup> Dworkin (n 1428); cited by Shelton, ‘What Happened in Rio to Human Rights?’ (n 1411).

<sup>1849</sup> Ronald Dworkin, *Is Democracy Possible Here?: Principles for a New Political Debate* (Princeton University Press 2008) 31.

<sup>1850</sup> Dworkin (n 1428) 198.

rights directly clashes with the optimisation principle of the nuclear regulation regime which essentially places the rights of individuals on a balance against other interests, often economic or industrial interests of private or state enterprises.<sup>1851</sup> As such, the normative proposal for nuclear disaster protection compiled by the team of environmental jurists led by Prieur includes a specific provision which states that ‘[i]n no case should the search for profitability outweigh safety’, in which ‘health protection should be prioritized over economic interests by avoiding benefit risk analysis’.<sup>1852</sup>

However human rights are not free from balancing exercise, especially through the principle of proportionality which has been well established in the case-laws of the Court of Justice of the European Union (CJEU), ECtHR, and other jurisdictions. In the ECtHR case-laws, proportionality is often expressed as striking a “fair balance” between the general interest of the community and the protection of individual’s rights, in which states are accorded to exercise a certain “margin of appreciation”.<sup>1853</sup> Indeed, this balancing exercise alludes to the principle of justification and optimisation in the nuclear framework. The important difference is that the justification principle systematically gives precedence to “collective interests” over “individual rights”, while the proportionality principle does not favour one over the other depending on the circumstances. In the case of ECtHR, the principle intervenes most often in

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<sup>1851</sup> The recent report of the Special Rapporteur on the right to a safe and healthy environment clearly announced that ‘health, quality of life and a wide range of human rights are compromised ostensibly for “growth”, “progress” or “development” but in reality to serve private interests’. See UNHRC, ‘OHCHR | A/HRC/49/53’ (n 123) para 28.

<sup>1852</sup> The normative proposal was made by a group of French and Japanese environmental jurists and submitted to the 3<sup>rd</sup> World Conference of the UNDRR held in Sendai in 2015. See CIDCE (Limoges) and Waseda University Institute of Comparative Law, ‘Recommendations on Human Rights and Medical Management in Nuclear Disasters’ (2015) (Considering that: 7) <[https://cidce.org/wp-content/uploads/2016/08/Recommendations-on-human-rights-and-medical-management-in-nuclear-disasters\\_14.III.2017\\_EN.pdf](https://cidce.org/wp-content/uploads/2016/08/Recommendations-on-human-rights-and-medical-management-in-nuclear-disasters_14.III.2017_EN.pdf)> accessed 9 April 2021.

<sup>1853</sup> *Lopez Ostra v. Spain* (cited above) para 51; *Ilascu and others v. Moldova and Russia* (cited above) para 332; both cited by Akandji-Kombe (n 1289).

respect of the rights with limitation clauses such as the right to private and family life (Article 8) and freedom of expression (Article 10).<sup>1854</sup>

Meanwhile, some rights are deemed “fundamental”<sup>1855</sup> or “non-derogatory”<sup>1856</sup> which would dodge cost-benefit analysis or balancing tests all together. One of the examples that could be applied in the event of nuclear disasters is the right to life. As CCPR affirms, such a right shall be protected even ‘[i]n time of public emergency which threatens the life of the nation and the existence’ (Article 4 of ICCPR).<sup>1857</sup> Also, for other rights, particularly the right to health and the right to a safe environment, the CJEU and ECtHR case-laws have specifically pronounced at a number of occasions the precedence of these rights over economic interests.<sup>1858</sup>

The rights-based nuclear disaster protection thus ensures that the essential rights of individuals are neither compromised nor conditioned on state’s political and economic interests such as territorial administrative and economic survival and the preservation of the nuclear energy industry.

## 2. Positive Obligation of Duty-Bearer (the State)

Under the HRBA framework, states are clearly identified as the principal duty-bearers with specific obligations to respect, protect, and fulfil the human rights of all persons in their jurisdiction, the rights-holders.<sup>1859</sup> These obligations are also called positive and negative

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<sup>1854</sup> Other rights with limitation clauses include the right to freedom of religion (Art 9) and freedom of assembly and association (Art 11).

<sup>1855</sup> The notion of “fundamental” rights derives from constitutional rights established within national jurisdiction and therefore the exact content of such rights differs from country to country. For details, see Meron (n 1437).

<sup>1856</sup> Non-derogatory rights are defined by core human rights instruments but they are not all the same. For example, the ICCPR establishes non-derogatory rights as follows: the right to life (Art 6), the prohibition against torture (Art 7), the prohibition against slavery (Art 8), and others.

<sup>1857</sup> CCPR, ‘General Comment No. 36; Article 6: Right to Life’ (n 1191) para 1.

<sup>1858</sup> For the CJEU case-laws, for example, *Alpharma v Council*, *Pfizer Animal Health v Council*, *Artogodan v Commission* and others (cited above). For the ECtHR case-laws, see *Băcilă v Roumania* and *Di Sarno and others v Italy* (cited above)

<sup>1859</sup> OHCHR Europe (n 1260) 6.

obligations of the state, which have been extensively developed by international human rights instances such as the Human Rights Committee and the ECtHR. While the negative obligation is to refrain from interfering with or curtailing the enjoyment of human rights of rights-holders, the positive obligation means that the state authorities are required to take affirmative and proactive steps to prevent the infringement or abuse by other actors and facilitate and ensure the enjoyment of human rights.

In nuclear disasters, states have thus a positive obligation especially under the right to life (ICCPR Art 6; ECHR, Art 2) to take all appropriate and practical measures to ensure the effective protection of citizens.<sup>1860</sup> This entails for the state to ‘put in place a legislative and administrative framework’ to prevent the threats, provide necessary information, and ‘ensure, by all means at its disposal, an adequate response’ to safeguard such a right.<sup>1861</sup> Likewise, states have a positive duty to take ‘reasonable and appropriate’<sup>1862</sup> or ‘appropriate and sufficient’<sup>1863</sup> measures to secure other rights, notably the right to private and family life, according to the ECtHR decisions.<sup>1864</sup>

In nuclear emergencies, this could be translated into instructing precautionary evacuation of residents and ITB intake and in post-accident recovery, precautionary demarcation of restricted zones and precautionary resettlement of residents in view of scientific uncertainties with low-dose radiation effects.

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<sup>1860</sup> This was well established by the HR Committee (CCPR) commentaries and case-laws of the ECtHR. For the former, see Nowak (n 1294).

<sup>1861</sup> For example, *Öneryildiz v. Turkey* (cited above) para 89-91

<sup>1862</sup> For example, *Lopez Ostra v. Spain* (cited above) para 51

<sup>1863</sup> For example, *Ilascu and others v. Moldova and Russia* (cited above) para 7

<sup>1864</sup> Akandji-Kombe (n 1289).

### 3. Protection of Vulnerable Groups

Under the human rights framework, special attention must be paid to the protection of vulnerable groups. In situations of disasters, those segments of the population become even more vulnerable because of their social, economic, physical, political, cultural, or ethnic status. These groups include women, children, older persons, persons with disabilities, indigenous peoples, ethnic minorities, foreign residents, and LGBTI persons.<sup>1865</sup>

Especially in nuclear and radiation disasters, children and pregnant women (i.e., foetus) should be provided with special attention and care due to their increased sensitivity to radiation effects compared to other groups. This has been already established in past disasters such as the Chernobyl accident through the enactment of Chernobyl Laws and the Fukushima accident via the Nuclear Accident Victims and Children Support Act. Both national laws provided special protection status for children (and pregnant women in the case of Fukushima) by acknowledging their specific vulnerabilities against radiation effects. Though both schemes were not properly implemented in the end, due to financial difficulty in the former and lack of political will in the latter<sup>1866</sup>, they established an important precedent and a model for legal protection of these vulnerable groups in nuclear disasters.

Also, special consideration needs to be accorded to other vulnerable groups because of their physical and social circumstances. For example, women are in general more sensitive to radiation effects, compared to men, due to their body size. As analysed in the earlier chapter

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<sup>1865</sup> UNHRC, 'Final research-based report of the Human Rights Council Advisory Committee on best practices and main challenges in the promotion and protection of human rights in post-disaster and post-conflict situations' (n 1825).

<sup>1866</sup> Japan was criticised by the CESCR's 2013 review which stated that 'specific needs of disadvantaged and vulnerable groups, such as older persons, persons with disabilities, and women and children, were not sufficiently met during the evacuation and in the rehabilitation and reconstruction efforts'. See CESCR, 'Concluding Observations on the Third Periodic Report of Japan, Adopted by the Committee at Its Fiftieth Session (29 April-17 May 2013)' (ECOSOC, 10 June 2013) UN Doc E/C.12/JPN/CO/3 para 24.

on radiological protection, dose restriction norms have been developed based on the anatomic model of “standard man” (i.e. a Caucasian man between 20 and 30 years of age, weighing 70kg, measuring 170 cm of height, etc).<sup>1867</sup> As such, existing radiation norms may not be sufficiently protective for women, and also men of different anatomical and physiological characteristics to the “standard man” model.<sup>1868</sup> Also, competent authorities shall ensure that other categories of vulnerable populations, especially minorities in the society, have the same access to assistance and reparation as the rest of the population by installing an independent monitoring mechanism or translating the information (e.g. for foreigners and ethnic minorities) so that they would not be arbitrarily denied access or fell out of the support scheme.

#### 4. Non-Discrimination

Non-discrimination is part of the equality principle, one of the core human rights principles. It means that the enjoyment of rights shall be ensured without distinction as to sex, gender, sexual orientation, race, nationality, language, religion, political opinions, or any other opinions, national or social origin, belonging to any minority group, wealth, birth, disability, age, or any other status.<sup>1869</sup>

However, not every distinction or difference in treatment constitutes discrimination. In certain circumstances, especially in the protection of vulnerable groups, states are required ‘to take affirmative action in order to diminish or eliminate conditions which cause or help to perpetuate discrimination’.<sup>1870</sup> Some differential treatment is thus legitimate if such action is

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<sup>1867</sup> ICRP, ‘Report on the Task Group on Reference Man. ICRP Publication 23.’ (n 274).

<sup>1868</sup> For example, the mass of bodily fat is reported to be around 50% less for Asian (Chinese) male adults compared to Caucasian male adults, which would significantly alternate risk calculations for the former since they are based on the body absorption rate of radioactive materials for the latter body type. See ICRP, ‘Basic Anatomical and Physiological Data for Use in Radiological Protection Reference Values. ICRP Publication 89.’ (n 276).

<sup>1869</sup> CRIDEAU-OMIJ (University of Limoges) (n 127) Article 7.

<sup>1870</sup> CCPR, ‘General Comment No.18: Non-Discrimination’ (Human Rights Committee 1989) 10 November 1989 para 10.

implemented with a view to correct discrimination and has objective and reasonable justifications. According to these principles, special assistance scheme targeting children, pregnant women, and other social minority groups are both legitimate and necessary in case of nuclear disasters to offset their vulnerable conditions toward radiation or within the society, ensuring thereby the enjoyment of rights and freedoms for all on an equal footing.

## 5. Information and Participation

Information dissemination and participation in decision-making are some of the key environmental procedural rights guaranteed in several international (regional) conventions, notably the 1998 Aarhus Convention. Indeed, the Convention requires the state to ensure, in the event of environmental disasters, ‘all information which could enable the public to take measures to prevent or mitigate harm arising from the threat and is held by a public authority is disseminated immediately and without delay’ (Article 5.1(c)). Also, the public has the right to participate in decision-making concerning the plans, programmes, and policies related to activities with environmental risks including nuclear-related activities (Articles 6-8). This principle is particularly important in the event of nuclear disasters since the nuclear regulatory framework had long been extremely reluctant to open up to the society.<sup>1871</sup>

The case study of the Fukushima accident affirmed this tendency and showed that information sharing and consultation were always organised too little too late. The information on the core meltdown, the passage of radioactive plume predicted by SPEEDI, or the initial radiation doses measured on the ground were kept from the public by the authorities until a few weeks to months later in order to ‘avoid causing panic’ among the population.<sup>1872</sup> Moreover, important decisions which directly mattered the safety, the health, and the future life of residents

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<sup>1871</sup> Reyners (n 101).

<sup>1872</sup> Cabinet Secretariat (n 716).



were made with little input from residents themselves, especially concerning the selection of reference dose, the evacuation, and the return of residents.

As affirmed by the UN Human Rights Council, information dissemination relevant to disaster mitigation should be made to the public by the government even in emergency situations and such information ‘should not be distorted to *prevent social panic*’.<sup>1873</sup> A number of the ECtHR case-laws have also established that the state had a positive obligation under the right to private and family life (Art 8) and even the right to life (Art 2) to ensure public access to information in order to prevent the threats to those rights in environmental disasters.<sup>1874</sup> As such, the normative proposal by Michel Prieur also prescribes that post-disaster response and communication should be made to ‘meet the obligation of states to ensure public safety in respect of human rights’, and not to ‘reassure population on radiation risk’.<sup>1875</sup>

In light of existing scientific uncertainty as regards low-dose radiation risk, the participation of affected population in the decision-making of post-disaster protection measures which directly concern their lives is also crucial, at least for the recovery phase if not the emergency phase, especially in relation to the reference dose level, evacuation, return, resettlement, decontamination, reconstruction and radiation protection. In addition, third-party organisations such as victim associations, the human rights Ombudsman, legal expert NGOs shall also be allowed to participate in such decision-making processes so as to monitor and ensure that the voice of the affected will be sufficiently reflected in the final decisions.

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<sup>1873</sup> UNHRC, ‘Final research-based report of the Human Rights Council Advisory Committee on best practices and main challenges in the promotion and protection of human rights in post-disaster and post-conflict situations’ (n 1825) para 41(f).

<sup>1874</sup> *Öneryildiz v. Turkey* (cited above) para 62, 89. See also *L.C.B. v. the United Kingdom* (cited above), *Guerra and Others v. Italy* App no. 116/1996/735/932 (ECtHR, 19 February 1998) and others.

<sup>1875</sup> CIDCE (Limoges) and Waseda University Institute of Comparative Law (n 1852) (Considering that: 8).

## B. Precautionary Principle

Precautionary principle is one of the core environmental law principles which solicits actions on potential, uncertain, or non-elucidated threats that may cause ‘serious or irreversible damage’.<sup>1876</sup> The principle has been incorporated in multiple international environmental instruments, notably the 1992 Rio Declaration, and well developed under EU laws. The application of the principle plays a vital role in protecting persons in nuclear disasters since it deals with low-dose radiation risk that has not yet been fully elucidated and is subject to scientific controversies. Under the paradigm of precautionary principle, the competent authorities are required to take preventive protective actions against risks ‘without having to wait until the reality and seriousness of those risks become fully apparent’.<sup>1877</sup> Lack of scientific certainty will not thus suffice to justify their inaction. Inversely, affected persons do not have to provide a definitive proof of harm, the existence of a potentially ‘serious or irreversible damage’ is sufficient, to justify their self-protective actions such as “voluntary” relocation and demand adequate protection and assistance from the competent authorities.

In the face of environmental risk that is as unsettled as low-dose radiation, the principle also becomes quite instrumental in determining protection levels or risk thresholds. These controversies precisely occur when there is a dominant scientific view supported by the government, which dismisses dissenting and divergent scientific opinions. The precautionary principle requires that the risk debate should be conducted ‘in an open, transparent, and pluralistic manner’ and that decision-making should no longer be ‘the preserve of a scientific

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<sup>1876</sup> The citation is from Article 15 of the 1992 Rio Declaration

<sup>1877</sup> The quotes are from the CJEU case-laws such as Case C-180/96 *United Kingdom v Commission* [1998] ECR I-2265, para 99, ‘the BSE judgement’; Case C-157/96 *National Farmers’ Union and Others* [1998] ECR I-2211, para 63; Case C-180/96 *United Kingdom v Commission* [1998] ECR I-2265, para 99; Case C-236/01 *Monsanto Agricoltura Italia* [2003] ECR I-08105, para 111; Case T-13/99 *Pfizer Animal Health SA v Council* [2002] ECR II-03305, para 139; cited by de Sadeleer, ‘The Precautionary Principle in EC Health and Environmental Law’ (n 1515).

class close to the political elite'.<sup>1878</sup> This is also consistent with the WTO Appellate Body case-laws which held that risk assessment could set out 'both the prevailing view representing the mainstream of scientific opinion and the opinions of scientists taking a divergent view'.<sup>1879</sup> In situations of nuclear disaster, this would be translated into making sure the participation of academic scholars and independent scientists from the civil society, in addition to official experts affiliated to state or public institutions, in determining the reference dose.

Also, the adoption of the precautionary principle in nuclear disaster protection are ensured by the following two sub-principles: universal dose limit at 1 mSv/year (1) and intergenerational protection (2).

#### 1. Universal Dose Limit of 1 mSv/year and Reference Dose of 5 mSv/year

Public annual dose limit is established at 1 mSv/year by international nuclear and radiation protection authorities, namely IAEA and ICRP. The level was determined incorporating several factors: available scientific knowledge and its uncertainty on radiation risk at low doses, the sense of precaution, societal pressures, and political compromises. This is because, ultimately, there is no "safe" dose of radiation. As the 1956 BEAR report stated, '[f]rom the point of view of genetics, they [radiation exposures] are all bad'.<sup>1880</sup> Under the circumstance, the dose limit of 1 mSv/year was deemed the best workable, precautionary, and morally acceptable level of dose to protect the public who do not directly "benefit" from radiation exposure unlike workers and patients.

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<sup>1878</sup> *ibid* 153.

<sup>1879</sup> WTO, *EC Measures Concerning Meat and Meat Products (Hormones)* (16 January 1998) WT/DS26/AB/R and WT/DS48/AB/R; cited by Nicolas de Sadeleer, 'The Precautionary Principle in EC Health and Environmental Law' (2006) 12 *European Law Journal* 139.

<sup>1880</sup> National Research Council/National Academy of Sciences, 'The Biological Effects of Atomic Radiation: A Report to the Public' (n 156) 20.

However, this dose limit is currently applied only in planned exposure situations, the situation without nuclear accidents. As soon as a radiation emergency occurs, such a dose limit is immediately disregarded and replaced by a more flexible “reference dose” which can be fixed between 20-100 mSv/year during the emergency phase and 1-20 mSv/year during the recovery phase. Under such a system, it is safe to say that “dose limit” does not assume the function of the dose limit, rather a concept of “pie in the sky” which gives an illusion of protection but in reality does not do anything when the need arises.

By adopting the precautionary principle, this public dose limit shall become the universal dose limit, applied in all situations including emergencies and disasters. This dose limit accounts for estimated effective exposure doses of an individual from both external and internal exposures excluding those from natural background and medical exposures. This was indeed the post-accident reference dose established by the former Soviet authorities in the Chernobyl accident as well as the dose standard strongly recommended by the UN human rights institutions after the Fukushima accident. At doses more than 1 mSv/year, protective actions, namely evacuation and relocation (resettlement), shall be implemented, facilitated, and assisted (or at least offered as an option) by the competent authorities. Moreover, lower dose values could be fixed for vulnerable groups such as children, pregnant women, or people with specific medical conditions who are sensitive to radiation effects.

Furthermore, the thesis also proposes the secondary dose limit of 5 mSv/year, a sort of “reference dose”, uniquely applicable concerning the return of evacuees to the contaminated territories. Chernobyl and Fukushima accidents showed that some residents, especially the elderly, wished to remain or return home despite the contamination. From this perspective, the secondary dose limit of 5 mSv/year may be installed with a view to facilitate the wish of these residents while keeping such a dose level relatively low so that radiation protection measures

would be efficient and relatively easy to implement for the returnees. At doses more than 5 mSv/year, resettlement should be strongly advised, facilitated, and fully assisted for the residents. In cases where residents wish to remain or return in the area where doses exceed 5 mSv/year, they may be allowed to do so at their own risk after being fully informed of potential risks by the competent authorities and signing a document of informed consent. However, for children and pregnant women, this secondary limit should not be applied and only the universal dose limit applies at all times in view of their sensitivity to radiation.

This secondary dose limit of 5 mSv/year was drawn from the Chernobyl precedent – Chernobyl Concept and Laws – as well as the recommendation made by the Japan Federation of Bar Association (JFBA) after the Fukushima accident. In fact, the JFBA’s proposal was based on the Japanese radiation legislation on the Radiation Controlled Area (RCA) which prescribes that the area with doses exceeding 1.3 mSv per three months (5 mSv/year) must be designated as RCA where the entry is strictly controlled for workers’ protection.<sup>1881</sup> In addition, the dose level for industrial accident recognition for leukaemia among radiation workers is established at 5 mSv/year through jurisprudence in Japan.<sup>1882</sup> Although these court decisions did not establish the causal link between such a exposure dose and the disease, the 5 mSv/year threshold

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<sup>1881</sup> Sources: MHLW Ordinance on Prevention of Ionizing Radiation Hazards (Ministry of Labour No 41 of 1972) (Article 3), METI Public Notice on Dose Limits (No 187 of 2001) (Article 2), MEXT Public Notice on Dose Limits (No 20 of 1988) (Article 2), MEXT Public Notice on Establishing Values of Radioisotope (No 5 of 2000) (Article 4)

<sup>1882</sup> Source: MHLW, ‘「電離放射線障害の業務上外に関する検討会」の検討結果及び労災認定について (The View on Industrial Accident Recognition for Radiation Exposure and Leukaemia)’ (Ministry of Health, Labour and Welfare 2015) 20 Octobre 2015 <<https://www.mhlw.go.jp/file/05-Shingikai-11201000-Roudoukijunkyo-Soumuka/kouhyousiryoushou.pdf>> accessed 18 April 2023. The dose criterion is 5 mSv multiplied by the years of service. For example, a worker who was exposed to more than 5 mSv of radiation in the first year and developed leukaemia in the following year, it is recognised as work-related injury, thus eligible for compensation.

was adopted as a policy in Japan to provide relief (compensation) to victims from the viewpoint of workers' protection.<sup>1883</sup>

If one follows the advice of the ICRP which says that dose restriction levels are justifiable in relation to the benefits that individuals and the society receive from exposure situations,<sup>1884</sup> members of the public receive zero or negative “benefits” from radiation exposure after nuclear disasters. As such, the dose restriction level shall remain as 1 mSv/year in nuclear disasters.

## 2. Intergenerational Protection

Based on precautionary principle, the protection of radiation disaster victims shall be extended to the next generations. The intergenerational medical follow-up and assistance shall be the absolute norm for protective actions. This derives from several scientific findings which have confirmed the hereditary effect of radiation despite the continued silence from all the international nuclear and radiation authorities – IAEA, UNSCEAR, and ICRP – who have not officially acknowledged such an effect.

One of such findings is the H.J. Muller's 1928 study and the works of other geneticists demonstrating that radiation exposure induced mutations even with small doses (no threshold) and this mutagenic effect was irreversible and cumulative over a lifetime, transmittable to offspring from a parent who had no apparent radiation-induced injuries during his/her lifetime.

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<sup>1883</sup> Hideyuki Hirakawa, ‘区域外避難はいかに正当化されるかーリスクの心理ならびに社会的観点からの考察 (How Can the Out-of-Zone Evacuation Be Justified?: The Reflection from Risk Psychology and Social Perspective)’ in Takehisa Awaji and others (eds), *原発事故被害回復の法と政策 (Laws and Policies for Nuclear Accident Damage Reparation)* (Nihon Hyoron Sha 2018).

<sup>1884</sup> ICRP, ‘Implications of Commission Recommendations That Doses Be Kept as Low as Readily Achievable’ (n 174); ICRP, ‘The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.’ (n 28).

This led to the famous quote from the 1956 BEAR report, ‘[f]rom the point of view of genetics, they [radiation exposures] are all bad’.<sup>1885</sup>

This particular characteristic of radiation effect has also been acknowledged by the decisions and opinions of international courts. Typically, the 1996’s ICJ opinion on nuclear weapons stated that ‘radiation has the potential to damage the future environment, food and marine ecosystem, and to cause genetic defects and illness in future generations’.<sup>1886</sup> Also, a nuclear law expert Nobert Pelzer admitted that detrimental effects of radiation can be latent for a long time and that ‘[i]onization of the human genes do not only cause somatic damage but may also cause damage to the following generation’.<sup>1887</sup>

As analysed earlier, this intergenerational protection has already been established in past disasters, notably for Chernobyl accident victims and Hiroshima/Nagasaki A-bomb survivors. This should become the norm for all the future nuclear disaster protections.

### **C. The Guaranteed “Right to Displacement”**

The third pillar of protection principles is to ensure “the right to displacement” of the affected individuals in nuclear disasters. The notion of this right is drawn from the “new” human right which stands at the intersection of human rights and environmental laws, namely the right to a safe and healthy environment. From the analysis conducted in this doctoral research, the thesis considers the guaranteed right to displacement, alternatively called the “right to evacuation”, “move”, or “travel”, constitutes an indispensable principle of nuclear disaster protection. This principle indeed ensures and operationalises the right to a safe and healthy

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<sup>1885</sup> National Research Council/National Academy of Sciences, ‘The Biological Effects of Atomic Radiation: A Report to the Public’ (n 156) 20.

<sup>1886</sup> *Legality of the Threat or Use of Nuclear Weapons* (cited above), para 35

<sup>1887</sup> Pelzer, ‘The Present State of Research Carried Out by the English-Speaking Section of the Centre for Studies and Research’ (n 17) 269.

environment, or “to non-toxic environment”,<sup>1888</sup> in situations of environmental disasters. It functions to effectively protect people from being “trapped” in or being compelled to return to contaminated areas where their health or life would be threatened by hazardous substances such as radioactivity.

Under the forced migration framework, “the right to displacement” is guaranteed only in the phase of post-displacement and as a durable solution (i.e. resettlement). In environmental disasters such as nuclear accidents, “the right to displacement” must be guaranteed by the competent authorities from the outset of the emergency (i.e. evacuation). The concept indeed constitutes “the right to survive by fleeing”, suggested by Michel Prieur according to whom evacuation in ecological disasters represents ‘a manifestation of their fundamental right to life’.<sup>1889</sup>

The other concept which goes hand in hand with such a right is the “right to be protected from exposure *in situ*”, conceived for the protection of those who choose to remain in the contaminated areas as well as of those who choose to return to these areas of their own accord. This was originally proposed by Japanese legal NGOs and the JFBA following the Fukushima nuclear accident.<sup>1890</sup> In practical terms, it means that the stayers shall be provided with effective radiation protection measures and advices with a view to avoid or reduce exposure doses as much as possible while living in the contaminated environment.

As such, “the right to displacement” and “the right to radiological protection *in situ*” form the core principle of protection which shall be guaranteed by competent authorities in nuclear disasters.

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<sup>1888</sup> UNHRC, ‘OHCHR | A/HRC/49/53’ (n 123).

<sup>1889</sup> Prieur (n 106) 1.

<sup>1890</sup> Fukuda and Kawasaki (n 50); Fukuda (n 1139).



## **§2: Proposal of Protection Norms**

After setting the above three principles, this paragraph proposes key protective actions which shall be incorporated into new nuclear disaster protection norms. Many of these actions were inspired and drawn from the experience of the Fukushima accident case study. They are divided into three phases of disaster management cycle: prevention and preparedness (A), emergency response (B), and recovery and long-term protection (C).

### **A. Prevention and Preparedness**

Ideally, the following measures shall be planned and put in place by the operator in close cooperation with local authorities before an operation licence is granted by the regulatory authorities. They consist of exclusion zone (EZ) (1), evacuation preparation zone (EPZ) (2), and pre-distribution of ITB (3).

#### **1. Establish the “Exclusion Zone (EZ)” of 5-10 km**

The thesis proposes that each nuclear facility (of more than 1,000 MW (th)) should have an exclusion or non-habitation zone (EZ) of between 5-10 km radius (at least 5 km radius) from the facility, with a certain flexibility regarding local specificities (e.g. local landmarks, administrative boundaries, geographical conditions). Within the EZ, residential homes and “sensitive” facilities such as hospitals, schools, mayor’s office, elderly homes, and hotels should not be constructed or established. The distance of 5 km indeed corresponds to the Precautionary Action Zone (PAZ) recommended by the IAEA (3-5 km radius for the reactors of more than 1,000 MW). The PAZ is neither an exclusion nor non-habitation zone but an area where residents are prepared to take emergency protective measures such as precautionary evacuation and the ITB intake in events of a nuclear emergency. The thesis thus proposes to replace the PAZ with the EZ so that in case of an accident, it considerably reduces the risk of residents

getting exposed to high radiation doses in the immediate phase of an accident. For the authorities, it would mean that there will be fewer residents to evacuate in nuclear emergencies.

Establishing an EZ at a minimum 5 km radius can also be justified by the study conducted by the IAEA which found that sheltering or evacuation from 5 km radius areas at the start of the release might not prevent the public exposure to doses above 2 Gy.<sup>1891</sup>

Moreover, establishing an exclusion or restriction zone is a common practice in disaster prevention and preparedness against natural disaster risks in many countries. For example, in Japan, the “Disaster Risk Zone” is established and demarcated in the cities and towns exposed to the risk of tsunami, floods, and landslides.<sup>1892</sup> Within these zones, residential houses are not allowed to be built and, in some municipalities, the construction ban also concerns other facilities such as nursery schools, elderly homes, and accommodation facilities (e.g., Kesenuma city). Also in France, restrictive zones are instituted against natural disaster risks such as flood-prone areas (e.g., *le plan de prévention des risques naturels d’inondations* – PPRNi).

However, none of these restrictive zones are established against nuclear risk. In Japan, even after the Fukushima accident, the authorities refuse to create such restrictive zones. In France, the nuclear regulator has tried to establish such zones in the immediate vicinity of nuclear power plants but faced difficulties in implementing it on the ground. The 2006 Act on Transparency and Security in the Nuclear Field (so-called the TSN law)<sup>1893</sup> authorised the

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<sup>1891</sup> IAEA, ‘Actions to Protect the Public in an Emergency Due to Severe Conditions at a Light Water Reactor’ (n 72) 101.

<sup>1892</sup> The measure is implemented based on Article 39 of the Building Standards Act (Act No. 201 of May 24, 1950).

<sup>1893</sup> la loi n°2006-686 du 13 juin 2006 relative à la transparence et à la sécurité en matière nucléaire (translation by R. Hasegawa), which was elaborated by le circulaire du 17 février 2010 relative à la maîtrise des activités au voisinage des installations nucléaires de base (INB) susceptibles de présenter des dangers à l’extérieur du site ; The law does not use the term “exclusion” but allows administrative authorities to establish “public utility easements (*servitudes d’utilités publiques*)” regarding the use of the land and construction works around nuclear facilities (article 31).

Nuclear Safety Authority (ASN) to establish”“public utility easement (*servitudes d'utilités publiques*)” – “restrictive zones” in effect – of 2 km radius around nuclear sites but its implementation had been quite patchy and incoherent due to oppositions from local authorities and lack of clear policy guideline on the part of the ASN.<sup>1894</sup> The guideline was finally compiled and published in 2016, 10 years after the enactment of the law.<sup>1895</sup>

As Hasegawa and others has shown in the comparative study between tsunami and nuclear disaster management,<sup>1896</sup> disaster preparedness and response for natural disasters is generally more preventive, precautionary, and protective than those for nuclear disasters while the degree of risk threatening human life and health does not change much between the two disasters, or even more pernicious in the latter. This incoherence of disaster policies between natural and nuclear disasters is quite incomprehensible and something that needs to be rectified.

## 2. Establish the Evacuation Preparation Zone (EPZ) of 30 km Radius

The thesis also proposes to establish the Evacuation Preparation Zone (EPZ) at 30 km radius from every nuclear facility (of more than 1,000 MW (th)). The notion of EPZ suggested here roughly corresponds to what is expected to be done in IAEA’s Precautionary Action Zone (PAZ) mentioned earlier. In effect, the thesis proposes to extend the distance of PAZ (3-5km) to 30 km based on the precautionary principle as well as the experience from the Fukushima

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<sup>1894</sup> Philippe Collet, ‘Le Difficile Encadrement de l’urbanisation Autour Des Sites Nucléaires’ *Actu Environnement* (Paris, 13 January 2014) <<https://www.actu-environnement.com/ae/dossiers/risques-industriels/urbanisation-sites-nucleraires.php>> accessed 18 April 2023.; Also, see the debate at the Sénat on the management of urban planning around nuclear sites, <https://www.senat.fr/questions/base/2015/qSEQ15071209S.html>, consulted 30 June 2022

<sup>1895</sup> Autorité de sûreté nucléaire (ASN), ‘Maîtrise des activités au voisinage des installations nucléaires de base’ (French Nuclear Safety Authority 2016) Guide N° 15.

<sup>1896</sup> Hasegawa, ‘Disaster Evacuation from Japan’s 2011 Tsunami Disaster and the Fukushima Nuclear Accident’ (n 42). In this report, the author made a comparative analysis of disaster responses undertaken by the Japanese authorities for tsunami disaster for one and nuclear disaster for the other.

nuclear accident. Also, this criterion of 30 km radius is the distance of the exclusion zone initially planned by the American Atomic Energy Commission (AEC) in 1950.<sup>1897</sup>

Within the 30 km radius, residents shall be informed and trained in advance on what to do in case of nuclear emergencies and once an emergency occurs, they will be instructed to take urgent protection measures (i.e. precautionary evacuation, stable iodine intake, and prevention of ingestion) within one hour from the declaration of a general emergency and preferably before a release of radiation. Within the EPZ, local authorities are required to prepare an evacuation plan (i.e., evacuation routes, means, and priorities) and an arrangement for the place of relocation shelters. More importantly, the local authorities shall identify sensitive facilities and set up a plan for evacuating vulnerable populations such as children at school, patients at hospitals and care homes, and persons with disabilities (depending on circumstances).

Simultaneously, it is crucial for the local authorities to plan and prepare a support system for those who cannot evacuate for various family, health, professional and other reasons (e.g. caring for a sick and heavily disabled persons, due to injuries, etc) and thus need to shelter indoors for a prolonged period of time. Moreover, others who simply wish to remain at their own risk shall be allowed to do so by signing an informed consent form prepared by the local authorities.

In fact, following the Fukushima accident, the Japanese new regulatory authority, the NRA, also designated the area of 30 km radius as Urgent Protective Action Planning Zone (UPZ) based on the recommendation made by the IAEA. While the IAEA's UPZ (15-30 km radius) is basically an extension of the PAZ with the priority of urgency placed on the latter, the Japanese UPZ envisages only sheltering indoors as an urgent protection measure.

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<sup>1897</sup> Topçu, 'Catastrophes nucléaires et « normalisation » des zones contaminées : Enjeux politiques, économiques, sanitaires, démocratiques et éthiques.' (n 319); Foasso (n 319).

### 3. Pre-distribution of Iodine Thyroid Blocking (ITB) at 100 km Radius

As part of the preparation for the EPZ, stable iodine (ITB) must be pre-distributed to every household and sensitive facilities such as schools, hospitals, elderly homes, mayor's office and so on within 30 km radius from each nuclear site. In addition, free pre-distribution of ITB should be made available to the area of 30-100 km radius from each site, in which families and public and private establishments are strongly advised to collect from nearby pharmacies and safely store them at home, office, or facility at all times. This follows the latest guidance made by the Association of the Heads of the European Radiological Protection Competent Authorities (HERCA) - Western European Nuclear Regulators' Association (WENRA) in 2014.<sup>1898</sup> Indeed, Belgium has already adopted the policy of ITB pre-distribution for the area up to 100 km radius from the concerned site (i.e. the entire country) in the National Nuclear and Radiological Emergency Plan (NEP) revised in March 2018.<sup>1899</sup>

In summary, the table below (Table 21) shows the overview of the proposed emergency zones in comparison to the IAEA emergency zones.

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<sup>1898</sup> HERCA and WENRA, 'HERCA-WENRA Approach for a Better Cross-Border Coordination of Protective Actions during the Early Phase of a Nuclear Accident' (Heads of the European Radiological Protection Competent Authorities/Western European Nuclear Regulators' Association 2014). In this guideline, HERCA-WENRA recommends the evacuation preparation zone to be extended up to 20 km and sheltering and ITB intake up to 100 km (p. 9).

<sup>1899</sup> Kingdom of Belgium, 'Seventh Meeting of the Contracting Parties to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management' (Federal Agency for Nuclear Control (FANC) 2020) National Report 10.

Table 21: The Proposal of Nuclear Emergency Zones in Comparison with the IAEA Zones

	<b>Distance (radius)</b>	<b>Proposed Actions (Pre- and Post-Accident)</b>	<b>Equivalent IAEA Zone</b>	<b>IAEA Distance</b>
<b>Exclusion Zone (EZ)</b>	5-10 km	No dwelling and sensitive facilities	None	
<b>Emergency Preparation Zone (EPZ)</b>	30 km	- Evacuation drills and emergency training - Precautionary evacuation, ITB intake, prevention of ingestion	- Precautionary Action Zone (PAZ) - Urgent Protective Action Planning Zone (UPZ)	3-5 km 15-30 km
<b>ITB Pre-Distribution Zone</b>	100 km	- ITB intake pre-distribution - Spontaneous evacuation	Extended Planning Distance (EPD) <sup>1900</sup>	100 km

## B. Emergency Response

The key emergency protection measures are composed of the following: precautionary evacuation and ITB intake (1), spontaneous evacuation (2), the protection of stayers (3), and medical screening and registration (4).

### 1. Precautionary Evacuation and ITB Intake: EPZ (30 km Radius)

As soon as an emergency which could lead to an important release of radiation is declared at a nuclear site, precautionary evacuation, ITB intake and prevention of ingestion should be instructed within the EPZ, 30 km radius from the site, as planned. Most importantly, this precautionary evacuation shall be instructed before a release of radiation from the site. In most cases, the timing, the direction, and the quantity of a release will be unknown in the beginning of an emergency. Therefore, this measure shall be systematically implemented as soon as a release of radiation which could cause exposure doses of more than 1 mSv/year to the

<sup>1900</sup> The recommended protective actions for the EPD zone are different from those proposed by this thesis for the ITB pre-distribution zone. IAEA recommends the prevention of ingestion and radiation monitoring to locate hotspots for potential evacuation or relocation.

public is suspected on the site. According to IAEA, there is usually a warning time of ‘two or more hours’ to initiate urgent protective actions before the release, even for the worst accident cases.<sup>1901</sup> Combined with the iodine intake, IAEA asserts that a prompt evacuation prior to a release is ‘the most effective protective action within the PAZ and UPZ (described as the EPZ in this thesis)’ to protect the population from severe radiation exposure.

Accordingly, precautionary evacuation of residents would constitute the positive obligation of states in nuclear disasters under the right to life as well as the precautionary principle. This also secures the protection of what Prieur called ‘the right to survive by fleeing’ of individuals in nuclear disasters.<sup>1902</sup> After such an evacuation, these evacuated residents shall be recognised as IDPs and environmentally displaced persons and assisted and protected according to the IDPs protection normative documents, notably the GPID, and the outcome document of the Nansen Initiative.

Ideally, this precautionary evacuation shall be organised in a phased fashion, starting, for example, from the zone 5-10 km radius, followed by the zone 10-20 km radius and then the zone 20-30km radius. This would not only enable those at most risk to evacuate first but also mitigate the road congestion and blockade (as it was the case during the Fukushima accident). As the IAEA guideline recommends, the EPZ shall be evacuated in all directions due to the wind shifts which could take place during a release.

The precautionary evacuation shall last at least one week in order for the authorities to have more clarity on the situation of the troubled facility. If the situation does not seem to

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<sup>1901</sup> IAEA, ‘Actions to Protect the Public in an Emergency Due to Severe Conditions at a Light Water Reactor’ (n 72) 100.

<sup>1902</sup> Prieur (n 106).

stabilise quickly or get worse, the competent authorities shall organise and find solutions and provide assistance for a prolonged evacuation or relocation of residents.

## 2. Spontaneous Evacuation up to 100 km Radius and at 1 mSv/year

Outside the EPZ, beyond a 30 km radius, spontaneous evacuation of residents can be recommended by the authorities as a precautionary measure in the area up to 100 km when the quantity of a potential release is not clear, but the reactor situation is serious (i.e. core damage or meltdown). The distance of 100 km is sourced from the 2014 HERCA-WENRA guideline which recommended sheltering and ITB intake up to 100 km. It also derives from the US government's evacuation advice for its nationals living in Japan at the time of the Fukushima accident which was established at 80 km radius and remained in place for seven months while the Japanese authorities lifted evacuation order from the 20-30 km radius area after five months from the accident.

The residents living between 30-100 km radius thus have the right to evacuate on their own and continue such an evacuation until the situation at the troubled facility becomes clear. The cost for this evacuation shall be made eligible for compensation by the operator. Once the situation at the troubled facility gets resolved or poses no more threat, spontaneous evacuees from 30-100 km radius can return home as long as the radiation level of their community of origin does not exceed 5 mSv/year according to the dose protection principle proposed above. But if the dose level exceeds the public dose limit of 1 mSv/year, these evacuees shall have the right to a prolonged relocation or resettlement assisted by the competent authorities.

This relocation eligibility shall also apply to other areas beyond 100 km. The residents living at radiation hotspots or in an area where estimated doses exceed 1 mSv/year outside the 100 km zone shall also have the right to relocation or resettlement, if they wish, with adequate



assistance and compensation from the authorities and the operator. Both Chernobyl and Fukushima experiences showed that radiation hotspots often extended beyond 100 km from the troubled facility.

Most importantly, like the EPZ evacuees, these spontaneous evacuees shall be recognised and treated as IDPs and environmentally displaced persons whose protection shall be implemented in accordance with the IDP protection normative framework. This measure is especially designed to operationalise and ensure this new concept of right that this thesis proposes – the right to displacement. The criteria for spontaneous evacuation, initially up to 100 km and later at more than 1 mSv/year, are particularly conceived to prevent the situation of involuntary immobility, addressing thus the issue of “trapped” populations, in nuclear disasters.

### 3. Prolonged Sheltering or Remaining with Radiation Protection Measures

Sheltering indoors shall be avoided as an emergency protective measure since, as the IAEA also acknowledges, it is not sufficiently protective against radiation exposure in nuclear emergencies.<sup>1903</sup> Moreover, it is a short-term measure which shall not usually last more than 24 hours. It should be devised only when immediate and safe evacuation is impossible or hazardous (e.g. extreme weather, extremely fragile health conditions, lack of transportation means). Precautionary evacuation should always be the priority over sheltering even though the EP&R of major nuclear countries tend to adopt sheltering as their primary protective action for emergencies.

But for those who are obliged to remain or shelter for a prolonged period within the EPZ for various family, professional, and other reasons (e.g. caring for a sick and disabled

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<sup>1903</sup> IAEA, ‘Actions to Protect the Public in an Emergency Due to Severe Conditions at a Light Water Reactor’ (n 72).

persons, due to injuries, etc) – voluntary staying –, local authorities shall arrange logistical (i.e. transport, food, water, and power) and medical (i.e. periodic visit by a doctor/nurse) support system and provide radiation protection advices (i.e. restricting the consumption of local produce, prevention of ingestion of radioactive materials) with a view to enable such prolonged sheltering or remaining of the EPZ residents at the lowest risk possible.

These measures correspond to ensuring “the right to avoid radiation exposure *in situ*”, the other twin of “the right to displacement”, both of which constitute the substantive elements of the right to a safe and healthy environment.

#### 4. Medical Screening and Registration of Estimated Exposure Doses

Medical screening, decontamination and registration of affected/exposed persons are one of the most important protective actions specific to nuclear disasters. All residents who evacuate from the EPZ should be medically screened at the arrival in the place of relocation. The medical team shall first examine a possible contamination and record the activities and movements of each evacuee from the start of an accident/emergency. The registration of this initial information is crucial to estimate exposure doses of an individual, which will constitute a reference for the future health monitoring and a key evidence for future damage compensation. If a resident is detected with contamination (i.e. deposition of radioactive materials on the clothes or the skin), the medical team shall conduct a decontamination procedure (i.e. remove of the clothes, shower) and, depending on the amount of contamination, transfer him/her to a specialised hospital for treatment.

### **C. Recovery and Long-Term Protection**

Protective actions for the recovery and long-term phase of a nuclear disaster can largely refer to the existing international protection norms established for refugees, IDPs,

persons affected by natural and technological disasters. Notwithstanding, there are also some measures which are distinct for nuclear disasters such as delimitation of restricted zones and life-long medical follow-up. The thesis proposes the key recovery protective actions for this phase as follows: voluntary choice on return or resettlement (1), alternative durable solutions (2), delimitation of restriction zone (3), and medical follow-up for life and beyond generations (4).

### 1. Durable Solutions: Voluntary and Informed Choice on Return or Resettlement

Once the accident situation is resolved or stabilised, evacuated residents shall be able to make a free and informed decision about her/his durable solution: either to return home (habitual residence), or to resettle elsewhere in the country. As prescribed in the GPIIP, the state authorities have ‘the primal duty and responsibility to establish conditions, as well as provide the means’ to facilitate the realisation of their choices by assisting the reconstruction of their lives both in the place of return and resettlement (Principle 28). Most importantly, this assistance should be equitably allocated for the two options so as not to encourage one option against the other. This is in line with Principle 15(d) of the GPID and the Framework on Durable Solutions according to which ‘under no circumstances should IDPs be encouraged or compelled to return or resettle to areas where their life, safety, liberty or health would be at risk’.<sup>1904</sup>

In accordance with the second protection principle – precautionary principle – proposed above, the dose limit (or the threshold dose) for the durable solutions shall be 1 mSv/year for resettlement and 5 mSv/year for return. In other words, the voluntary return of evacuees can be envisaged when the estimated individual exposure doses in the area is below

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<sup>1904</sup> UNHRC, ‘Report of the Representative of the Secretary-General on the Human Rights of Internally Displaced Persons, Walter Kälin, Addendum: Framework on Durable Solutions for Internally Displaced Persons’ (n 545) para 21(f).

5 mSv/year. Likewise, the long-term relocation of evacuees shall be assisted and facilitated when such doses exceed 1 mSv/year in the area. Meanwhile, residents who make an informed decision to return to the area where estimated doses exceed 5 mSv/year are still allowed to do so but at their own risk.

## 2. Alternative Durable Solutions: Collective Resettlement and Half-Resettlement

As shown in the Fukushima accident case study, the dichotomy of the option – return or resettlement – may not provide adequate durable solutions for all the nuclear disaster IDPs. Based on the Fukushima experience, the thesis proposes two other options for durable solutions, namely “collective resettlement” and “half-resettlement”.

The first alternative solution, collective resettlement, was the idea suggested not only by Fukushima evacuees themselves but also by affected municipalities and academic scholars. It derived from the fact that many who chose resettlement as a durable solution expressed desire not only to be resettled together as a community but also to return to their community of origin one day when their children will grow up or the radiological situation will improve. As the UN RSG’s Framework on Durable Solutions also described, those opting for resettlement often do so ‘for the time being while retaining the prospect of an eventual return’.<sup>1905</sup> As a matter of fact, a person who resettled elsewhere does not lose the right to repatriation once return becomes feasible.<sup>1906</sup> In this context, the concept of “transitional town”<sup>1907</sup> or “second town”<sup>1908</sup> was proposed by some scholars as an alternative durable solution. The basic idea is to create a sort of “enclave” in another town where an evacuee community will be relocated or implanted

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<sup>1905</sup> *ibid* para 21(c).

<sup>1906</sup> *ibid* para 21(e).

<sup>1907</sup> Imai, 自治体再建—原発避難と「移動する村」 (*Reconstruction of Municipalities: Nuclear Evacuation and “Mobile Town”*) (n 786); Yokemoto, ‘不均等な復興とは何か (What Is Imbalanced Reconstruction?)’ (n 832).

<sup>1908</sup> Yamashita and Kainuma (n 890).

“temporarily”<sup>1909</sup> until the return to the community of origin becomes feasible and approved by the majority of residents.<sup>1910</sup> This collective return-in-waiting resettlement indeed presents many advantages for affected populations and municipalities. For example, relocated residents can receive the same municipal services as before such as sending children to same municipal schools as well as continue to rely on their social networks and mutual help system in reconstructing their lives. Affected municipalities are also able to survive as towns and retain their historical and cultural particularities and heritage.

The second alternative solution is called “half-return”, “half-resettlement”, or “in-between return and resettlement”<sup>1911</sup>. Some Fukushima evacuees who did not feel comfortable with either of the proposed solutions invented their own durable solutions. Also called “dual residency”,<sup>1912</sup> they resettled in other cities but returned to their towns of origin for work during the day by commuting every day. This allowed them to keep their social relationships or provide necessary care for ageing parents living in the original town while their children are safe from radiation exposure in the resettled town. These adaptive and creative solutions shall be fully supported by the competent authorities in order to find genuinely workable durable solutions for the affected individuals. Again, this can be achieved by ensuring the participation of stakeholders in the decision-making process of all policies especially in relation to durable solutions.

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<sup>1909</sup> The time frame of this collective relocation was expected to last around 30 to 40 years, taking into account the half-life of caesium137 (about 30 years) and the decommissioning of the F1NPP (40 years, according to government estimate).

<sup>1910</sup> Imai, *自治体再建—原発避難と「移動する村」* (*Reconstruction of Municipalities: Nuclear Evacuation and “Mobile Town”*) (n 786).

<sup>1911</sup> Fassert and Hasegawa (n 42).

<sup>1912</sup> Mosneaga (n 854).

### 3. Delimitation of Restricted Zone at 5 mSv/year

As a long-term protection measure, IAEA advises to delineate areas where human habitation is unwarranted due to a high level of radiological contamination and control the access.<sup>1913</sup> However, IAEA does not provide any specific dose levels for the implementation of this measure. This thesis proposes, based on the protection principles elaborated above, to set the threshold dose at 5 mSv/year, the secondary dose limit, for the delimitation of these areas (restricted zone). Once designated as restricted zone, the area shall be prohibited for human habitation and only allowed to be used for activities which would require little human presence (e.g. solar panels, wind farms, etc) where workers' entry and conduct should be strictly regulated, just like the regulation of the Radiation Controlled Areas (RCA). As mentioned earlier, former residents who wish to return to live in these restricted zones as an informed choice may be permitted to do so at their own risk or under certain conditions (e.g. age, medical and family situations of the residents, etc).

Decontamination of the contaminated territories is not recommended as a long-term protective action in this thesis. The experience from the Fukushima accident showed that it was proved rather ineffective in durably reducing doses, especially at lower doses.<sup>1914</sup> Ultimately, decontamination, what nuclear institutions often call “remediation”, is an action to move radioactive materials from one place to another, as one Fukushima evacuee simply put it “radiation transfer”, since radioactive materials do not disappear or get “cleansed” by decontamination. IAEA even alluded to this point by stating in its remediation guideline that

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<sup>1913</sup> IAEA and others, ‘Arrangements for the Termination of a Nuclear or Radiological Emergency’ (n 390).

<sup>1914</sup> Fassert and Hasegawa (n 42); Yokemoto, ‘不均等な復興とは何か (What Is Imbalanced Reconstruction?)’ (n 832).

decontamination might be unwarranted at an annual effective dose of less than 10 mSv.<sup>1915</sup> As such, administrative and financial efforts in the recovery phase shall focus on the relocation of the affected residents, the radiological protection of those who choose to remain and the facilitation of other durable solutions.

#### 4. Life-Time Medical Follow-Up and the Following Generations

Based on the principle of intergenerational protection set above, the thesis proposes to establish a life-long medical follow-up and support system not only for exposed victims but also for their descendants after nuclear disasters. The dose criteria should be set at an estimated effective dose of more than 1 mSv/year from external and internal exposures.

The scheme established for A-bomb survivors – *hibakusha* status – could be instructive here, not so much for the established eligibility criteria, but for the overall concept. Once recognised as exposed victims of a nuclear disaster using the above dose criterion, the person shall be provided with a health book or certificate which entitles her/him to free regular medical check-ups and medical care for life. When the person becomes ill or invalid, other types of assistance such as monthly allowance shall be administered. The aim of the follow-up is to detect and diagnose stochastic effects among the exposed early in order to provide effective treatments as well as to help them deal with psychological distress associated with radiation exposure. Most importantly, children, women, and persons with specific vulnerabilities shall be given special attention, especially thyroid cancer among children. The same or similar system of medical follow-up and assistance should be instituted for the following generations of exposed victims, the second generation and beyond.

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<sup>1915</sup> IAEA, 'Remediation Process for Areas Affected by Past Activities and Accidents' (n 502); But this reference dose disappeared in the latest version of remediation guideline, see IAEA and others, 'Remediation Strategy and Process for Areas Affected by Past Activities or Events' (IAEA 2022) GSG-15.

### **§3: Proposal of Adequate Nuclear Damage Compensation**

The compensation scheme for nuclear damage forms the other pillar of victim relief and protection in nuclear disasters. The main characteristic of nuclear damage is described by some scholars as: 1) unparalleled scale of damage, 2) continuity and longevity of damage, 3) total destruction of life from its foundation, and 4) unpredictability of damage.<sup>1916</sup> In the face of them, the current nuclear liability regime is grossly inadequate both in terms of the scope of liability and recognised damage.<sup>1917</sup> In fact, the nuclear liability regime is one of the most peculiar existing tort regimes in the world both in its origin and purpose. It was created first and foremost to facilitate civil nuclear energy development, rendering the activity financially securable (insurable) and commercially viable for private corporations. That meant to protect operators and the industry from potential massive liability claims and subsequent bankruptcies in case of accidents.<sup>1918</sup> It is no exaggeration to say that civil nuclear energy enterprise would not have simply existed today if it were not for this special tort regime.

In fact, the insurability of commercial nuclear activities was one of the primal concerns which led to the creation of a special liability regime, separated from the rest of ordinary tort regime under civil code. In reality, no insurance company is capable of covering the risk related to civil nuclear activities even today. This concern indeed formed the core specificities of the nuclear liability regime which include limited liability in amount and time, and the strict and exclusive liability of the operator. While the strict liability of the operator has certain merits for victims, the rest of the principles rather serves to protect the operator as well as the manufacturer, supplier, financier, and other actors of the industry. This was confirmed by IAEA itself which

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<sup>1916</sup> Kojima (n 920).

<sup>1917</sup> Currie (n 115); Dyke (n 115); Kiss, 'State Responsibility and Liability for Nuclear Damage' (n 115).

<sup>1918</sup> NEA/OECD, 'Liability and Compensation for Nuclear Damage - An International Overview' (Nuclear Energy Agency 1994).



explained that ‘[t]he limitation of the amount of his liability is clearly designed as an advantage for the operator, in order not to discourage nuclear-related activities’.<sup>1919</sup> As such, the current nuclear liability regime tends to ‘lead to the ruin of the victim’ by saving the nuclear industry.<sup>1920</sup>

In these circumstances, this final paragraph proposes some essential compensation principles and nuclear damages which shall be incorporated into the nuclear damage liability regime so as to provide adequate relief and protection, though not complete, to victims after nuclear disasters. First, it details some key compensation principles (A), followed by the scope of nuclear damage which is currently missing in the existing nuclear liability regime and is essential to properly address the plight of nuclear disaster victims (B). These proposals are mainly drawn from the Fukushima accident case study conducted in this thesis.

Meanwhile, this proposal does not deal with technical, practical, or financial aspects of the compensation: in other words, how to administer and finance the compensation system in accordance with the proposed principles and scope of damages. The prevention of bankruptcy or the survival of the operator or the nuclear industry is not the object of this thesis proposal. The primary objective of this proposal is how to provide adequate relief and protection to victims of nuclear disasters.

### **A. The Key Nuclear Liability Principles**

The core principles of the current international nuclear liability regime are composed of the following: strict liability, exclusive liability (legal channelling), compulsory financial security, limited liability in amount, and limited liability in time (statute of limitations).<sup>1921</sup>

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<sup>1919</sup> IAEA, ‘The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage — Explanatory Texts’ (n 1499) 12.

<sup>1920</sup> Currie (n 115) 85.

<sup>1921</sup> Source: Schwartz (n 340); NEA/OECD, ‘Responsabilité et réparation des dommages nucléaires - Une perspective internationale’ (n 338).

Apart from strict liability, these principles generally benefit the nuclear industry. The last two principles, limited liability in amount and time, largely undermine the right of victims to adequate reparation. Moreover, the principle of exclusive liability also prevents victims from fully exercising their right to claim damages while it ‘immuniz[es] the manufacturer and supplier of the nuclear facility’ by holding only the operator liable.<sup>1922</sup> Any actions to put a cap on liability constitute a violation of the polluter pays principle as well as a *de facto* protection measure for the tortfeasor in the neglect of victims.<sup>1923</sup> Accordingly, the thesis tries to rectify these flaws by proposing the following principles while retaining the principle of strict liability: unlimited liability in amount (1), unlimited liability in time (no statute of limitations) (2), the cancellation of exclusive liability (3), and liability for transboundary damage (4).

### 1. Unlimited Liability in Amount

The principle of limited liability of nuclear operators is said to have been established as the *quid pro quo* for the “benefits” to victims created by the principles of strict and exclusive liability imposed on a nuclear operator.<sup>1924</sup> The principle primarily shields the operator from paying compensation beyond the amount of imposed financial security, thus avoiding its potential bankruptcy and subsequently protecting its creditors and shareholders in case of an accident.<sup>1925</sup> This is the key principle which allowed the operator to have insurance coverage and the State to develop the civil nuclear programme in the first place. However, under this system, victims’ right to full compensation is compromised, ultimately leading to a situation where citizens will bear the cost of a nuclear accident caused by a private or public operator.<sup>1926</sup>

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<sup>1922</sup> Dyke (n 115) 34.

<sup>1923</sup> Currie (n 115).

<sup>1924</sup> Schwartz (n 340).

<sup>1925</sup> Some nuclear legal experts argue that the operator’s liquidation would not necessarily benefit or help the victims attain adequate compensation either. See NEA/OECD, ‘Responsabilité et réparation des dommages nucléaires - Une perspective internationale’ (n 338); Schwartz (n 340).

<sup>1926</sup> Oshima and Yokemoto (n 912).

As analysed earlier, the cost of a major accident would easily exceed the amount of financial security imposed on the operator. The financial security is currently capped at maximum 700 million euros by the international nuclear liability regime,<sup>1927</sup> while the cost of a major accident is estimated at 600 *billion* euros for the Fukushima accident,<sup>1928</sup> 760 *billion* euros by the French IRSN study,<sup>1929</sup> and over 5,000 *billion* euros by a German study.<sup>1930</sup> This notably prompted Sezin Topçu to conclude that ‘the notion of “responsibility” in the nuclear field operates above all as a discursive regime (in the sense of Michel Foucault), as a means of organising responsibility as well as irresponsibility’.<sup>1931</sup> In this context, the victims of a major nuclear accident will always risk not being fully compensated. According to Topçu, this “sacrifice” on the part of victims is pre-programmed, a constitutive element of the nuclear sector.<sup>1932</sup>

In fact, several countries have rejected the principle of limited liability on the ground that there is ‘no reason why victims should have their compensation rights so restricted’ when the nuclear industry has already attained maturity.<sup>1933</sup> Austria, Germany, Japan and Switzerland thus adopt the nuclear liability regime which prescribes unlimited liability of the operator. In reality, they prescribe the State intervention under certain conditions when the liability of the operator exceeds the amount of financial security, as it is the case with many other nuclear

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<sup>1927</sup> The 2004 Protocol to Paris Convention (cited above), Article 7(a).

<sup>1928</sup> JCER (n 343).

<sup>1929</sup> IRSN, ‘Examen de La Méthode d’analyse Coût-Bénéfice Pour La Sécurité’ (IRSN 2007) DSR No 157; Ludivine Pascucci-Cahen and Momal Patrick, ‘Massive Radiological Releases Profoundly Differ from Controlled Releases’ (Forum Eurosafe 2012, Brussels, 5 November 2012); both cited by Topçu, ‘Organiser l’irresponsabilité? La Gestion (Inter)Nationale Des Dégâts d’un Accident Nucléaire Comme Régime Discursif’ (n 315).

<sup>1930</sup> Hans-Jürgen Ewers and Klaus Rennings, ‘Economics of Nuclear Risks — A German Study’ in Olav Hohmeyer and Richard Ottinger (eds), *Social Costs of Energy: Present Status and Future Trends* (Springer-Verlag 1994) 157; cited by Currie (n 115).

<sup>1931</sup> Topçu, ‘Organiser l’irresponsabilité? La Gestion (Inter)Nationale Des Dégâts d’un Accident Nucléaire Comme Régime Discursif’ (n 315) 97–98.

<sup>1932</sup> Topçu, ‘Organiser l’irresponsabilité? La Gestion (Inter)Nationale Des Dégâts d’un Accident Nucléaire Comme Régime Discursif’ (n 315).

<sup>1933</sup> Schwartz (n 340) 59.

powers (e.g. France). As shown in the Fukushima accident case study, the Japanese government in effect created the Nuclear Damage Compensation Facilitation Corporation to finance the TEPCO compensation for the victims. In fact, the 1963 Vienna Convention, unlike the Paris Convention, never clearly prescribed a limitation on liability amount and the revised Vienna and Paris Conventions opened the door for unlimited liability.<sup>1934</sup>

In the face of an “almost limitless”<sup>1935</sup> scale of nuclear damage and in the absence of clear reciprocal acceptance of their potential “sacrifice” in case of a major accident, leaving the victims suffer without proper compensation is neither a responsible nor justifiable public policy. In view of this as well as keeping in line with the polluter pays principle, illimited liability of the operator shall be the norm in any nuclear liability regime. At the same time, both international and national nuclear liability regimes should also clearly prescribe the State intervention in cases where the compensation amount exceeds the financial security on the condition that the means for the payment are exhausted by the operator, for example, through legal liquidation that involves capital reduction and debt waiver where shareholders and creditors would also bear the cost.<sup>1936</sup> The establishment of the latter condition for the State intervention is crucial so that the operator – tortfeasor – would assume its full responsibility for the accident and would not end up escaping from it. This is, however, what happened after the Fukushima accident with the creation of the Nuclear Damage Compensation Facilitation Corporation where the TEPCO which is liable for the accident does not actually pay for compensation and the State which pays compensation is not held liable for the accident, thus blurring the notion of responsibility.<sup>1937</sup>

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<sup>1934</sup> Pelzer, ‘Learning the Hard Way: Did the Lessons Taught by the Chernobyl Nuclear Accident Contribute to Improving Nuclear Law’ (n 419).

<sup>1935</sup> Schwartz (n 340) 38.

<sup>1936</sup> Oshima and Yokemoto (n 912).

<sup>1937</sup> *ibid.*

The State intervention can be justified from the following three grounds. First, the State is generally considered bearing a responsibility arising from having developed, promoted, and authorised the civil nuclear enterprise in the country. The post-Fukushima laws such as the Nuclear Damage Compensation Facilitation Corporation Act and the Children Support Law indeed stated that the State had “the social responsibility that comes along with its having promoted a nuclear energy policy”.<sup>1938</sup> Secondly, the State also bears the responsibility as a regulator of nuclear activities. Finally, the State has a duty to protect and ensure the welfare of citizens especially at times of cataclysmic events such as large-scale floods and earthquakes. Nuclear disasters are one of those cataclysmic events which call for the State intervention.

## 2. Unlimited Liability in Time or “Just Time Limit”<sup>1939</sup>

Limited time liability is another condition imposed by insurance companies. Under the international nuclear liability regime, a statute of limitation was initially imposed as 10 years from the accident, which was extended to 30 years by the Protocols.<sup>1940</sup> According to a nuclear law specialist, “[n]either insurance companies nor nuclear operators can accept the prospect of remaining liable to pay compensation [...] for an indefinite or even an extended period of time after a nuclear accident”.<sup>1941</sup> However, this statement ignores the specific characteristics of radiation effects. They are indeed atypical in that damage might be latent for a long time and may not manifest itself until decades or generations later. One does not need to look further than the case of Hiroshima/Nagasaki A-bomb *hibakusha*: some survivors are still fighting at

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<sup>1938</sup> The Nuclear Damage Compensation Facilitation Corporation Act (2011), cited above, Article 2; The Act on Promotion of Support Measures for the Lives of Disaster Victims to Protect and Support Children and Other Residents Suffering Damage due to Tokyo Electric Power Company’s Nuclear Accident (2012), cited above, Article 3.

<sup>1939</sup> Currie (n 115) 93.

<sup>1940</sup> Both the 1997 Vienna Protocol and the 2004 Paris Protocol extended a statute of limitations to 30 years as regards loss of life and personal injury while for other damages, 10-year-limitation remains.

<sup>1941</sup> Schwartz (n 340) 41; Also see NEA/OECD, ‘Responsabilité et réparation des dommages nucléaires - Une perspective internationale’ (n 338).

court for compensation over health injuries 77 years after the A-bomb attack. In view of this, there should be no time limit to claim damage from the date of a nuclear disaster. It is essential that claims can be brought when the damage is manifested (i.e. cancer and other radiation-related illness) and that any limit on time should run from the date it becomes known to the claimant.<sup>1942</sup>

After the Fukushima nuclear accident, the Japanese government has indeed enacted the Act on Special Cases for Extinctive Prescription on Nuclear Damage<sup>1943</sup> in 2013 to extend the statute of limitations for nuclear damage arising from the accident and replace the expression “from the time of the tortious act” with “from the time at which the damage occurred”, thus removing the statute of limitations which starts from the date of the accident. According to the new law, a claim can be instituted within 10 years (instead of 3 years) from the date when he/she took knowledge of the damage, and within 20 years from the *inception* of damage (instead of the date of the accident).<sup>1944</sup>

### 3. No Exclusive Liability: ‘All Responsible Parties Should Bear Liability’<sup>1945</sup>

Under the principle of exclusive liability, all liability claims are “channelled” through the operator. This principle specifically benefits the nuclear industry as a whole including the manufacturers, the suppliers, and the carriers, who are spared from negotiating costly insurance

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<sup>1942</sup> Currie (n 115).

<sup>1943</sup> A short form of ‘the Act Concerning Measures to Achieve Prompt and Assured Compensation for Nuclear Damage Arising from the Nuclear Plant Accident following the Great East Japan Earthquake and Exceptions to the Extinctive Prescription, etc. of the Right to Claim Compensation for Nuclear Damage’ (No 97 of 11 December 2013). It is unofficial translation of 東日本大震災における原子力発電所の事故により生じた原子力損害に係る早期かつ確実な賠償を実現するための措置及び当該原子力損害に係る賠償請求権の消滅時効等の特例に関する法律 by NEA/OECD in Nuclear Law Bulletin No. 94, Volume 2014/2.

<sup>1944</sup> Under the Japanese nuclear liability law, a statute of limitations is imposed in accordance with the ordinary tort law provision from Civil Code (Article 724). Under the Civil Code, the right to claim damages expires when a claimant does not bring action within 3 years from the date when he/she acquired knowledge of the damage and of the person liable (“discovery rule”). The right will also be extinguished when 20 years has passed from the time of the tortious act.

<sup>1945</sup> Currie (n 115) 93.

premiums for their operations. IAEA explains that it also benefits the victims of a nuclear accident ‘since it relieves them of the burden of proving the liability of parties other than the operator’.<sup>1946</sup> But what it actually does to the victims is to slash their right to claim compensation from other actors who may have committed a fault resulting in an accident, and thus reduce the legitimate amount of compensation that they shall receive. If relieving the victims of burden of proof is the only advantage, it is of little benefit since claimant lawyers can easily decide whether it would be worth the burden.<sup>1947</sup>

Austria presents an interesting example where its nuclear liability regime removed, to a great extent, the principle of legal channelling. Considering the international nuclear liability regime ‘highly unsatisfactory’,<sup>1948</sup> the country is not party to either Convention and has developed its own liability regime which ‘stands in sharp contrast to the basic principles of international nuclear law’.<sup>1949</sup> In effect, the 1999 Federal Law on Civil Liability for Damages caused by Radioactivity<sup>1950</sup> prescribes that nuclear damage claims can be brought not only against the operator of a plant or the carrier of nuclear material under this law, but also against other entities and persons including the insurer under other laws such as the general provisions of tort law and state liability law.<sup>1951</sup> Though with certain restrictions, suppliers or maintenance companies to a nuclear plant can also be held liable for nuclear damage under this Law. Interestingly, the Austrian government says it advocates the incorporation of these key

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<sup>1946</sup> IAEA, ‘The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage — Explanatory Texts’ (n 1499) 11.

<sup>1947</sup> Currie (n 115).

<sup>1948</sup> Austrian Ministry of Climate Action, Environment, Energy, Mobility, Innovation and Technology <<https://www.bmk.gv.at/en/topics/climate-environment/nuclear-coordination/nuclear-liability.html>> consulted 17 October 2022

<sup>1949</sup> Monika Hinteregger, ‘The New Austrian Act on Third Party Liability for Nuclear Damage’ [1998] Nuclear Law Bulletin No. 62 (NEA/OECD) 27, 195.

<sup>1950</sup> Bundesgesetz über die zivilrechtliche Haftung für Schäden durch Radioaktivität [AtomHG 1999] Bundesgesetzblatt Teil I [BGB1 I] No. 170/1998 (Austria); Unofficial English translation available in NEA/OECD, ‘Austria - Federal Act on Civil Liability for Damage Caused by Radioactivity (Atomic Liability Act 1999 - AtomHG 1999)’ (1999) 63 Nuclear Law Bulletin Supplement.

<sup>1951</sup> Hinteregger (n 1949).

provisions in the international nuclear liability regimes, ‘yet has hardly found any allies in this endeavour’.<sup>1952</sup>

Liability for a nuclear accident should be borne by all the parties responsible, potentially including the state regulatory agency. The right of nuclear disaster victims to claim damage should be equal to that of the victims of other industrial accidents in accordance with the equality under the law.

#### 4. Liability for Transboundary Damage

As illustrated by the Chernobyl accident, nuclear disasters often cause damage not only within the territory of the accident State and its immediate neighbours but also in countries far beyond its borders. Radioactive fallout from the crippled Chernobyl reactors indeed reached all over Europe, as far as 2,500 km in the UK where 8,900 farms were placed under restriction for sale and movement of their livestock.<sup>1953</sup> Despite this fact, the nuclear liability regime, both international and national, had long been reluctant to address the issue of damage incurred to the territory beyond the national jurisdiction of the nuclear installation State. This deficiency may well amount to a breach of international obligations of the State in some cases as well as the polluter pays principle. Initially formulated in the 1941 *Trail Smelter Case*, the responsibility of States ‘to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of areas beyond the limits of national jurisdiction’ has been established as customary international law.<sup>1954</sup> This principle has been repeatedly affirmed by the judgement of international jurisdictions, notably

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<sup>1952</sup> Austrian Ministry of Climate Action, Environment, Energy, Mobility, Innovation and Technology (n 1948)

<sup>1953</sup> Fairlie and Sumner (n 8).

<sup>1954</sup> Principle 21 of the 1972 Stockholm Declaration; Principle 2 of the 1992 Rio Declaration



of the ICJ in the Advisory Opinion on the *Legality of the Threat or Use of Nuclear Weapons*<sup>1955</sup> and the case of *Gabčíkovo-Nagymaros Project*<sup>1956</sup>. These jurisprudences implicate that States have an obligation to take necessary measures to prevent or minimise transboundary harm through exercising due diligence.<sup>1957</sup> States also become responsible for transboundary damage at least when it results from a failure of this due diligence and possibly from accidents.<sup>1958</sup>

According to the 2001 ILC's Draft Articles on State responsibility, the conduct of a private person or entity 'which is empowered by the law of that State to exercise elements of the governmental authority'<sup>1959</sup> or 'on the instructions of, or under the direction or control of, that State in carrying out the conduct'<sup>1960</sup> shall be considered 'an act of the State under international law [...] even if it exceeds its authority or contravenes instructions'.<sup>1961</sup> These activities typically include the nuclear industry, the space industry, and some public transportation industry.<sup>1962</sup> As such, a nuclear accident caused by the negligence of a private operator may constitute 'an act of the State' and the State may therefore be held liable for transboundary damage caused by the accident under certain conditions.

The 1997 Vienna Protocol and the 2004 Paris Protocol revising the respective Conventions of the 1960s opened doors for addressing the issue of transboundary damage, but

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<sup>1955</sup> *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Rep 1996; The court recognised '[t]he existence of the general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or of areas beyond national control is now part of the corpus of international law relating to the environment' (p 29).

<sup>1956</sup> The court repeated the statement made above in the 1996 Advisory Opinion (n 177) in the judgment concerning the *Gabčíkovo-Nagymaros Project (Hungary v. Slovakia)* (Judgment) [1997] ICJ Rep 1997

<sup>1957</sup> Kiss, 'State Responsibility and Liability for Nuclear Damage' (n 115); Boyle and Redgwell (n 1505).

<sup>1958</sup> Kiss, 'State Responsibility and Liability for Nuclear Damage' (n 115). However, Boyle and Redgwell (ibid) consider that state practices have not sufficiently supported the state responsibility for transboundary damage from accidental release as was observed in the case of Chernobyl accident.

<sup>1959</sup> ILC, 'Draft Articles on Responsibility of States for Internationally Wrongful Acts' (2001) (A/56/10) Report of the International Law Commission: Fifty-third session para 76, Art 5 and 7.

<sup>1960</sup> ILC, 'Report of the International Law Commission: Fifty-Third Session' (UN International Law Commission 2001) UN Doc A/56/10 Article 8.

<sup>1961</sup> ibid Article 7.

<sup>1962</sup> Hanqin (n 6).

with important loopholes. The Vienna Protocol is the only instrument which clearly affirms the coverage of nuclear damage ‘wherever suffered’<sup>1963</sup> for the first time, thus removing the geographical scope of nuclear liability. However, it also leaves a significant discretionary power to the accident State to decide excluding damage suffered in other countries if these countries are not Parties to the Convention but have a nuclear installation in their territories and do not afford equivalent reciprocal benefits. On the other hand, nuclear damage suffered in non-Contracting States without nuclear installation must not be excluded from its liability. The Paris Protocol has similar provisions but contains more conditions for recognising transboundary damage. For example, it does not cover damage suffered in the territory of the nuclear installation states that are not parties to either Convention and its nuclear liability legislation does not provide ‘equivalent reciprocal benefits’ and is not based on principles identical to those of the Paris Convention.<sup>1964</sup>

The fact that the state responsibility for transboundary harm in the event of a nuclear accident has not been clearly established under international law pushed some non-nuclear countries to argue that the use of nuclear energy should be made conditional upon the establishment of an adequate compensation system for both in-country and transboundary damage.<sup>1965</sup>

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<sup>1963</sup> Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage (cited above), Article IA.

<sup>1964</sup> Ironically, the country which may be excluded from the coverage of transboundary damage prescribed in the Paris Protocol is Austria. As mentioned earlier, Austria is a nuclear installation country, non-Party to either of the Conventions. The provisions of its own liability regime afford more protection to victims than those established in international liability instruments (e.g., unlimited liability, no legal channelling, no exclusive jurisdiction, etc.). But precisely because of these more protective principles, the country risks being excluded from the application of transboundary liability obligation prescribed in the Paris Convention. See Pelzer, ‘Learning the Hard Way: Did the Lessons Taught by the Chernobyl Nuclear Accident Contribute to Improving Nuclear Law’ (n 419) footnote 158.

<sup>1965</sup> IAEA, ‘The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage — Explanatory Texts’ (n 1499) 28.

## B. The Key Nuclear Damage

Another aspect of the nuclear liability regime which hinders the victims from getting adequate compensation is the limited scope of recognised damage. International nuclear liability instruments initially recognised only the following three damages: loss of life, any personal injury, and damage to property.<sup>1966</sup> For other damage, it simply relegated each State Party to define as they fit. The revised Conventions enlarged the scope by adding economic loss, environmental remedy costs, loss of income due to environmental impairment (e.g. tourism), costs of preventive measures, and other economic loss.<sup>1967</sup> But this extension is conditioned by the phrase, ‘to the extent determined by the law of the competent court’,<sup>1968</sup> in both Protocols, meaning that it is up to each State Party to decide whether to incorporate them or not.

Most critically, the current international nuclear liability regime ignores major damages that are symptomatic to nuclear disasters. From the experience of the Fukushima nuclear accident, the thesis identifies these neglected damages as follows: psychological distress related to radiation exposure (1), evacuation cost and emotional distress related to evacuation (2), repatriation and resettlement cost (3), loss of hometown (4), medical monitoring cost (5), and damage to the entire ecosystem (ecological damage) (6).<sup>1969</sup> For an adequate compensation, these damages, or equivalent of them, shall be clearly incorporated into any nuclear liability regimes.

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<sup>1966</sup> Vienna Convention on civil liability for nuclear damage (cited above) Article 1.1(k)(i); Convention on Third Party Liability in the Field of Nuclear Energy (Paris Convention) (cited above), Article 3(a)

<sup>1967</sup> The 1997 Vienna Protocol (cited above) Article 2.2; The 2004 Paris Protocol (cited above) Article 1(a)(vii).

<sup>1968</sup> *ibid*

<sup>1969</sup> The idea for this proposal derived from Professor Awaji’s analysis: Takehisa Awaji, ‘福島原発事故の損害賠償の法理をどう考えるか (How to Understand the Jurisprudence of Damage Compensation for Fukushima Nuclear Accident)’ (2013) 43 (2) 環境と公害 (Research on Environmental Disruption) 4; Awaji, ‘「包括的生活利益」の侵害と損害 (Violation of “Comprehensive Life Benefit” and Its Damage)’ (n 935).

## 1. Psychological Distress Related to Radiation Exposure (Prejudice of Anxiety)

This is probably one of the most neglected compensation items in many nuclear liability instruments. While physical injury from radiation exposure attracts more attention, emotional harm from the exposure also constitutes ‘a true injury that does not manifest itself physically’ and a major consequence of a radiation disaster.<sup>1970</sup> It is a permanent anxiety about the risk of developing illness as a result of radiation exposure at any time in one’s life, which is reinforced each time one undergoes medical examinations. This is the prejudice incurred to exposed individuals before being diagnosed with a radiation-induced illness. Because of the latency of the radiation effect, the person can suffer from this fear for decades or all his/her life.

From the interviews conducted among the victims of the Fukushima nuclear accident, many mothers expressed their strong anxiety, not only about their own future health, but more about that of their children. In the Fukushima compensation scheme, the prejudice due to ‘fear and unease about exposure to radiation’ was only recognised for the remaining residents in out-of-zone contaminated areas with meagre compensation amount. The court rulings on Fukushima victim lawsuits recognised this prejudice among other victims (e.g. evacuees from evacuation zones, etc), thus somewhat rectifying the flaw of the government compensation guideline, though the low appreciation of the prejudice in amount remained a problem.<sup>1971</sup>

Here, the general attitude of the nuclear regulation authorities toward the anxiety related to exposure plays a significant role in underestimating and underappreciating the gravity of such prejudice. After both Chernobyl and Fukushima accidents, both international and national nuclear regulatory authorities identified the ‘psychological problems due to unwarranted fear of radiation’ or simply “radiophobia” as the major problem causing the ill

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<sup>1970</sup> Dyke (n 115) 43.

<sup>1971</sup> Nagano (n 1640).

health and diseases among the affected population, thus denying the potential causal link between radiation exposure and health effects. According to these authorities, emotional distress associated with exposure is caused by a “false” idea about low-dose radiation risk and thus needs to be dealt with by “risk communication” which basically consists of “enlightening” and “reassuring” the population with “correct” information on radiation risk to remove such unwarranted fear.<sup>1972</sup> This particular interpretation of the prejudice is endemic among the nuclear experts and institutions, which subsequently undermines the proper reparation of such prejudice.

Meanwhile, in the domain of toxic torts, this prejudice is well established in the case-laws of national courts such as in France and the US. In the US, these claims have been filed as the negligent infliction of emotional distress (NIED).<sup>1973</sup> Initially, it was instituted for the emotional distress which stems from the actual diagnosis of disease in toxic tort cases, but many courts have since abolished this strict physical impact rule. Most US courts require the following elements as criteria for the NIED recognition, though not exhaustive: 1) proof of being exposed to toxic substance, 2) the claimant’s knowledge of having an increased risk of developing a disease, 3) the fear must be reasonable, and 4) the fear must be causally related to the exposure. In the French jurisprudence, the established conditions include: 1) proof of being exposed to harmful substance, 2) mental disorders substantiated by testimonies and medical certificates or being exposed to “significant quantities” of the substance,<sup>1974</sup> and 3) the

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<sup>1972</sup> Shirabe, Hasegawa and Fassert (n 829).; This type of communication is generally called “deficit model”, the term coined by Brian Wynne, ‘Knowledges in context’ (1997) 16(1) *Science, Technology and Human Values* 111. According to this model, the problem in communication lies with the knowledge deficit of the information receivers (e.g. the public). The role of experts, in this case, is to reduce this deficit by providing information and “enlighten” the public. Under the model, information receivers are considered unknowledgeable or, in some cases, naïve, possessed by false ideas and inadequate and exaggerated information. There is no place for taking into account the knowledge already possessed by citizens themselves.

<sup>1973</sup> Dyke (n 115).

<sup>1974</sup> The recent decision of the Council of State (28 March 2022) for former military personnel exposed to asbestos replaced the medical certificate condition with the degree of exposure. See CE 2e et 7e ch.-réunies, 28 Mar 2022, n° 453378

knowledge of being at high risk of developing a serious pathology. Yet, this conditionality attached to prejudice recognition has been criticised by some legal specialists as too restrictive, who argued for adopting the concept of “the prejudice of exposure”<sup>1975</sup>, in other words, “the presumption of prejudice of anxiety” for all those who can present a proof of being exposed to a highly toxic substance.<sup>1976</sup>

Considering that anxiety is felt in a different manner to each individual and the latency and harmfulness of radiation effects are a well-known fact, the thesis proposes that the prejudice of anxiety shall be recognised as “the prejudice of exposure” incurred to all individuals who were exposed to estimated effective dose of more than 1 mSv/year as a result of the disaster. The estimation of exposed doses shall be certified at the emergency medical screening or medical follow-up. This has already been instituted by the former Soviet government after the Chernobyl accident where the system of compensation was designed on the principle of ‘compensating exposure to risk rather than actual injury’.<sup>1977</sup> Most importantly, this prejudice shall be compensated in the form of monthly allowance like the *hibakusha* status allowance, not the lump sum payment, after obtaining the certificate or the health book of a radiation disaster victim at the initial medical screening following a disaster. The allowance shall be paid regardless of their mobility status – evacuees, returnees, resettlers, or stayers – and until the diagnosis of an illness.

## 2. Evacuation Costs and Emotional Distress related to Evacuation

Today, the prejudice related to evacuation is not listed as nuclear damage in the international nuclear liability regime. However, as IAEA affirms, precautionary evacuation of

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<sup>1975</sup> The term was coined by Asquinazi-Bailleux (n 1774).

<sup>1976</sup> *ibid*; Mireille Bacache, ‘Préjudice d’anxiété - Le préjudice d’anxiété lié à l’amiante : une victoire en demi-teinte’ (2019) 19 *La Semaine Juridique Edition Générale* 508.

<sup>1977</sup> UNDP and UNICEF (n 10) para 2.16.

the population before a radiation release is the most effective protective action in nuclear emergencies, which should be undertaken without hesitation by the concerned authorities. In this respect, the prejudice associated with evacuation, both material and moral damages, shall be the standard compensation item in any nuclear liability regime.

In this thesis, precautionary evacuation of residents is recommended from the EPZ (within 30 km radius), which shall be facilitated and financially assisted by competent authorities. On the other hand, spontaneous evacuation of residents outside the EPZ shall be entitled to compensation so that the evacuees can recover the costs once the emergency situation is either resolved or stabilised. The operator or competent authorities should set up a special committee to assess the eligibility and promptly process the damage claim of these evacuees according to the criteria proposed above: the distance of 100 km from the site or the radiological situation exceeding the dose limit of 1 mSv/year. Also, evacuees from the EPZ should also be able to bring claims in case of any irregularities and other contentious situations.

The claims related to evacuation usually involve transport, housing, property, unemployment, absence of schooling, medical and other related expenditures, and psychological damage related to evacuation. Among them, emotional distress related to evacuation is a particularly important item to be recognised in nuclear damage compensation schemes. In the Fukushima compensation system, it was qualified as mental pain caused by ‘the disruption of a normal day-to-day life over an extended period of time’.<sup>1978</sup> The court rulings on Fukushima litigation cases recognised mental anguish related to evacuation as

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<sup>1978</sup> Dispute Reconciliation Committee for Nuclear Damage Compensation, ‘東京電力株式会社福島第一、第二原子力発電所事故による原子力損害の範囲の判定等に関する中間指針 (Interim Guidelines on Determination of the Scope of Nuclear Damage resulting from the Accident at the Tokyo Electric Power Company Fukushima Daiichi and Daini Nuclear Power Plants)’ (n 944) 18.

follows: 1) having faced a real threat from serious radiation injury, 2) having suddenly lost their habitual lives, and 3) being constrained to a prolonged evacuation life with future uncertainties.

The reparation for this prejudice shall thus be instituted for all evacuees from both precautionary and spontaneous evacuations and separately from the prejudice of exposure.

### 3. Repatriation and Resettlement Costs

Just like the evacuation cost, repatriation and resettlement related costs should also be clearly identified as the standard nuclear damage. This thesis proposes that repatriation and resettlement of evacuees be fully taken charge of by competent authorities. If that is not the case, affected individuals must be able to receive compensation for repatriation and resettlement costs and its related damages. Also, evacuees who returned or resettled with government assistance should also be able to file complaints in case of any irregularities and other contentious issues.

The claims related to repatriation usually involve transport, house repair, decontamination of house and the surrounding environment, property damage, radiation protection measures (e.g. food testing, Geiger counters), unemployment, absence of schooling, medical and other related expenditures. The resettlement related claims shall include transport, housing, property damage, unemployment, absence of schooling, medical and other related expenditures.

In the Fukushima accident, the repatriation of evacuees was not only assisted but rather promoted by numerous financial incentives while the resettlement, especially that of “out-of-zone” evacuees, was either partially assisted or not assisted at all. In such a case, resettlers shall be able to claim damage incurred by this biased policy and recover the cost via compensation scheme or at court.



#### 4. Loss of Hometown and Community

This is a new concept of nuclear damage which was established by the court rulings from Fukushima victim litigations in Japan. Large nuclear accidents often result in creating so-called “no-go zones” or restricted zones where human dwelling is prohibited due to high levels of radiological contamination. The residents who are relocated from these zones lose not only their homes but also their hometown. The “loss of hometown”, in the sense of *being uprooted*, was initially conceptualised by Masafumi Yokemoto who argued that nuclear disaster victims lose not only personal properties in a nuclear disaster, but also social relationships, local culture and traditions built over generations, which had been maintained through shared history, climate, economic activities, religious events, local festivals, and the surrounding ecosystem.<sup>1979</sup> For those who were born and spent all their lives in a rural town as those affected by the Fukushima accident, losing the hometown is equivalent to losing the whole life of a person.<sup>1980</sup>

The destruction and sudden loss of these community-life benefits caused a significant distress and a deep sense of uprootedness among the affected, especially the elderly.<sup>1981</sup> The Fukushima litigation cases, especially the Sendai High Court ruling of the Hama-dori action in March 2020, established that the “hometown” represents the whole of a particular natural and social environment which forms the foundation of inhabitants’ life in the community, and judged that its loss had caused not only psychological damage but also tangible and intangible prejudices to the plaintiffs.<sup>1982</sup> The same ruling also described that this loss encompassed the

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<sup>1979</sup> Yokemoto, *原発賠償を問う—曖昧な責任、翻弄される避難者 (Questioning the Nuclear Compensation: Obscured Liability and Tossed Around Evacuees)* (n 919); Yokemoto, ‘避難者の「ふるさとの喪失」は償われているか (Is the Evacuees’ “Loss of Hometown” Compensated?)’ (n 947); Yokemoto, ‘「ふるさとの喪失」被害とその回復措置 (The Damage Related to “Loss of Hometown” and Its Remedy Measures)’ (n 988) and others.

<sup>1980</sup> Yamashita, Ichimura and Sato (n 787).

<sup>1981</sup> Awaji, ‘「包括的生活利益」の侵害と損害 (Violation of “Comprehensive Life Benefit” and Its Damage)’ (n 935); Kanbe (n 1659).

<sup>1982</sup> Awaji, ‘10 Years since the Accident: Infringed Interests and Harm from Hometown Loss and Transformation as Seen in the Appellate Court Decisions in the Lawsuits Seeking Compensation for the Fukushima Accident’ (n 1644) 10.

transformation or the change of “hometown”, their habitual communal life, due to the accident and the subsequent evacuation of residents.

Accordingly, the psychological prejudice related to “loss of hometown or community” shall be recognised as a core nuclear damage in the context of large nuclear accidents in order to provide some relief to these victims.

## 5. Medical Follow-Up Cost

Radiation victims who were exposed to doses more than 1 mSv/year shall be entitled to recover anticipated costs of long-term diagnostic testing and consultations necessary to detect latent diseases that may develop as a result of the exposure. While the current nuclear liability regime compensates for actual injuries induced by radiation exposure, it does not cover the cost of medical follow-up which precedes their apparition. As emphasised by the principle of intergenerational protection, medical monitoring should be instituted for the entire life of a radiation victim as well as for their next generations. If this is not already provided by the competent authorities as a protection scheme, exposed victims shall be able to claim its lump sum cost through a reparation procedure.

## 6. Damage to Ecosystem

Liability for environmental damage is a concept ‘still evolving and in need of further development’.<sup>1983</sup> Currently, there exist no international legally binding agreements dealing specifically with the question except some soft-law and regional instruments.<sup>1984</sup> The

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<sup>1983</sup> Sands and Peel (n 109) 735.

<sup>1984</sup> These exceptions include the ILC, ‘Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising Out of Hazardous Activities’ (2006) (A/61/10) Report of the International Law Commission: Fifty-eighth session para 66, Principle 2(b).; Council of Europe’s Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment (Lugano Convention) of 21 June 1993, which did not enter into force due to insufficient ratifications; Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage; cited by Durand-Poudret (n 202).

“environment” here means ‘natural resources, both abiotic and biotic, such as air, water, soil, fauna and flora on the interaction between the same factors, and the characteristic aspects of the landscape’<sup>1985</sup> and therefore does not include people and their property. There are generally two ways to conceptualise such a liability: the first is to make a reparation for pure damage to the environment (pure environmental damage), and the second is to compensate the costs of reinstatement or the loss of profits induced by the impaired environment (consequential environmental damage). The difficulty in the first concept is to value such degradation in monetary terms. As the ILC pronounced, ‘environmental damage will often extend beyond that which can be readily quantified in terms of clean-up costs or property devaluation’, which is ‘no less real and compensable than damage to property, though it may be difficult to quantify’.<sup>1986</sup> Some scholars argued that pure damage to the environment might ultimately be incapable of calculation in economic terms but ‘it may have a non-economic value requiring restoration to the state prior to the damage occurring’.<sup>1987</sup>

Nuclear disasters inflict irreversible and enduring damage not only onto human lives but to the environment for generations to come. In the revised international nuclear liability conventions, “the costs of measures of reinstatement of impaired environment” and “loss of income deriving from an economic interest in any use or enjoyment of the environment” were adopted for the first time as nuclear damage on certain conditions.<sup>1988</sup> They both belong to the second concept of the liability – reparation for consequential environmental damage – which can be recovered in pecuniary terms. This has been implemented after the Fukushima nuclear

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<sup>1985</sup> The definition is from the ILC, ‘Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising Out of Hazardous Activities’ (n 1984) Principle 2(b).

<sup>1986</sup> ILC, ‘Report of the International Law Commission: Fifty-Third Session’ (n 1960) 252 (Article 36, commentary (15)).

<sup>1987</sup> Michael Bowman, ‘Biodiversity, Intrinsic Value, and the Definition and Valuation of Environmental Harm’ in Alan Boyle and Michael Bowman (eds), *Environmental Damage in International and Comparative Law: Problems of Definition and Valuation* (Oxford University Press 2002) 42; cited by Philippe Sands, *Principles of International Environmental Law* (University Press 2003).

<sup>1988</sup> The 1997 Protocol to Vienna Convention and the 2004 Protocol to Paris Convention

accident through the compensation scheme established by the Reconciliation Committee. Though it represents a significant step forward in accounting the environment as part of nuclear damage, what to do with pure damage done to the environment by radiological contamination remains unsolved. Essentially, the reparation intended under the revised Conventions is not targeting the environment *per se* but the infringed rights of individual victims as a result of environmental damage.<sup>1989</sup>

As for reinstating the damaged environment, the case study from the Fukushima accident showed rather a grim picture. Even with a pharaonic decontamination programme which would cost the State the equivalent of 160 billion euros,<sup>1990</sup> restoring the environment to the state before the accident seemed almost illusory. In this case, how can one properly value pure damage done to the environment by nuclear disasters? In addition to calculating the restoration costs, contingent and behavioural use valuations are some of the alternative methods which have been developed over the years to account for pure environmental damage.

Contingent valuation is a method of economic valuation where the value of the impaired environment is measured by public opinion surveys which ask the price that an individual would be willing to pay for environmental goods such as clean air or water or the preservation of endangered species.<sup>1991</sup> In contrast, behavioural use valuation is an attempt to indirectly measure the use value of the environment by observing the change in human behaviour as the result of environmental impairment. It usually uses either the hedonic model or travel cost valuation. The first model uses the change in the pricing of the housing market to measure the value of environmental impairment, while the latter calculates the travel costs that

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<sup>1989</sup> Durand-Poudret (n 202).

<sup>1990</sup> JCER (n 343).

<sup>1991</sup> See James Peck, 'Measuring Justice For Nature: Issues in Evaluating and Litigating Natural Resources Damages' (1999) 14 *Journal of Land Use & Environmental Law* 275; Sands (n 1987).

an individual would spend to access and enjoy an environmental resource. These methods have both advantages and shortcomings, but it is still far from gauging the intrinsic value of the environment, its existence independent of human satisfactions.<sup>1992</sup>

Considering the severity, duration, and geographical extent, environmental damage incurred by nuclear disasters may well constitute an international crime as suggested by the ILC's 1976's Draft Articles on State Responsibility<sup>1993</sup> and thus the international criminal law approach could also be useful in conceptualising such damage in addition to the regular tort law framework in the future.

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<sup>1992</sup> Peck (n 1991).

<sup>1993</sup> ILC, 'Draft Articles on State Responsibility' (n 1780) Article 19. However, as explained above, this article disappears in the 2001 updated version of the Draft Articles.

## Conclusion of Chapter 2

The nuclear disaster protection norms based on human rights and environmental laws, focusing especially on the right to a safe and healthy environment and precautionary principle, provide a completely different framework of protection, in terms of philosophy, form and scope, from the one established by the international nuclear regime. Nuclear regulatory institutions have set many conditions, notably dose criteria (e.g. reference dose), cost-benefit analysis, ALARA, and operational criteria (e.g. facility conditions), to trigger protective actions in nuclear disasters. The thesis' proposal removed these high bars and simplified the action by adopting the public annual dose limit of 1 mSv/year for all circumstances with a secondary dose limit of 5 mSv/year which was specifically set for the return of evacuees.

Also, the proposal placed heavier responsibility on the part of the state authorities, urging them to take more proactive, effective and precautionary actions to counter radiation threat for the population in large nuclear disasters. As confirmed by numerous case-laws of international human rights instances, States have a positive obligation under international law to safeguard the right to life – an inalienable right of individuals – in nuclear disasters, which shall come before national and economic interests.

However, this has already been the standard practice in many disasters, particularly against natural hazards. For example, before the arrival of a mega-typhoon Nanmadol in September 2022, the Japanese government issued an evacuation order for up to nine million people from Kyushu, Shikoku and Chugoku regions as a precautionary protection measure.<sup>1994</sup> Therefore, what this thesis is proposing is neither new nor unfeasible for many governments in

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<sup>1994</sup> BBC News, 'Japan Storm: Nine Million People Told to Evacuate as Super Typhoon Nanmadol Hits' *British Broadcasting Corporation* (19 September 2022) <<https://www.bbc.com/news/world-asia-62952942>> accessed 26 April 2023.

theory. As in all disaster rescue, relief, and rehabilitation operations, the protection of human rights should be the basis of all actions and policies related to off-site protection in nuclear disasters before State's political and economic interests, let alone those of the nuclear industry.

However, the nuclear disaster management framework has not changed since before and after the 2011 Fukushima nuclear accident. While the Chernobyl accident in the late 1980s became the catalyst for establishing new or reinforced international instruments in nuclear safety and disaster response, the Fukushima accident did not produce the same effect. Instead, things seem to move toward the reaffirmation of the current nuclear disaster framework despite the criticisms made by the UN human rights institutions and the Japanese civil society. For the moment, it looks as though the Fukushima experience will be repeated in the next large nuclear disaster. What should be done to change the status quo will be the topic of future research works but the thesis tries to address some of these issues in the general conclusion below.





## Conclusion of Title II

This final Title of the thesis reviewed national precedents related to the protection of nuclear disaster victims from past major catastrophes and proposed new protection principles and norms incorporating these lessons learnt as well as drawing from international normative regimes analysed in the earlier chapters. The review of national experiences complemented the review of international normative regimes in filling the protection deficiency and gap created by the nuclear regime's disaster response model. While the international legal review filled in the flaws of human rights protection, national precedents added the missing protection measures such as special safeguard for children and pregnant women, intergenerational healthcare coverage, and the dose limit (i.e. ICRP's "reference level") of 1 mSv/year for evacuation and relocation.

The experiences from past disasters offered a mixed and ambivalent picture of nuclear disaster protection. Ironically, the example from the world's third economy with advanced technology presented a protection model of strict minimum, extremely restrictive and much less protective than the model installed by the former Soviet Union 37 years ago, at least on the policy level. The Japanese model of protection indeed made an unsettling precedent for the future nuclear disaster handling of other nuclear power nations. As a matter of fact, following the Fukushima example, the French authorities fixed the reference level for nuclear emergency as 20 mSv/year and codified it for the first time in the Public Health Code in 2018.<sup>1995</sup>

The experiences from past disasters demonstrated that large nuclear accidents quickly surpass technical and financial capacities of any government. Ultimately, nuclear activities

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<sup>1995</sup> Article R 1333-93 du code de la santé publique, modifié par Décret no 2018-434 du 4 juin 2018 ; The text states that the reference level of exposure of a person to radioactive substances resulting from a radiological emergency is set at 20 mSv effective dose in the year following the end of the radiological emergency. Translation from French by R. Hasegawa.

repose in a cynical standpoint where those involved know too well that in the event of a large accident, things could easily get out of human control and its damage to human lives and the environment could become “almost limitless”<sup>1996</sup> and irreparable. This inevitably questions the viability and the ethics of nuclear energy enterprise itself though it is not the topic of this thesis.

In this context, adequate protection of persons in nuclear disasters may finally not be so much about the protection norms but much to do with political will and a democratisation of decision-making about nuclear accident management and the use of such an energy itself.

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<sup>1996</sup> Schwartz (n 340) 38.; Julia A. Schwartz was the Head of Legal Affairs of the OECD Nuclear Energy Agency when she wrote the article.

# General Conclusion

This doctoral research all started by questioning the validity of the nuclear disaster response and protection model vis-à-vis the principles of international human rights and humanitarian laws in the wake of the 2011 Fukushima accident in Japan, the most severe nuclear accident to have occurred in the world after the 1986 Chernobyl accident. It was startling, to say the least, to observe the country known for its expertise and effectiveness in dealing with natural disasters to become completely overwhelmed by the nuclear disaster and utterly lost as to what to do for protecting its nationals against its effects. Moreover, the protection of nuclear disaster victims was quickly separated from the rest of disaster relief framework set up for the 2011 Great East Japan triple disaster and governed by a series of arbitrary and ad-hoc decisions made by nuclear regulatory authorities, without the consent of the Diet, which were inconsistent with certain provisions of radiation regulation legislation in effect. These decisions were then defended by the authorities by referring to the norms established by international nuclear institutions such as ICRP, UNSCEAR and IAEA.

The Fukushima disaster response implemented by the nuclear authorities was very different from the regular disaster response applied in natural and other human-made disasters. It was unique in a sense that it essentially disregarded human rights protection unlike the rest of international normative frameworks which adopt the rights-based approach in assisting disaster victims. Instead, the protection of nuclear disaster victims was guided by the principle of justification and optimisation which gave precedence to collective (or State) interests over individual rights and balanced the protection of human lives and health against economic interests and nuclear activity benefits. Under the nuclear framework, the protection of individuals is hinged upon the State's political, economic, energetic, and national security

priorities. Ultimately, nuclear disaster is a peculiar human-made environmental disaster which implicates the State who then intervenes in every aspect of its response.

The legal scrutiny conducted by this doctoral study in effect found that the nuclear regulatory framework was largely in dissonance with or in violation of certain principles of international human rights and environmental laws. The study elucidated that there are other international normative frameworks which do apply in case of nuclear disasters, namely forced migration, human rights, DRR and environmental law frameworks established for the protection of IDPs, environmentally displaced persons and disaster victims. Among these frameworks, the human rights principles directly collide with those of the nuclear regime, thus creating a normative conflict concerning the protection of nuclear disaster victims. As a result of these findings, this thesis argues for the establishment of a new or revised nuclear disaster protection framework in accordance with human rights and environmental law principles in order to address the specific needs of nuclear disaster victims.

But how does the international community let such a disaster response framework be established in the first place? Why does the nuclear normative regime remain dominant and unchallenged in the international community or the UN system? The answer to these questions is found in the peculiar status of atomic energy constructed after the World War II.

#### *Atomic Energy: An Existential Question?*

The history of nuclear energy all began with atomic bombs. A German philosopher, Günther Anders, once described that atomic bombs symbolised the third and final stage of the industrial revolution where we were constantly working on the production of our own extinction.<sup>1997</sup> According to Anders, atomic energy ultimately poses the question of

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<sup>1997</sup> Anders (n 1).; According to Anders, the first industrial revolution is characterised by “the production of machines by way of machines” and the second revolution by “the production of ‘needs’ for production”.

“metaphysical nature”.<sup>1998</sup> The ICJ seemed to affirm such an assertion by stating that nuclear weapons had ‘the potential to destroy all civilization and the entire ecosystem of the planet’.<sup>1999</sup> Under such threat, human existence or survival as a species is in suspension. Though climate change has since replaced all-out nuclear war as the greatest existential threat to humanity,<sup>2000</sup> the recent Russian invasion of Ukraine reminds us that the threat posed by atomic energy, both from “peaceful” installations and nuclear weapons, is always intact.

However, this precarious human condition under nuclear threat had long been obscured by the ideology of nuclear deterrence and the tamed image of “peaceful” uses for the benefit of humankind. Most recently, the energy is rebranded as a key energy source for transition between fossil fuel and renewable energy, contributing to the fight against climate change. The reality is that the basic nuclear technology used today has not changed since the discovery of nuclear fission more than 80 years ago, requiring uranium (limited resource) as fuel and producing highly toxic wastes at the end of the cycle. These wastes remain toxic for thousands or even millions of years on earth depending on radionuclide.<sup>2001</sup> The accumulated quantity of these wastes around the globe remains unknown but it is estimated that several million cubic meters of nuclear waste (not even including uranium mining and processing wastes) has been produced in Europe alone.<sup>2002</sup> And no country in the world has yet established a final disposal site in operation for spent nuclear fuel – high-level waste – after 60 years of civil nuclear programme.<sup>2003</sup> The nuclear energy use indeed invokes the question of intergenerational equity and sustainable environment. Meanwhile, severe melt-down accidents have occurred at much

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<sup>1998</sup> *ibid* 20.

<sup>1999</sup> *Legality of the Threat or Use of Nuclear Weapons* (cited above), para 35

<sup>2000</sup> Samuel P Huntington, *The Clash of Civilizations and the Remaking of World Order* (Simon & Schuster 1996).

<sup>2001</sup> For example, the byproduct of spent fuel, uranium-234, has a half-life of 245,000 years and neptunium-237 a half-life of 2 million years.

<sup>2002</sup> WNWR project, ‘The World Nuclear Waste Report 2019 - Focus Europe’ (2019) <<https://worldnuclearwastereport.org/>> accessed 6 November 2022.

<sup>2003</sup> *ibid*. Finland is the only country which is currently constructing a permanent storage facility (deep repository site) for the high-level nuclear waste, expected to be operational in 2024-25.

greater frequency in the world than previously estimated by nuclear regulation authorities.<sup>2004</sup> This seems to support Charles Perrow's "normal accidents" theory according to which major accidents are the unavoidable and inherent part of nuclear power plants, a typical high-risk system of interactive complexity and tight coupling which is bound to accidents.<sup>2005</sup>

### *Legal Ambiguity on the Use of Atomic Energy*

Yet international law has been ambivalent on the use of atomic energy. Asked on the legality of nuclear weapons, the ICJ could not provide a definitive answer.<sup>2006</sup> The court did not find any customary or international law which clearly prohibits or authorises the use of nuclear weapons. The judges were split on certain questions and could not find legal consensus.<sup>2007</sup> Nevertheless, its recognition of the weapon's capacity to cause "a catastrophe to the environment", "untold human suffering" and "damage to generations to come" suggests some potential infringement of public international laws.<sup>2008</sup> On the other hand, the Human Rights Committee (CCPR) had clearly pronounced that nuclear weapons were 'among the greatest threats to the right to life which confront mankind' and 'should be prohibited and recognised as crimes against humanity' (General Comment No. 14),<sup>2009</sup> only to modify the expression to a less definitive and more ambiguous one in the latest revision (General Comment

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<sup>2004</sup> By taking into account the 2011 Fukushima disaster in the calculation, the overall probability of another severe accident in the world within the next decade rose as high as 70% according to one study. See Thomas Rose and Trevor Sweeting, 'How Safe Is Nuclear Power? A Statistical Study Suggests Less than Expected' (2016) 72(2) *Bulletin of the Atomic Scientists* 112.

<sup>2005</sup> Perrow (n 561).

<sup>2006</sup> *Legality of the Threat or Use of Nuclear Weapons* (cited above)

<sup>2007</sup> The judges were split in half (seven to seven) on the following question: '[i]t follows from the above-mentioned requirements that the threat or use of nuclear weapons would generally be contrary to the rules of international law applicable in armed conflict, and in particular the principles and rules of humanitarian law; However, in view of the current state of international law, and of the elements of fact at its disposal, the Court cannot conclude definitively whether the threat or use of nuclear weapons would be lawful or unlawful in an extreme circumstance of self-defence, in which the very survival of a State would be at stake' (para 105(2)E)

<sup>2008</sup> *Legality of the Threat or Use of Nuclear Weapons* (cited above) para 35-36

<sup>2009</sup> CCPR, 'General Comment No.14: Article 6 (Right to Life); Nuclear Weapons and the Right to Life' (n 1191) para 6.

No. 36) that such weapons were ‘incompatible with respect for the right to life and *may* amount to a crime under international law’.<sup>2010</sup>

As regards the “peaceful” use, the 1968 Treaty on the Non-Proliferation of Nuclear Weapons (NTP) guarantees “the *inalienable* right” of the State parties, especially of non-nuclear weapons states, to develop and use nuclear energy for peaceful purposes in exchange for renouncing the development and possession of nuclear weapons.<sup>2011</sup> The treaty was ratified by a total of 191 States, which makes it the world’s most important disarmament agreement to date.<sup>2012</sup> As Gabrielle Hecht pointed out,<sup>2013</sup> no other scientific or technological activity has ever been prescribed as an “inalienable right” of States in international treaties, which accords atomic energy a special status under international law. After all, nuclear energy is the only energy source on earth bestowed a dedicated UN agency for its promotion.

Nuclear accidents, on the other hand, implicate the principles of other international laws, notably international human rights, environmental, and criminal laws. Indeed, the ILC’s Draft Articles on State Responsibility once qualified that the State’s failure to safeguard and preserve the human environment, such as failing to prevent ‘massive pollution of the atmosphere or of the seas’, would constitute an international crime.<sup>2014</sup> Civil nuclear activity itself is not an inherently “wrongful act” but it may become an “internationally wrongful act”

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<sup>2010</sup> UN Human Rights Committee, ‘General Comment No.36 (2018) on Article 6 of the International Covenant on Civil and Political Rights, on the Right to Life’ (HR Committee, 30 October 2018) UN Doc CCPR/ C/GC/36 para 66. (emphasis added)

<sup>2011</sup> The Treaty on the Non-Proliferation of Nuclear Weapons (adopted 1 July 1968, entered into force 5 March 1970) 729 UNTS 161 (NPT), art IV.1. (emphasis added)

<sup>2012</sup> UN website (<https://www.un.org/disarmament/wmd/nuclear/npt/>), consulted 26 October 2022

<sup>2013</sup> Gabrielle Hecht, *Being Nuclear: Africans and the Global Uranium Trade* (MIT Press 2012).

<sup>2014</sup> ILC, ‘Draft Articles on State Responsibility’ (n 1780) Article 19. The other international crimes were defined as aggression, colonial domination, slavery, genocide and apartheid. However, this article disappears in the 2001 revision of Draft Articles.

if the operation of the plant causes harm to the persons, property, or environment of a neighbouring State and beyond under certain circumstances.<sup>2015</sup>

### *Nuclear Exceptionalism and “Sovereignty”*

In this legal ambivalence, the international nuclear community has established an exclusive authority in all matters related to atomic energy in both national and international contexts with its own doctrine, legal instruments, rules, lexicon, experts, and operational culture as if it were operating in an autonomous enclave within the State structure or the international community, separate from the civil (common) law or the rest of international law frameworks, deterring intervention from all other actors. This “nuclear exceptionalism”<sup>2016</sup> is rarely scrutinised or questioned by the international community and legal scholars and is hardly opened for public debates or put under the media’s spotlight except in events of large nuclear disasters.

In effect, this exceptionalism of the nuclear regime alludes to Carl Schmitt’s notion of “sovereign” analysed by Giorgio Agamben, according to which it is ‘at the same time outside and inside the juridical order’ since sovereign is bestowed the power by the juridical order to decide a state of exception, in other words, to suspend the order’s validity.<sup>2017</sup> Interestingly, nuclear technology is sometimes described as “*sovereign* technology” controlled by “*sovereign* industries” which repose in a power structure built within the government, becoming so important to the nation’s economy and security over time that it would ultimately be beyond political oversight and even exercise a leverage on various government’s decisions including

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<sup>2015</sup> Dyke (n 115).

<sup>2016</sup> Hecht (n 2013). Hecht described *nuclear exceptionalism* as situations where the uniqueness of nuclear things is emphasised and claimed in political, technological, cultural, institutional and scientific spheres, so as to be differentiated from other things.

<sup>2017</sup> Giorgio Agamben, *Homo Sacer: Sovereign Power and Bare Life* (Stanford University Press 1998) 15.



its foreign policy.<sup>2018</sup> This nuclear sovereignty could ultimately defy democratic institutions. As a revered political scientist Robert A. Dahl once argued, atomic energy operates in a regime of “guardianship”, largely escaping the control of the democratic process.<sup>2019</sup> This is particularly the case with States which attribute a great importance to its national nuclear programme or are heavily dependent on nuclear energy for its power generation (e.g. France).

The disaster management of nuclear accidents, especially the protection of population from disaster effects, is also monopolised by this sovereign power of the nuclear regime or, more precisely, a particular form of such power, the “biopolitics” conceptualised by Michel Foucault.<sup>2020</sup> In his genealogical analysis of state power and governmentality, Foucault argues that sovereign power has been transformed over the centuries from the control exercised over territory to that over population, placing the biological life of individuals at the core of such exercise.<sup>2021</sup> This “biopower”, the control of the population as a mass and the politicisation of biological life and health of citizens exercised by the nuclear regulatory authority was particularly visible in the Fukushima accident management, especially its unilateral decision to raise reference dose, *de facto* permissible dose, for the population 20 times the public dose limit without any intervention from the Diet and in contradiction with some provisions of radiation regulation laws.

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<sup>2018</sup> Alain-Marc Rieu, ‘Thinking after Fukushima. Epistemic Shift in Social Sciences’ (2013) 11 *Asia Europe Journal* 65. Emphasis added.

<sup>2019</sup> Dahl (n 1845). According to Dahl, “guardianship” means that a small minority of qualified persons (often political elites) govern the rest, by reason of their superior knowledge and virtue, exercising the delegated authority (e.g., technocracy). But often this “superior virtue” lacks in guardians and the “delegated authority” becomes “alienated power” from its citizens.

<sup>2020</sup> Michel Foucault, *The History of Sexuality, Vol. 1: An Introduction* (Reissue edition, Vintage 1990); The original publication in French, Michel Foucault, *La Volonté de Savoir* (Gallimard 1976); A similar analysis was made by Majia Holmer Nadesan, ‘Nuclear Governmentality: Governing Nuclear Security and Radiation Risk in Post-Fukushima Japan’ (2019) 50 *Security Dialogue* 512.

<sup>2021</sup> Michel Foucault, *Security, Territory, Population: Lectures at the College De France, 1977-1978* (Michel Senellart ed, Graham Burchell tr, Picador USA 2009).

According to Foucault, biopower is not exercised in a judicial form but effected through a series of *dispositif* – interventions and regulatory controls – which ‘incite, reinforce, control, monitor, optimize, and organize’ the population, rather than subjugating, restraining, and destroying them by the Schmitt-style “sovereign” power and laws, influencing births, mortality, the level of health, and life expectancy of its citizens.<sup>2022</sup> Post-disaster management by the nuclear authorities strongly suggests the exercise of this biopower, determining the “acceptable” level of radiation exposure for the population, in other words, the “acceptable” risk and long-term damage on their health, influencing the level of health and life expectancy of the entire population, on behalf of the State. In nuclear disasters, nuclear authorities become the sovereign power within a sovereign State, exercising the biopolitics of the population and determining the future of the “society”<sup>2023</sup> after the disaster, which include the future of nuclear industry and national energy strategy.

This nuclear “biopolitics” is ultimately the system which allows the sacrifice of individuals rights, most often those of minorities and vulnerable groups, for the sake of the majority and the “common good”.<sup>2024</sup> Under this “sacrificial system”, ‘the benefit of some is produced and maintained at the expense of others’ lives, health, properties, dignities, hopes and so on’, and these sacrifices are ‘often either made invisible or praised as “noble sacrifice” for the sake of common interests such as that of the State, the population, the society or the economy’.<sup>2025</sup> These nuclear sacrifices are encoded not only in the principle of justification and optimisation but also in the system of differentiated exposure situations and the concept of

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<sup>2022</sup> Foucault, *The History of Sexuality, Vol. 1* (n 2020) 138; The original publication in French, Foucault, *La Volonté de Savoir* (n 2020).

<sup>2023</sup> According to Foucault, biopolitics represents the transformation of governmentality from the defence of “sovereign” to the defence of “society”. See Michel Foucault, *Society Must Be Defended: Lectures at the College De France, 1975-76* (David Macey tr, Reprint édition, Picador 2003).

<sup>2024</sup> Shrader-Frechette (n 303).

<sup>2025</sup> Takahashi, 犠牲のシステム 福島 沖縄 (*Sacrificial System: Fukushima and Okinawa*) (n 302) 42.

reference dose which would essentially mean accepting excess mortality among certain segments of the population without their consent.<sup>2026</sup>

This nuclear sovereignty has always resisted international intervention and control over safety issues including disaster response. Nuclear energy programme, due to its sheer scale of political and financial stakes, its symbol of mastery in advanced science and technology, and the sensitivity of its materials for national security, has always been the State affair and “a national matter of major sensibility”.<sup>2027</sup> Any international supervision on nuclear safety is thus viewed as interference with domestic affairs or infringement of national sovereignty. Consequently, regulating nuclear safety and emergencies has been a matter of a “national responsibility”<sup>2028</sup> where the State gets to decide, supposedly within the limit of its national legislation, ‘which level of safety is safe enough’.<sup>2029</sup>

*Legal Challenges to the Nuclear “Sovereign” Regime: International Human Rights and Environmental Laws*

How could the international community then ensure the protection of affected persons in nuclear disasters in the face of this nuclear “sovereign” regime? One way is to recall State obligations under international human rights conventions. International human rights law is indeed one branch of international law, largely regarded as “self-contained regime”,<sup>2030</sup> which directly collide with the norms of the nuclear regime and its principles can largely fill in the

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<sup>2026</sup> Shrader-Frechette (n 303).

<sup>2027</sup> Pelzer, ‘Learning the Hard Way: Did the Lessons Taught by the Chernobyl Nuclear Accident Contribute to Improving Nuclear Law’ (n 419) 87.

<sup>2028</sup> IAEA and others, ‘Fundamental Safety Principles’ (n 129) para 1.2.; Nuclear Safety Directive (2009/71/Euratom), cited above, (8).

<sup>2029</sup> Pelzer, ‘Safer Nuclear Energy Through a Higher Degree of Internationalisation? International Involvement Versus National Sovereignty’ (n 370) 48.

<sup>2030</sup> Simma and Pulkowski (n 66).

protection deficiency of the nuclear normative regime. As a matter of fact, all nuclear powers<sup>2031</sup> are State Parties to both the ICCPR and the ICESCR (except the UAE and China<sup>2032</sup>) and to at least five human rights conventions. Moreover, half of these nations are also Parties to the ECHR. And these obligations apply in disaster situations including nuclear accidents,<sup>2033</sup> which was clearly confirmed by the ECtHR case-laws<sup>2034</sup> and the UN Special Rapporteur's reports on Fukushima.

Secondly, the lack of robust safety enforcement measures and adequate liability system of the nuclear regime would call for the application of the principles of general international law, notably the principle of State responsibility. Though nuclear regime is recognised as *lex specialis*, another “self-contained regime” as the human rights regime, the application of the general principle of state responsibility may not be precluded in view of the inadequacy of these secondary rules. Under customary international law, States have a duty to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States. As Chernobyl and Fukushima examples amply demonstrated, severe accidents can cause extensive and durable damage not only within the limits of national jurisdiction but also to areas beyond its national borders. As the nuclear law specialist, Nibert Pelzer, also admits, the risk of transboundary nuclear damage ‘not only justifies international involvement in determining the concept of nuclear safety but, moreover, principles of public international law oblige the

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<sup>2031</sup> The countries with either or both military and civil nuclear powers. They are Argentina, Armenia, Belarus, Belgium, Brazil, Bulgaria, Canada, China, Czech, Finland, France, Germany, Hungary, India, Iran, Israel, Japan, Mexico, Netherland, North Korea (DPRK), Pakistan, Romania, Russia, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, UAE, UK, Ukraine, and US.

<sup>2032</sup> China is Party only to the ICESCR and not the ICCPR.

<sup>2033</sup> Prieur (n 255); Kälin, ‘The Human Rights Dimension of Natural or Human-Made Disasters Focus’ (n 255).; Article 4 of the ICCPR and Article 15 of the ECHR allow States to temporarily suspend human rights application in time of public emergency which threatens “the life of the nation” excluding certain rights, notably the right to life. Kälin estimates that disasters do not generally create such conditions that call for derogations.

<sup>2034</sup> The most notable cases are *Öneriyildiz v. Turkey* (2004) and *Budayeva and others v. Russia* (2008) as cited above.

installation State to accept the international concept provided it prevents or significantly mitigates transboundary damage better than its own national approach to nuclear safety'.<sup>2035</sup>

*The Need for the “Denuclearisation” and a Stronger International Control of Nuclear Disaster Protection*

Yet the monopoly of the nuclear regime in dealing with nuclear disasters and creating the dominant narrative of such disasters has neither changed nor seriously put into question even after the Fukushima nuclear accident.<sup>2036</sup> But how many more devastating nuclear disasters does the world tolerate before finally questioning and reviewing the nuclear regime hegemony which poses potential catastrophic threats to all humanity and the environment? Today, the world has 440 power-generation reactors operating in 33 countries,<sup>2037</sup> unknown number of research and military nuclear facilities, unknown number of nuclear waste facilities, and estimated 12,705 nuclear weapons stockpiled around the globe.<sup>2038</sup> Amidst them, the international community and people around the globe are suspended on the “default” mode, largely disarmed against nuclear disasters which may cause “untold human suffering”, “a catastrophe for the environment”, and “damage to generations to come”<sup>2039</sup> in the absence of a robust and effective international protection system.

The international community has developed a comprehensive legal and normative framework to deal with situations of war since the end of World War II, which is anchored in

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<sup>2035</sup> Pelzer, ‘Safer Nuclear Energy Through a Higher Degree of Internationalisation? International Involvement Versus National Sovereignty’ (n 370) 49.

<sup>2036</sup> Christine Fassert and Tatiana Kasperski, ‘Risques nucléaires : à quand la fin du monopole des experts internationaux ?’ (*Journal de l’énergie*, 7 May 2021) <<https://journaldelenergie.com/nucleaire/risques-nucleaires-monopole-experts-internationaux/>> accessed 27 October 2022.

<sup>2037</sup> Source: the site of World Nuclear Association, found at <https://world-nuclear.org/information-library/current-and-future-generation/plans-for-new-reactors-worldwide.aspx>, consulted 28 September 2022

<sup>2038</sup> The number of weapons is an estimation from nine states - the US, Russia, the UK, France, China, India, Pakistan, Israel and North Korea (DPRK). Source: Stockholm International Peace Research Institute, *SIPRI Yearbook 2022: Armaments, Disarmament and International Security* (Oxford University Press 2022).

<sup>2039</sup> ICJ, *Legality of the Threat or Use of Nuclear Weapons* para 35-36.

the 1949 Geneva Conventions and the 1951 Refugee Convention. It is especially intended to protect persons in the countries whose governments are either unwilling or incapable of protecting their own nationals. These international regimes indeed play the role of filling the vacuum of national protection in times of particular circumstances. In nuclear disasters, due to its strategic importance and its proximity of the energy to the State power, the same type of protection vacuum is prone to occur. Moreover, the emergency response of large nuclear accidents does resemble that of armed conflicts often involving ‘a large military operation’<sup>2040</sup> in order to contain the damage and the disaster effects are quite comparable to those of wars where countries can ‘lose a part of their territory’.<sup>2041</sup> This was certainly the case with Chernobyl and Fukushima nuclear accidents.

In this context, the world needs a robust international control mechanism to regulate the state conducts in nuclear disasters. As a first step, this thesis proposes to “denuclearise” disaster response and protection, removing it from the nuclear paradigm and reintegrating it to the humanitarian and forced migration framework which normally applied in disasters, which respects, protects, and ensures human rights of the affected. This “denuclearisation” or reintegration to the rights-based framework especially ensures the protection of vulnerable groups and minorities in disaster response, recognising the different vulnerabilities of respective individuals in the face of disaster effects, the notion which is utterly ignored by the nuclear normative regime. Secondly, the “denuclearisation” process also involves incorporating new protection concepts into the conventional forced migration and disaster protection framework such as precautionary principle and “the right to displacement” in order to address the specific

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<sup>2040</sup> UNGA, ‘Report of the World Commission on Environment and Development: “Our Common Future” (Brundtland Report)’ (n 449) 156.

<sup>2041</sup> Pelzer, ‘The Present State of Research Carried Out by the English-Speaking Section of the Centre for Studies and Research’ (n 17) 270. Also see ICRP, ‘Application of the Commission’s Recommendations to the Protection of People Living in Long-Term Contaminated Areas after a Nuclear Accident or a Radiation Emergency. ICRP Publication 111.’ (n 18) 30.

plight of nuclear disaster victims: namely, the situations of “voluntary” evacuation and involuntary immobility.

However, the reality is that the rights-based normative proposal made by this thesis would most certainly be received with dismay, suspicion, and disapproval by some policymakers, nuclear regulatory institutions and experts of nuclear power countries. They would likely argue that it is financially and logistically impossible to apply such protection norms. But why is that so? How one can justify that the rights-based disaster management cannot be applied in nuclear disasters while it does apply to all other disasters? Is it justifiable to provide only a partial or relative protection to the population in case of nuclear accidents in the absence of their reciprocal acceptance of risk or potential “sacrifices” from the outset? As demonstrated by Chernobyl and Fukushima accidents, nuclear disaster effects largely escape technological and financial capacities of any government. This means that the “sacrifices” on the part of nationals (and potentially the citizens of neighbouring countries) are pre-programmed, making integral part of the nuclear disaster response framework.<sup>2042</sup> Under the circumstance, some nations neighbouring the nuclear installation states once demanded that the legality of civil nuclear energy use should be made conditional upon an adequate system of compensation for transboundary damage.<sup>2043</sup> In the same vein, citizens of nuclear installation states should be able to either accept these potential sacrifices for the sake of the interests and benefits of nuclear activities, or to make these activities conditional upon the establishment of a robust human rights-based protection system in case of accidents, or to have the option to

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<sup>2042</sup> Takahashi, 犠牲のシステム 福島 沖縄 (*Sacrificial System: Fukushima and Okinawa*) (n 302). Takahashi talks about the sacrificial system in the nuclear energy activity as a whole, not just in nuclear disaster management.

<sup>2043</sup> IAEA, ‘The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage — Explanatory Texts’ (n 1499) 28.

refuse such risks all together. Yet this choice has rarely been offered in the major democracies that have developed nuclear industries.



# Bibliography

**For French readers:** This thesis adopts the referencing style OSCOLA (Oxford Standard for Citation of Legal Authorities). Accordingly, there are certain differences with the French legal referencing style. For example, the title of journals is expressed in non-*italics* while the title of books is in *italics*. Moreover, the volume/issue number of a journal appears before the title of the journal and the page number of the concerned article is referenced after the title of without the abbreviation of page, “p.”. Moreover, the page number of a book chapter does not appear.

E.g., **Bloch L**, « Le “désamiantage” du préjudice d’anxiété par la chambre sociale », *Responsabilité civile et assurances* n° 12, 2019, pp.7-11”

In OSCOLA style, it will be referenced as:

**Bloch L**, ‘Le «désamiantage» du préjudice d’anxiété par la chambre sociale’ (2019) 12 *Responsabilité civile et assurances* 7

The translation of the title of Japanese sources was done by the author of this thesis unless otherwise specified.

## Books

**Ackerman G, Grandazzi G and Lemarchand F (eds)**, *Les silences de Tchernobyl: L’avenir contaminé* (Frontières, Autrement 2006)

**Agamben G**, *Homo Sacer: Sovereign Power and Bare Life* (Stanford University Press 1998)

**Anders G**, *L’Obsolescence de l’homme: Tome II: Sur la destruction de la vie à l’époque de la troisième révolution industrielle* (original text in German published in 2002, Christophe David tr, éditions Fario 2011)

**Anderson MR and Boyle A (eds)**, *Human Rights Approaches to Environmental Protection* (New ed, Clarendon Press 1998)

**Anton DK and Shelton DL**, *Environmental Protection and Human Rights* (Cambridge University Press 2011)

**Arima T**, 原発・正力・CIA —機密文書で読む昭和裏面史 (*Nuclear Energy-Shoriki-CIA: Behind-the-Scene History of Showa Era Read Through Classified Documents*) (Tokyo, Shinchosha 2008)

——, 原発と原爆「日・米・英」核武装の暗闘 (*Nuclear Energy and Atomic Bomb: Japan-US-UK Secret Feud of Nuclear Armament*) (Bunshun-shinsho 2012)

**Arnold R and Quéniwet NNR (eds)**, *International Humanitarian Law and Human Rights Law: Towards a New Merger in International Law* (Martinus Nijhoff Publishers 2008)

**Asahi Newspaper Special Reporting Unit**, プロメテウスの罠—明かされなかった福島原発事故の真実 (*The Trap of Prometheus: the Non-Disclosed Facts About the Fukushima Nuclear Accident*) (Gakken 2012)

**Awaji T, Yoshimura R and Yokemoto M (eds)**, 福島原発事故 賠償の研究 (*Fukushima Nuclear Accident: the Compensation Study*) (Nihon Hyoron Sha 2015)

**Awaji T and others (eds)**, 原発事故被害回復の法と政策 (*Laws and Policies on Reparations for Nuclear Accident Damage*) (Nihon Hyoron Sha 2018)

**Barthe Y**, *Les Retombées du passé: Le paradoxe de la victime* (Seuil 2017)

**Beck U**, *Risk Society: Towards a New Modernity* (1992 English translation, SAGE Publications 1986)

**Betts A**, *Forced Migration and Global Politics* (Wiley-Blackwell 2009)

**Beurier, JP**, *Droit international de l'environnement* (5e édition, Pedone 2017)

**Billet Ph, Naim-Gesbert, E and others (eds)**, *Les grands arrêts du droit de l'environnement* (Daloz 2017)

**Birnie PW, Boyle AE and Redgwell C**, *International Law and The Environment* (Oxford University Press 2009)

**Blaikie P and others**, *At Risk: Natural Hazards, People Vulnerability and Disasters* (2nd edn, Routledge 2003)

**Boudia S and Jas N**, *Powerless Science: Science and Politics in a Toxic World*, vol 2 (Berghahn Books 2014)

**Boyle A and Bowman M (eds)**, *Environmental Damage in International and Comparative Law: Problems of Definition and Valuation* (Oxford University Press 2002)

**Boyle A and Redgwell C**, *Birnie, Boyle, and Redgwell's International Law and the Environment* (Fourth Edition, Oxford University Press 2021)

**Brown K**, *Manual for Survival: A Chernobyl Guide to the Future* (Allen Lane 2019)

**Chateauraynaud F and Torny D**, *Les sombres précurseurs. Une sociologie pragmatique de l'alerte et du risque* (Editions de l'École des hautes études en sciences sociales 2000)

**Costello C, Foster M and McAdam J (eds)**, *The Oxford Handbook of International Refugee Law* (Oxford University Press 2021)

**Cournil C and Colard-Fabregoule C (eds)**, *Changement climatiques et défis du droit* (Bruylant 2010)

**Cournil C and Vlassopoulos C (eds)**, *Mobilité humaine et environnement : Du global au local* (Éditions Quæ 2020)

**Dahl RA**, *Controlling Nuclear Weapons: Democracy Versus Guardianship* (Syracuse University Press 1985)

**Déjeant-Pons M and Pallemmaerts M (eds)**, *Human Rights and The Environment* (Council of Europe Publishing 2002)

**De Sadeleer N**, *Les principes du pollueur-payeur, de prévention et de précaution* (Bruylant 1999)

———, *Environnement et marché intérieur* (Éditions de l'Université de Bruxelles 2010)

———, *Environmental Principles: From Political Slogans to Legal Rules* (2<sup>nd</sup> edn, OUP Oxford 2020)

**Deng FM and others**, *Sovereignty as Responsibility: Conflict Management in Africa* (Brookings Institute Press 1996)

**Dudley W and Engelhard K**, *Immanuel Kant: Key Concepts* (Taylor & Francis Group 2014)

- Dworkin R**, *Taking Rights Seriously* (Harvard University Press 1977)
- , *Is Democracy Possible Here?: Principles for a New Political Debate* (Princeton University Press 2008)
- Faist T and Schade J (eds)**, *Disentangling Migration and Climate Change: Methodologies, Political Discourses and Human Rights* (Springer 2013)
- Ferrier M**, *Fukushima: Récit d'un désastre* (Gallimard 2013)
- Fiddian-Qasmiyeh E and others**, *Oxford Handbook of Refugees and Forced Migration Studies* (Oxford University Press 2014)
- Fisher E, Lange B and Scotford E**, *Environmental Law: Text, Cases & Materials* (Second Edition, Oxford University Press 2019)
- Foucault M**, *La volonté de savoir* (Gallimard 1976)
- , *The History of Sexuality, Vol. 1: An Introduction* (Reissue edition, Vintage 1990)
- , *Society Must Be Defended: Lectures at the College De France, 1975-76* (David Macey tr, Reprint édition, Picador 2003)
- , *Security, Territory, Population: Lectures at the College De France, 1977-1978* (Michel Senellart ed, Graham Burchell tr, Picador USA 2009)
- Funabashi Y**, *カウントダウン・メルトダウン (Countdown to Meltdown)*, vol 2 (Bungei-Shunshu 2012)
- Garner BA (ed)**, *Black's Law Dictionary* (5th edition, Thomson Reuters 2016)
- Guinchard S and Debard T (eds)**, *Lexique des termes juridiques (édition 2018/2019)* (26e édition, Dalloz 2018)
- Hague Academy of International Law (ed)**, *The Hazards Arising Out of the Peaceful Use of Nuclear Energy* (Martinus Nijhoff Publishers 1993)
- Hammar T and others (eds)**, *International Migration, Immobility and Development: Multidisciplinary Perspectives* (Routledge 1997)
- Hanqin X**, *Transboundary Damage in International Law* (University Press 2003)

**Hautereau-Boutonnet M (ed)**, *Après-Fukushima, Regards juridiques Franco-Japonais* (Presses Universitaires d'Aix-Marseille 2014)

**Hecht G**, *The Radiance of France: Nuclear Power and National Identity after World War II* (MIT Press 1998)

——, *Being Nuclear: Africans and the Global Uranium Trade* (MIT Press 2012)

**Huntington SP**, *The Clash of Civilizations and the Remaking of World Order* (Simon & Schuster 1996)

**Ichinose M and others (eds)**, *低線量被爆のモラル (The Moral of Low-Dose Exposure)* (Kawade-Shobou-Shinsha 2012)

**Imai A**, *自治体再建—原発避難と「移動する村」(Reconstruction of Municipalities: Nuclear Evacuation and “Mobile Town”)* (Chikuma Shinsho 2014)

**Imanaka T (ed)**, *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998)

**Institute of Disaster Area Revitalization (Kansai Gakuin University), JCN and SAFRAN (eds)**, *原発避難白書 (White Paper on Nuclear Evacuation)* (Jinbun Shoin 2015)

**Ito N, Tabe C and Nakagawa S**, *被爆者はなぜ原爆症認定を求めるのか (Why Do Hibakusha Demand ‘Atomic Bomb Disease Certification’?)* (Iwanami Shoten 2006)

**Jaczko GB**, *Confessions of a Rogue Nuclear Regulator* (Simon & Schuster 2020)

**Japan Association for Environmental Law and Policy (ed)**, *原発事故の環境法への影響 (The Implication of Nuclear Accidents to Environmental Law)* (Shoji Homu 2013)

**JFBA**, *原発事故・損害賠償マニュアル (Nuclear Accident Damage Compensation Manual)* (Nihon Kajo Shuppan 2011)

**Kälin W**, *Guiding Principles on Internal Displacement: Annotations* (The American Society of International Law 2008)

**Kawasaki K and others (eds)**, *避難の権利、それぞれの選択 (The Right to Evacuation, Respective Choices)* (Iwanami Booklet No 839, Iwanami-Shoten 2012)

- Kimura AH**, *Radiation Brain Moms and Citizen Scientists* (Duke University Press 2016)
- Kiss A and Shelton D**, *International Environmental Law* (3<sup>rd</sup> edn, Brill 2004)
- , *Guide to International Environmental Law* (Brill 2007)
- Koyanagi H**, *原子力損害賠償制度の成立と展開 (The Creation and Evolution of Nuclear Damage Liability Scheme)* (Nihon Hyoron Sha 2015)
- Kuchinskaya O**, *The Politics of Invisibility: Public Knowledge about Radiation Health Effects after Chernobyl* (MIT Press 2014)
- Kurokawa S**, ‘「心の除染」という虚構 (The Fabricated "Decontamination of the Heart")」 (Shueisha International 2017)
- Loucaides L**, *The European Convention on Human Rights: Collected Essays* (Martinus Nijhoff Publishers 2007)
- McLeman R and Gemenne F (eds)**, *Routledge Handbook of Environmental Displacement and Migration* (Routledge 2018)
- Maertens L**, *Le haut commissariat des nations unies pour les réfugiés (HCR) Face aux catastrophes naturelles: ce que le tsunami de 2004 a changé* (L'Harmattan 2012)
- Martin-Bidou P**, *Droit de l'environnement* (2nd edn, Bréal 2021)
- Matsuoka S**, *福島原発の失敗: 事故対応過程の検証とこれからの安全規制 (The Failure of Fukushima Nuclear Power Station: Review of Disaster Response Process and Future Safety Regulation)* (Waseda University Press 2012)
- Miller C**, *Environmental Rights: Critical Perspectives* (Taylor & Francis Group 1998)
- Morgan KZ and Peterson KM**, *The Angry Genie: One Man's Walk through the Nuclear Age* (University of Oklahoma Press 1999)
- Nakagawa Y**, *放射線被曝の歴史: アメリカ原爆開発から福島原発事故まで (The History of Radiation Exposure: From the American Atomic Bomb Development to the Fukushima Nuclear Accident)* (Enlarged Version of the 1991 Original Edition, Akashi Shoten 2012)
- Nakajima H**, *原発賠償 中間指針の考え方 (Interim Guidelines on the Determination of*

*the Scope of Nuclear Damage*) (Shojihomu 2013) (Translation of the title by the book author)

**Nanda V and Pring G (Rock)**, *International Environmental Law and Policy for the 21st Century* (2nd revised edn, Brill Nijhoff 2012)

**Naono A**, *被ばくと補償: 広島、長崎、そして福島* (*Radiation Exposure and Compensation: Hiroshima, Nagasaki, and Fukushima*) (Heibonsha, 2011)

**Neri N (ed)**, *Le droit international et le nucléaire* (Bruylant 2021)

**Nowak M**, *UN Covenant on Civil and Political Rights: CCPR Commentary* (2nd revised edition, NP Engel 2005)

**Omatsu R**, *3.11 とチェルノブイリ法: 再建への知恵を受け継ぐ* (*3.11 and Chernobyl Law: To Succeed the Wisdom for Reconstruction*) (Toyo Shoten 2013)

**Orchard P**, *Protecting the Internally Displaced: Rhetoric and Reality* (Routledge 2018)

**Perrow C**, *Normal Accidents: Living with High Risk Technologies* (Updated Edition, Princeton University Press 1999)

**Petryna A**, *Life Exposed: Biological Citizens after Chernobyl* (The 2013 Edition, Princeton University Press 2013)

**Piccone TJ**, *Catalysts for Change How the UN's Independent Experts Promote Human Rights* (Brookings Institution Press 2012)

**Piguet E, Pécoud A and de Guchteneire P (eds)**, *Migration and Climate Change* (UNESCO Publishing/Cambridge University Press 2011)

**Rebuild Japan Initiative Foundation**, *福島原発事故独立検証委員会: 調査・検証報告書* (*The Independent Investigation Commission on the Fukushima Nuclear Accident: Investigation Report*) (Discover 21 2012)

**Sands P and Peel J**, *Principles of International Environmental Law* (4<sup>th</sup> edn, Cambridge University Press 2018)

**Sawano N**, *本当に役立つ「汚染地図」* (*The Truly Useful 'Contamination Map'*) (Shueisha e-Shinsho 2014)

**Scarre G**, *Utilitarianism* (Routledge 2020)

**Schachter O**, *International Law in Theory and Practice: General Course in Public International Law* (Brill 2008)

**Shelton D**, *Advanced Introduction to International Human Rights Law* (2nd edn, Edward Elgar 2020)

**Shimazono S**, つくられた放射線「安全」論—科学が道を踏みはずすとき (*The Fabricated Theory of Radiation "Safety": When Science Steps Out of Line*) (Kawade-Shobou-Shinsha 2013)

**Shrader-Frechette KS**, *Nuclear Power and Public Policy: The Social and Ethical Problems of Fission Technology* (D. Reidel Publishing Company 1980)

**Study2007**, 見捨てられた初期被ばく (*Abandoned Initial Exposure Dose*) (Iwanami Shoten 2015)

**Suzuki T**, 核兵器と原発 日本が抱える「核」のジレンマ (*Atomic Weapons and Nuclear Power: 'Atomic' Dilemma of Japan*) (Kodansha Gendai Shinsho 2017)

**Takahashi H**, 封印されたヒロシマ・ナガサキ:米核実験と民間防衛計画 (*The Classified Hiroshima and Nagasaki: The US Atomic Bomb Tests and the Civilian Defence Plan*) (2013 edn, original in 2008, Gaifusha 2013)

**Takahashi T**, 犠牲のシステム: 福島 沖縄 (*Sacrificial System: Fukushima and Okinawa*) (Shueisha Shinsho 2012)

**Thieffry P**, *Handbook of European Environmental and Climate Law* (2<sup>nd</sup> edn, Bruylant 2021)

**Topçu S**, *La France nucléaire. L'art de gouverner une technologie contestée* (Seuil 2013)

**Walker JS**, *Permissible Dose: A History of Radiation Protection in the Twentieth Century* (University of California Press 2000)

**Yamashita Y**, 「復興」が奪う地域の未来—東日本大震災・原発事故の検証と提言 (*The Future of Local Communities Taken Away by "Reconstruction": Analysis and Proposals of Great East Japan Disaster and Nuclear Accident*) (Iwanami Shoten 2017)

**Yamashita Y, Ichimura T and Sato A**, 人間なき復興—原発避難と国民の「不理解」をめぐって (*The Reconstruction Without Humans: Nuclear Evacuation and Citizens' "Incomprehension"*) (Chikuma Bunko 2016)



**Yamashita Y and Kainuma H**, *原発避難論—避難の実像からセカンドタウン、故郷再生まで* (*The Theory of Nuclear Evacuation: From the Reality of Evacuation to Second Town and Hometown Revival*) (Akashi Shoten 2012)

**Yaroshinskaya A**, *Chernobyl: The Forbidden Truth* (Bison Books 1995)

**Yokemoto M**, *原発賠償を問う—曖昧な責任、翻弄される避難者* (*Questioning the Nuclear Compensation: Obscured Liability and Tossed Around Evacuees*) (Iwanami Shoten 2013)

**Yokemoto M and Watanabe T (eds)**, *原発災害はなぜ不均等な復興をもたらすのか—福島事故から「人間の復興」、地域再生へ* (*Why does nuclear disaster induce imbalanced reconstruction?: Toward the “Reconstruction of Human Lives” and Community Revival from the Fukushima Accident*) (Minerva Shobo 2015)

**Yoshioka H**, *原子力の社会史—その日本的展開 (新版)* (*Social History of Nuclear Energy: Its Japanese-Style Development (New Edition)*) (Asahi Shimbun Publications 2011)

### **Journal Articles and Book Sections**

**Abe K**, ‘原子力災害と人権 (Nuclear Disasters and Human Rights)’ (2013) 32 世界法年報 (Yearbook of World Law) 23

**Ackerman F and Heinzerling L**, ‘Pricing the Priceless: Cost-Benefit Analysis of Environmental Protection’ (2002) 150 University of Pennsylvania Law Review 1553

**Akandji-Kombe J-F**, ‘Positive Obligations under the European Convention on Human Rights: A Guide to the Implementation of the European Convention on Human Rights’ (Council of Europe 2007) Human Rights Handbooks, No.7

**Albrecht E and Malte P**, ‘International Recognition of Environmental Refugees’ (2015) 45 Environmental Policy and Law 78

**Amako M**, ‘原爆被爆者援護の現状と課題 (The Current Status and the Issues Concerning Atomic Bomb Survivors Support)’ (2008) 283 立法と調査 (Legislation and Research)

**Anastassov A**, ‘The Sovereign Right to Peaceful Use of Nuclear Energy and International Environmental Law’ in Jonathan L Black-Branch and Dieter Fleck (eds), *Nuclear Non-Proliferation in International Law - Volume I* (TMC Asser Press 2014)

**Anderson MR**, ‘Human Rights Approaches to Environmental Protection: An Overview’ in Michael R Anderson and Alan Boyle (eds), *Human rights approaches to environmental protection* (New edn, Clarendon Press 1998)

**Aronsson-Storrier M**, ‘Exploring the Foundations: The Principles of Prevention, Mitigation, and Preparedness in International Law’ in Katja LH Samuel, Kirsten Nakjavani Bookmiller and Marie Aronsson-Storrier (eds), *The Cambridge Handbook of Disaster Risk Reduction and International Law* (Cambridge University Press 2019)

**Aronsson-Storrier M and da Costa K**, ‘Regulating Disasters? The Role of International Law in Disaster Prevention and Management’ (2017) 26 *Disaster Prevention and Management* 502

**Asquinazi-Bailleux D**, ‘L’impossible preuve d’un préjudice d’anxiété pour les salariés exposés à des substances toxiques’ (2021) 47 *La semaine juridique Social*

**Atapattu S**, ‘Environmental Rights and International Human Rights Covenants: What Standards Are Relevant?’ in Dinah L Shelton and others (eds), *Environmental Rights: The Development of Standards* (Cambridge University Press 2019)

**Awaji T**, ‘福島原発事故の損害賠償の法理をどう考えるか (How to Understand the Jurisprudence of Damage Compensation for Fukushima Nuclear Accident)’ (2013) 43 (2) *環境と公害 (Research on Environmental Disruption)* 4

——, ‘L’accident nucléaire de Fukushima et la responsabilité de l’exploitant et de l’Etat’ in Mathilde Hautereau-Boutonnet (ed), *Après-Fukushima, regards juridiques franco-japonais* (Presses universitaires d’Aix-Marseille 2014)

——, ‘「包括的生活利益」の侵害と損害 (The Violation of “Comprehensive Life Benefit” and Its Damage)’ in Takehisa Awaji, Ryoichi Yoshimura and Masafumi Yokemoto (eds), *福島原発事故 賠償の研究 (Fukushima Nuclear Accident: Compensation Studies)* (Nihon Hyoron Sha 2015)

——, ‘10 Years since the Accident: Infringed Interests and Harm from Hometown Loss and Transformation as Seen in the Appellate Court Decisions in the Lawsuits Seeking Compensation for the Fukushima Accident’ (2021) 51(1) *環境と公害 (Research on Environmental Disruption)* 9 (Translation of the title by the journal)

**Awaji T and Yoshimura R**, ‘福島原発事故被害の現在と被害回復の課題 (The Current State of Fukushima Nuclear Accident Damage and the Issues for Damage Recovery)’ in Takehisa Awaji and others, *原発事故被害回復の法と政策 (Laws and Policies on*

*Reparations for Nuclear Accident Damage*) (Nihon Hyoron Sha 2018)

**Awaji T, Yoshimura R and Yokemoto M**, ‘福島第一原発事故が損害賠償法に投げかけた問題—各章の解題をかねて (The Challenges to the Act on Compensation for Nuclear Damage Posed by the Fukushima Daiichi Nuclear Accident: A Synopsis of Respective Chapters)’ in Takehisa Awaji, Ryoichi Yoshimura and Masafumi Yokemoto (eds), *福島原発事故 賠償の研究 (The Fukushima Nuclear Accident: Studies on Compensation)* (Nihon Hyoron Sha 2015)

**Ayeb-Karlsson S, Smith CD and Kniveton D**, ‘A Discursive Review of the Textual Use of “Trapped” in Environmental Migration Studies: The Conceptual Birth and Troubled Teenage Years of Trapped Populations’ (2018) 47 *Ambio* 557

**Bacache M**, ‘Préjudice d’anxiété - Le préjudice d’anxiété lié à l’amiante : une victoire en demi-teinte’ (2019) 19 *La semaine juridique - Edition générale* 508

**Balleisen EJ and others**, ‘Introduction’ in Edward J Balleisen and others (eds), *Policy Shock: Recalibrating Risk and Regulation after Oil Spills, Nuclear Accidents and Financial Crises* (Cambridge University Press 2017)

**Bandazhevskaya GS and others**, ‘Relationship between Caesium (137Cs) Load, Cardiovascular Symptoms, and Source of Food in “Chernobyl” Children -- Preliminary Observations after Intake of Oral Apple Pectin’ (2004) 134 *Swiss Medical Weekly* 725

**Bandazhevsky YI**, ‘Chronic Cs-137 Incorporation in Children’s Organs’ (2003) 133 *Swiss Medical Weekly* 488

**Barkenbus J and Forsberg C**, ‘Internationalizing Nuclear Safety: The Pursuit of Collective Responsibility’ (1995) 20 *Annual Review of Energy and the Environment* 179

**Bates DC**, ‘Environmental Refugees? Classifying Human Migrations Caused by Environmental Change’ (2002) 23 *Population and Environment* 465

**Baverstock K and Williams D**, ‘The Chernobyl Accident 20 Years On: An Assessment of the Health Consequences and the International Response’ (2006) 114 *Environmental Health Perspectives* 1312

**Bechhoefer BG and Stein E**, ‘Atoms for Peace: The New International Atomic Energy Agency’ (1956) 55 *Michigan Law Review* 747

- Beaud O**, ‘Ouverture: l’honneur perdu de l’État?’ (1992) 15 *Droits* 3
- Billet Ph**, ‘La « neutralité environnementale » : esquisses juridiques’ in Sébastien Beaugendre and others (eds), *Mélanges en l’honneur de François Collart Dutilleul* (Daloz 2017)
- Biermann F and Boas I**, ‘Preparing for a Warmer World: Towards a Global Governance System to Protect Climate Refugees’ (2010) 10 *Global Environmental Politics* 60
- Black R**, ‘Environmental Refugees: Myth or Reality?’ (UNHCR 2001) Working Paper 34
- , ‘Populations “trapped” at Times of Crisis’ (2014) 45 *Forced Migration Review*
- , ‘Migration as Adaptation’ (2011) 478 *Nature* 447
- , ‘Migration, Immobility and Displacement Outcomes Following Extreme Events’ (2013) 27 *Environmental Science & Policy* S32
- Black R and Collyer M**, ‘“Trapped” Populations: Limits on Mobility at Time of Crisis’ in Susan F Martin, S Weerasinghe and A Taylor (eds), *Humanitarian Crises and Migration* (Routledge 2014)
- Bloch L**, ‘Le « désamiantage » du préjudice d’anxiété par la chambre sociale’ (2019) 12 *Responsabilité civile et assurances* 7
- Boudia S**, ‘Global Regulation: Controlling and Accepting Radioactivity Risks’ (2007) 23 *History and Technology* 389
- , ‘Sur les dynamiques de constitution des systèmes d’expertise scientifique. La naissance du système d’évaluation et de régulation des risques des rayonnements ionisants’ (2008) 70 *Genèses* 26
- Boustany K**, ‘The Development of Nuclear Law Making or the Art of Legal “Evasion”’ (1998) 61 *Nuclear Law Bulletin* 39
- Bowman M**, ‘Biodiversity, Intrinsic Value, and the Definition and Valuation of Environmental Harm’ in Alan Boyle and Michael Bowman (eds), *Environmental Damage in International and Comparative Law: Problems of Definition and Valuation* (Oxford University Press 2002)
- Boyle A**, ‘The Role of International Human Rights Law in the Protection of the Environment’ in Michael R Anderson and Alan Boyle (eds), *Human Rights Approaches to Environmental Protection* (New ed, Clarendon Press 1998)

**Bradley M and Cohen R**, ‘Disasters, Displacement and Protection: Challenges, Shortcomings and Ways Forward’ in Thomas Faist and Jeanette Schade (eds), *Disentangling Migration and Climate Change: Methodologies, Political Discourses and Human Rights* (Springer Netherlands 2013)

**Brenner DJ and others**, ‘Cancer Risks Attributable to Low Doses of Ionizing Radiation: Assessing What We Really Know’ (2003) 100 *Proceedings of the National Academy of Sciences of the United States of America* 13761

**Cameron PD**, ‘Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management’ in Nathalie Horbach (ed), *Contemporary Developments in Nuclear Energy Law: Harmonizing Legislation in CEES/NIS* (Kluwer Law International 1999)

———, ‘Nuclear Safety After Chernobyl: The Role of International Law’ (1988) 1 *Leiden Journal of International Law* 121

**Cantor DJ**, ‘“The IDP in International Law”? Developments, Debates, Prospects’ (2018) 30 *International Journal of Refugee Law* 191

**Carling J**, ‘Migration in the Age of Involuntary Immobility: Theoretical Reflections and Cape Verdean Experiences’ (2002) 28 *Journal of Ethnic and Migration Studies* 5

**Cerna CM**, ‘Human Rights in Armed Conflict: Implementation of International Humanitarian Law Norms by Regional Intergovernmental Human Rights Bodies’ in Frits Kalshoven and Yves Sandoz (eds), *Implementation of International Humanitarian Law/Mise en oeuvre du droit international humanitaire* (Martinus Nijhoff Publishers 1989)

**Charlesworth FR and Gronow WS**, ‘A Summary of Experience in the Practical Application of Siting Policy in the United Kingdom’ in IAEA (ed), *Proceedings of A Symposium, Vienna, 3-7 April 1967: Containment and Siting of Nuclear Power Plants* (IAEA 1967)

**Chetail V**, ‘Moving Towards an Integrated Approach of Refugee Law and Human Rights Law’ in Cathryn Costello, Michelle Foster and Jane McAdam (eds), *The Oxford Handbook of International Refugee Law* (Oxford University Press 2021)

**Chevallier J**, ‘Réflexions sur l’idéologie de l’intérêt général’ in CURAPP-Faculté de droit et des sciences économiques de Reims, *Variations autour de l’idéologie de l’intérêt général* (PUF 1978)

———, ‘Déclin ou permanence du mythe de l’intérêt général ?’, *L’intérêt général - Mélanges en*

*l'honneur de Didier Truchet* (Dalloz 2015)

**Chimni BS**, 'The Geopolitics of Refugee Studies: A View from the South' (1998) 11 *Journal of Refugee Studies* 350

———, 'The Birth of a Discipline: From Refugee to Forced Migration Studies' (2009) 22 *Journal of Refugee Studies* 11

**Clark T and Simeon JC**, 'UNHCR International Protection Policies 2000–2013: From Cross-Road to Gaps and Responses' (2014) 33 *Refugee Survey Quarterly* 1

**Clarke RH and Valentin J**, 'The History of ICRP and the Evolution of Its Policies: Invited by the Commission in October 2008' (2009) 39 *Annals of the ICRP* 75

**Cohen R**, 'The Guiding Principles on Internal Displacement: An Innovation in International Standard Setting' (2004) 10 *Global Governance* 459

**Cohen R and Bradley M**, 'Disasters and Displacement: Gaps in Protection' (2010) 1 *Journal of International Humanitarian Legal Studies* 95

**Cooper JB**, 'Environmental Refugees. Meeting the Requirements of the Refugee Definition' (1998) 6(2) *New York University Environmental Law Journal* 480

**Costello C, Foster M and McAdam J**, 'Introducing International Refugee Law as a Scholarly Field' in Cathryn Costello, Michelle Foster and Jane McAdam (eds), *The Oxford Handbook of International Refugee Law* (Oxford University Press 2021)

**Cournil C**, 'The Protection of "Environmental Refugees" in International Law' in Etienne Piguet, Antoine Pécoud and Paul de Guchteneire (eds), *Migration and Climate Change* (UNESCO Publishing/Cambridge University Press 2011)

**Cournil C and Mazzega P**, 'Réflexions prospectives sur une protection juridique des réfugiés écologiques' (2007) 23 *Revue européenne des migrations internationales* 7

**Currie DEJ**, 'The Problems and Gaps in the Nuclear Liability Conventions and an Analysis of How an Actual Claim Would Be Brought Under the Current Existing Treaty Regime in the Event of a Nuclear Accident' (2006) 35 *Denver Journal of International Law and Policy* 85

**De Bousingen DD**, 'France Accused over Asbestos Delay' (1996) 348 *The Lancet* 53

**De La Fayette L**, 'International Environmental Law and the Problem of Nuclear Safety' (1993)

**De Sadeleer N**, ‘The Precautionary Principle in EC Health and Environmental Law’ (2006) 12(2) *European Law Journal* 139

——, ‘The Precautionary Principle in EU Law’ (2010) 5 *AV&S* 173

——, ‘Enforcing EUCHR Principles and Fundamental Rights in Environmental Cases’ (2012) 81 *Nordic Journal of International Law* 39

——, ‘The Risk of Risk Analysis’ (2017) 8(1) *European Journal of Risk Regulation* 28

**Delbecq D**, ‘Le casse-tête des faibles doses de radiations’ (2013) 478 *La Recherche* 56

**Deng FM and Kälin W**, ‘Introduction’ (2006) *Forced Migration Review* (Special Issue in commemoration of the work of Roberta Cohen) 3

**Doswald-Beck L**, ‘Human Rights Law and Nuclear Weapons’ in Annie Golden Bersagel, Gro Nystuen and Stuart Casey-Maslen (eds), *Nuclear Weapons under International Law* (Cambridge University Press 2014)

**Dun O and Gemenne F**, ‘Defining “Environmental Migration”’ (2008) 31 *Forced Migration Review*

**Durand-Poudret E**, ‘La prise en compte de l’environnement dans le cadre des accidents nucléaires: quel rôle pour le droit international après Fukushima?’ in Mathilde Hautereau-Boutonnet (ed), *Après-Fukushima, regards juridiques franco-japonais* (Presses universitaires d’Aix-Marseille 2014)

**Dyke JMV**, ‘Liability and Compensation for Harm Caused by Nuclear Activities’ (2006) 35 *Denver Journal of International Law and Policy* 13

**Emmereichs S**, ‘Environmental Law and Nuclear Law: A Growing Symbiosis’ (2008) 82 *Nuclear Law Bulletin* 91

——, ‘Droit de l’environnement et droit nucléaire: une symbiose croissante’ (2008) 2008 *Bulletin de droit nucléaire* 95

**Epiney A**, ““Environmental Refugees”: Aspects of International State Responsibility’ in Etienne Piguet, Antoine Pécout and Paul de Guchteneire (eds), *Migration and Climate Change* (UNESCO Publishing/Cambridge University Press 2011)

**Ewers H-J and Rennings K**, ‘Economics of Nuclear Risks — A German Study’ in Olav Hohmeyer and Richard Ottinger (eds), *Social Costs of Energy: Present Status and Future Trends* (Springer-Verlag 1994)

**Fairlie I and Sumner D**, ‘The Other Report on Chernobyl (TORCH): An Independent Scientific Evaluation of the Health-Related Effects of the Chernobyl Nuclear Disaster with Critical Analyses of Recent IAEA/WHO Reports’ (The European Greens 2006)

**Falstrom DZ**, ‘Stemming the Flow of Environmental Displacement: Creating a Convention to Protect Persons and Preserve the Environment Perspective’ (2002) 13 *Colorado Journal of International Environmental Law and Policy* 1

**Fassert C**, ‘Living in/with Contaminated Territories: An STS Perspective’ (2017) 8(1) *Technoscienza* 117

——, ‘Une revue de la littérature sur les thèmes de la confiance et de l’expertise en radioprotection: Rapport final de la tâche 1 du projet SHINRAI.’ (IRSN 2018)

**Fassert C and Hasegawa R**, ‘SHINRAI Research Project: The 3/11 Accident and Its Social Consequences: Case Studies from Fukushima Prefecture’ (IRSN/Sciences Po (Médialab) 2019)

**Fernex M**, ‘La santé : état des lieux vingt ans après’ in Galia Ackerman, Guillaume Grandazzi and Frédérick Lemarchand (eds), *Les silences de Tchernobyl* (Autrement 2006)

**Fujiwara H and Yokemoto M**, ‘福島復興政策を検証する—財政の特徴と住民帰還の現状 (The Review of Fukushima Reconstruction Policies: The Budget Characteristics and the State of Evacuee Return)’ in Takehisa Awaji, Ryoichi Yoshimura and others (eds), *原発事故被害回復の法と政策 (Laws and Policies for Nuclear Accident Damage Reparation)* (Nihon Hyoron Sha 2018)

**Fukuda K**, ‘おわりに 改めて避難する権利を考える (Epilogue: Reflecting on the Right to Evacuation)’ in Kenichiro Kawasaki and others (eds), *避難の権利、それぞれの選択 (The Right to Evacuation, Respective Choices)* (Iwanami Booklet No 839, Iwanami-Shoten 2012)

**Fukuda K and Kawasaki K**, ‘子ども・被災者支援法の成立と現状 (The Enactment and Status of the Nuclear Disaster Victims’ Support Act)’ in Institute of Disaster Area Revitalization, Regrowth and Governance, JCN and SAFRAN (eds), *原発避難白書 (White Paper on Nuclear Evacuation)* (Jinbun Shoin 2015)

**Fukuda T**, ‘応急仮設住宅制度の現状と課題 (Current Status and Challenges of Temporary



Shelter Housing Scheme)’ (National Diet Library 2017) Issue Brief No. 966

**Funabashi H**, ‘震災問題対処のために必要な政策議題設定と日本社会における制御能力の欠陥 (The Essential Policy Agenda Setting for Dealing with Disaster Issues and the Defects in Management Capacities of the Japanese Society)’ (2013) 255 *International Journal of Japanese Sociology*

**Funabashi Y and Kitazawa K**, ‘Fukushima in Review: A Complex Disaster, a Disastrous Response’ (2012) 68 (2) *Bulletin of the Atomic Scientists* 9

**Gamet L**, ‘Le préjudice d’anxiété’ (2015) *Droit social* 55

**Garcier RJ**, ‘The Nuclear “Renaissance” and the Geography of the Uranium Fuel Cycle’ (2009) 94 *Geography* 198

——, ‘Disperser, confiner ou recycler ? Droit, modes de gestion et circulations spatiales des déchets faiblement radioactifs en France’ (2014) 43 *L’Espace géographique* 265

**Garcier R, Martinais E and Rocher L**, ‘Naming, measuring and controlling: the politics of flows and “circulations”’ (2017) 91 *Géocarrefour*

**Gemenne F**, ‘How They Became the Human Face of Climate Change. Research and Policy Interactions in the Birth of the “environmental Migration” Concept’ in Etienne Piguet, Antoine Pécoud and Paul de Guchteneire (eds), *Migration and Climate Change* (UNESCO Publishing/Cambridge University Press 2011)

**Gemenne F and Brücker P**, ‘From the Guiding Principles on Internal Displacement to the Nansen Initiative: What the Governance of Environmental Migration Can Learn from the Governance of Internal Displacement’ (2015) 27 *International Journal of Refugee Law* 245

**Ghorbi D**, ‘There’s Something in the Water: The Inadequacy of International Anti-Dumping Laws as Applied to the Fukushima Daiichi Radioactive Water Discharge’ (2012) 27 *American University International Law Review* 473

**Gofman JW**, ‘Beware the Data Diddlers’ [2015] 49(4) *Bulletin of the Atomic Scientists* 40

**Gowlland-Debbas V and Gaggioli G**, ‘The Relationship between International Human Rights and Humanitarian Law: An Overview’ in Robert Kolb and Gloria Gaggioli (eds), *Research Handbook on Human Rights and Humanitarian Law* (Edward Elgar Publishing Limited 2013)

**Grandazzi G and Lemarchand F**, ‘Avant-Propos’ in Galia Ackerman, Guillaume Grandazzi

and Frédérick Lemarchand (eds), *Les silences de Tchernobyl: L'avenir contaminé* (Frontières, Autrement 2006)

**Grodzinsky D**, 'General Situation of the Radiological Consequences of the Chernobyl Accident in Ukraine' in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998)

**Guégan-Lécuyer A**, 'La consécration du droit à réparation d'un "préjudice spécifique d'anxiété" globalisé au profit des salariés exposées à l'amiante' (2013) 44(7581) *Recueil Dalloz* 2954

**Hancher L and Cameron PD**, 'After Chernobyl: Has Anything Really Chnaged?' in Peter Cameron, Leigh Hancher and Wolfgang Kühn (eds), *Nuclear Energy Law After Chernobyl* (Graham & Trotman and International Bar Association 1988)

**Handl G**, 'Human Rights and Protection of the Environment: A Mildly Revisionist View' in Antonio Augusto Cançado Trindade (ed), *Human Rights, Sustainable Development and the Environment* (Instituto Interamericano de Derechos Humanos San José de Costa Rica 1995).

——, 'The IAEA Nuclear Safety Conventions: An Example of Successful "Treaty Management"?' (2003) 72 *Nuclear Law Bulletin* 7

**Hasegawa R**, 'Disaster Evacuation from Japan's 2011 Tsunami Disaster and the Fukushima Nuclear Accident' (IDDRI 2013) IDDRI Study No.05/13

——, 'Returning Home after Fukushima: Displacement from a Nuclear Disaster and International Guidelines for Internally Displaced Persons.' (IOM 2015) 4(1) *IOM Policy Brief Series. Migration, Environment and Climate Change*

**Haylock RGE and others**, 'Cancer Mortality and Incidence Following External Occupational Radiation Exposure: An Update of the 3rd Analysis of the UK National Registry for Radiation Workers' (2018) 119 *British Journal of Cancer* 631

**Hecht G**, 'Negotiating Global Nuclearities: Apartheid, Decolonization, and the Cold War in the Making of the IAEA' (2006) 21 *Osiris* 25

**Hesselman M and Lane L**, 'Disasters and Non-State Actors – Human Rights-Based Approaches' (2017) 26 *Disaster Prevention and Management* 526

**Higuchi T**, 'Tipping the Scale of Justice: The Fallout Suit of 1958 and the Environmental Legal

Dimension of Nuclear Pacifism' (2013) 38 Peace & Change 33

**Hino K**, '原発避難の発生と経過 (Emergence and Process of Nuclear Evacuation)' in Institute of Disaster Area Revitalization, Regrowth and Governance, JCN and SAFRAN (eds), *原発避難白書 (White Paper on Nuclear Evacuation)* (Jinbun Shoin 2015)

**Hinteregger M**, 'The New Austrian Act on Third Party Liability for Nuclear Damage' [1998] Nuclear Law Bulletin No. 62 (NEA/OECD) 27

**Hirakawa H**, '区域外避難はいかに正当化されうるかーリスクの心理ならびに社会的観点からの考察 (How Can the Out-of-Zone Evacuation Be Justified?: the Reflection from Risk Psychology and Social Perspective)' in Takehisa Awaji and others (eds), *原発事故被害回復の法と政策 (Laws and Policies for Nuclear Accident Damage Reparation)* (Nihon Hyoron Sha 2018)

**Hiraoka M and Yokemoto M**, '原発賠償の仕組みと問題点ー生活再建と地域再生に向けた課題 (The System and the Problems of Nuclear Compensation: the Issues related to the Reconstruction of Lives and the Restoration of Communities)' in Masafumi Yokemoto and Toshihiko Watanabe (eds), *原発災害はなぜ不均等な復興をもたらすのかー福島事故から「人間の復興」、地域再生へ (Why does nuclear disaster induce imbalanced reconstruction?: Toward the "Reconstruction of Human Lives" and Community Revival from the Fukushima Accident)* (Minerva Shobo 2015)

**Hodgkinson D and others**, 'Towards a Convention for Persons Displaced by Climate Change: Key Issues and Preliminary Responses' (2009) 6 IOP Conference Series: Earth and Environmental Science 562014

**Horton R**, 'Offline: The Day Bill Gates Crossed the Road' (2014) 383 The Lancet 2110

**Hugo G**, 'Environmental Concerns and International Migration' (1996) 30 The International Migration Review 105

**Iijima S**, '原爆と日本の医学 (Atomic Bomb and Japanese Medicine)' (2001) 1(2) Journal of the Research Society for 15 Years War and Japanese Medicine

**Imai A**, '原発災害避難者の実態調査 (3次) (The Third Survey of Nuclear Evacuees)' (2012) 402 The Japan Research Institute for Local Government Monthly

——, '原発災害避難者の実態調査 (4次) (The Fourth Survey of Nuclear Evacuees)' (2014) 424 The Japan Research Institute for Local Government Monthly

——, ‘原発災害避難者の実態調査（5次）(The Fifth Survey of Nuclear Evacuees)’ (2016) 450 The Japan Research Institute for Local Government Monthly

**Imanaka T**, ‘Research Activities of the Nuclear Safety Research Group of KURRI with Belarussian, Russian and Ukrainian Colleagues about the Chernobyl Accident’ in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998)

——, ‘「100ミリシーベルト以下は影響ない」は原子力村の新たな神話か？」(Is “No Effect Under 100 Millisiervert” a New Myth of Nuclear Village?; Translation by R. Hasegawa)’ (2011) 81(11) Kagaku 1150

——, ‘チェルノブイリと福島：事故プロセスと放射能汚染の比較 (Chernobyl and Fukushima: the Comparison of Accident Process and Radiological Contamination)’ (2016) 86(3) Kagaku 0252

**Isono Y**, ‘原子力事故と国の責任—国の賠償責任について若干の考察 (Nuclear Accident and State Liability: Some Reflections on State Compensation Liability)’ (2011) 41 環境と公害 (Research on Environmental Disruption) 36

——, ‘除染の問題と課題 (The Problems and Challenges of Decontamination)’ in Takehisa Awaji, Ryoichi Yoshimura and Masafumi Yokemoto, *福島原発事故 賠償の研究 (Fukushima Nuclear Accident: the Compensation Study)* (Nihon Hyoron Sha 2015)

**Jaeger G**, ‘On the History of the International Protection of Refugees’ (2001) 83 (843) International Review of the Red Cross 727

**Jankowitsch O**, ‘The Convention on Nuclear Safety’ (1994) 54 Nuclear Law Bulletin 9

**Jensen SE and Nonbol E**, ‘Description of the Magnox Type of Gas Cooled Reactor (MAGNOX)’ (Nordic Nuclear Safety Research (NKS) 1999)

**Jobin P**, ‘Fukushima Ou La radioprotection, retour sur un terrain interrompu’ in Annie Thebaud-Mony and others (eds), *Santé au travail* (La Découverte 2012)

——, ‘Qui est protégé par la radioprotection ?’ [2012] Ebisu. Études japonaises 121

**Jones CG**, ‘A Review of the History of U.S. Radiation Protection Regulations, Recommendations, and Standards’ (2005) 88(2) Health Physics 105

**Jones M**, ‘The Governance Question: The UNHCR, the Refugee Convention and the International Refugee Regime’ in James C Simeon (ed), *The UNHCR and the Supervision of International Refugee Law* (Cambridge University Press 2013)

**Kageura K**, ‘安全の語りをめぐって (Around the Discourse on Safety)’ in Ichinose M., Ito K., Kageura K., Kodama T., Shimazono S., and Nakagawa K. (eds), *低線量被曝のモラル (The Moral of Low-Dose Exposure)* (Kawade-Shobou-Shinsha 2012)

**Kälin W**, ‘The Future of the Guiding Principles on Internal Displacement’ (2006) *Forced Migration Review* (Special Issue) 5

——, ‘Displacement Caused by the Effects of Climate Change: Who Will Be Affected and What Are the Gaps in the Normative Framework for Their Protection?’ (Brookings 2008) Background Paper submitted to IASC informal working group on 15 September 2008

——, ‘Conceptualising Climate-Induced Displacement’ in Jane McAdam (ed), *Climate Change and Displacement: Multidisciplinary Perspectives* (Hart Publishing 2010)

——, ‘From the Nansen Principles to the Nansen Initiative.’ (2012) 41 *Forced Migration Review* 48

——, ‘The Human Rights Dimension of Natural or Human-Made Disasters Focus: Disaster Preparedness and Response’ (2012) 55 *German Yearbook of International Law* 119

——, ‘Internal Displacement’ in Elena Fiddian-Qasmiyeh and others (eds), *The Oxford Handbook of Refugee and Forced Migration Studies* (Oxford University Press 2014)

——, ‘Internal Displacement’ in Cathryn Costello, Michelle Foster and Jane McAdam (eds), *The Oxford Handbook of International Refugee Law* (Oxford University Press 2021)

**Kälin W and Schrepfer N**, ‘Protecting People Crossing Borders in the Context of Climate Change: Normative Gaps and Possible Approaches’ (UNHCR 2012) UNHCR Legal and Protection Policy Research Series, PPLA/2021/01

**Kamiya K**, ‘解明されつつある「がん発症」のメカニズム (Mechanism of “Cancer Induction” Being Elucidated; Translation by R. Hasegawa)’ (2011) 208 *Healthist* 2

**Kamminga MT**, ‘The IAEA Convention on Nuclear Safety’ (1995) 44 *International & Comparative Law Quarterly* 872

**Kanbe H**, ‘福島原発事故避難者訴訟京都地裁判決の検討：避難の相当性・権利侵害・

損害を中心として (The Kyoto District Court Ruling on the Fukushima Disaster Evacuee Lawsuit: Appropriate Evacuation, Infringement of Rights, and Damages)' (2018) 10 災害復興研究 (Studies in disaster recovery and revitalization) 81 (Translation of the title by the journal)

**Katanoda K and others**, 'Childhood, Adolescent and Young Adult Cancer Incidence in Japan in 2009–2011' (2017) 47 Japanese Journal of Clinical Oncology 762

**Kathren RL**, 'Pathway to a Paradigm: The Linear Non Threshold Dose-Response Model in Historical Context: The American Academy of Health Physics 1995 Radiology Centennial Hartman Oration' (1996) 70 Health Physics 621

**Keim-Bagot M**, 'Préjudice d'anxiété : la Cour de cassation referme la boîte de Pandore' (2015) Droit social 360

**Keller H and Grover L**, 'General Comments of the Human Rights Committee and Their Legitimacy' in Helen Keller and Geir Ulfstein (eds), *UN Human Rights Treaty Bodies: Law and Legitimacy* (Cambridge University Press 2012)

**Kibreab G**, 'Environmental Causes and Impact of Refugee Movements: A Critique of the Current Debate' (1997) 21 Disasters 20

**Kimura AH**, 'Fukushima ETHOS: Post-Disaster Risk Communication, Affect, and Shifting Risks' (2018) 27 Science as Culture 98

**Kino R and Kawasaki K**, 'まえがき (Preface)' in Institute of Disaster Area Revitalization, Regrowth and Governance, JCN and SAFRAN (eds), 原発避難白書 (*White Paper on Nuclear Evacuation*) (Jinbun Shoin 2015)

**Kiss A**, 'Environmental and Consumer Protection' in Peers Steve and Ward Angela (eds), *The European Union Charter of Fundamental Rights* (Hart Publishing 2004)

——, 'State Responsibility and Liability for Nuclear Damage' (2006) 35 Denver Journal of International Law & Policy 67

**Kojima N**, '福島第一原発事故による被害とその法律問題 (Fukushima Daiichi Nuclear Accident Damage and Its Legal Issues)' (2011) 83(9/10) Horitsu Jiho 55

——, '原発 ADR の現状—その成果と限界・課題について (Current Situation of Nuclear Damage ADR: Its Achievements and Limits/Challenges)' (2015) 44 環境と公害 (Research on Environmental Disruption) 57

**Komendantova and Battagli**, ‘Beyond Decide-Announce-Defend (DAD) and Not-in-My-Backyard (NIMBY) Models? Addressing the Social and Public Acceptance of Electric Transmission Lines in Germany’ (2016) 22 *Energy Research & Social Science* 224

**Kothari M**, ‘From Commission to the Council: Evolution of UN Charter Bodies’ in Dinah Shelton (ed), *The Oxford Handbook of International Human Rights Law* (Oxford University Press 2013)

**Krohn W and Weingart P**, ‘Commentary: Nuclear Power as a Social Experiment-European Political “Fall Out” from the Chernobyl Meltdown’ (1987) 12 *Science, Technology, & Human Values* 52

**Laurier D**, ‘Is LNT Sufficiently Scientifically Supported?’, *NEA Workshop on Optimisation “Rethinking the Art of Reasonable”* (2020) <<https://hal.archives-ouvertes.fr/hal-02869295>> accessed 7 March 2021

**Leuraud K**, ‘Ionising Radiation and Risk of Death from Leukaemia and Lymphoma in Radiation-Monitored Workers (INWORKS): An International Cohort Study’ (2015) 2 *The Lancet Haematology* e276

——, ‘Ionizing Radiation Epidemiology: Research for Radiological Protection’ (IRSN 2018)

——, ‘Risk of Cancer Associated with Low-Dose Radiation Exposure: Comparison of Results between the INWORKS Nuclear Workers Study and the A-Bomb Survivors Study’ (2021) 60 *Radiation and Environmental Biophysics* 23

**Lindell B and Sowby D**, ‘The 1958 UNSCEAR Report’ (2008) 28 *Journal of Radiological Protection* 277

**Lindroos A**, ‘Addressing Norm Conflicts in a Fragmented Legal System: The Doctrine of Lex Specialis’ (2005) 74 *Nordic Journal of International Law* 27

**Lonergan S**, ‘The Role of Environmental Degradation in Population Displacement’ [1998] *Environmental Change and Security Project Report* 5

**Lubkemann SC**, ‘Involuntary Immobility: On a Theoretical Invisibility in Forced Migration Studies’ (2008) 21 *Journal of Refugee Studies* 454

**Machida N**, ‘「仮の町」から復興公営住宅へ (From “Virtual Town” to Recovery Public Housing)’ in Institute of Disaster Area Revitalization, Regrowth and Governance, JCN and

SAFRAN (eds), *原発避難白書 (White Paper on Nuclear Evacuation)* (Jinbun Shoin 2015)

**Malko MV**, ‘Chernobyl Accident: The Crisis of the International Radiation Community’ in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998)

——, ‘Social Aspects of the Chernobyl Activity in Belarus’ in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998)

**Marks SP**, ‘Emerging Human Rights: A New Generation for the 1980s Stoffer Lectures’ (1980) 33 Rutgers Law Review 435

**Marrani D and Turner SJ**, ‘The French Charter of the Environment and Standards of Environmental Protection’ in Dinah L Shelton and others (eds), *Environmental Rights: The Development of Standards* (Cambridge University Press 2019)

**Martin SF**, ‘Climate Change, Migration, and Governance’ (2010) 16 Global Governance 397

**Mathews JD and others**, ‘Cancer Risk in 680 000 People Exposed to Computed Tomography Scans in Childhood or Adolescence: Data Linkage Study of 11 million Australians’ (2013) 346 BMJ f2360

**McAdam J**, ‘Climate Change Displacement and International Law: Complementary Protection Standards’ (UNHCR 2011) Legal and Protection Policy Research Series

——, ‘Swimming against the Tide: Why a Climate Change Displacement Treaty Is Not the Answer’ (2011) 23 International Journal of Refugee Law 2

——, ‘Creating New Norms on Climate Change, Natural Disasters and Displacement: International Developments 2010–2013’ (2013) 29 Refuge 11

——, ‘Human Rights and Forced Migration’, *The Oxford Handbook of Refugee and Forced Migration Studies* (Oxford University Press 2014)

——, ‘From the Nansen Initiative to the Platform on Disaster Displacement: Shaping International Approaches to Climate Change, Disaster and Displacement’ (2016) 39(4) UNSW Law Journal 1518



——, ‘Displacement in the Context of Climate Change and Disasters’ in Cathryn Costello, Michelle Foster and Jane McAdam (eds), *The Oxford Handbook of International Refugee Law* (Oxford University Press 2021)

**McCrudden C**, ‘Human Dignity and Judicial Interpretation of Human Rights’ (2008) 19 *European Journal of International Law* 655

**McCue GS**, ‘Environmental Refugees: Applying International Environmental Law to Involuntary Migration’ (1993) 6 *Georgetown International Environmental Law Review* 151

**McGregor J**, ‘Refugees and the Environment’ in Richard Black and Vaughan Robinson (eds), *Geography of Refugees: Patterns and Processes of Change* (Belhaven Press 1993)

**Meron T**, ‘On a Hierarchy of International Human Rights’ (1986) 80 *American Journal of International Law* 1

——, ‘The Humanization of Humanitarian Law’ (2000) 94 (2) *The American Journal of International Law* 239

**Merrills JG**, ‘Environmental Protection and Human Rights: Conceptual Aspects’ in Michael R Anderson and Alain E Boyle (eds), *Human Rights Approaches to Environmental Protection* (New edn, Clarendon Press 1998)

**Meybatyan S**, ‘Nuclear Disasters and Displacement’ (2014) 45 *Forced Migration Review* 63

**Miura M and others**, ‘Radiation Risk Perception by Radiation Professionals - Survey Results Just before the Radiological Accident at the Tokyo Electric Power Company Fukushima Daiichi Nuclear Power Plant’ (2013) 12 *Japanese Journal of Radiation Safety Management* 46

**Miyairi K**, ‘復興行財政の実態と課題—今東日本大震災の復興行財政に問われているもの— (The Status and Challenges of Reconstruction Budget Policy: The Current Issues at Stake for the Reconstruction Budget Policy of the Great East Japan Disaster)’ (2015) 45 *環境と公害 (Research on Environmental Disruption)* 2

**Mooney ED**, ‘Towards a Protection Regime for Internationally Displaced Persons’ in Edward Newman and Joanne van Selm (eds), *Refugees and forced displacement: International security, human vulnerability, and the state* (United Nations University Press 2002)

**Morikawa K and Yamakawa Y**, ‘原発事故被害者に対する支援政策の課題—避難住宅政策と医療・健康対策について—(The Issues Concerning the Assistance Policy Toward

Nuclear Accident Victims: Evacuation Shelter Policy and Medical and Health Measures)' in Masafumi Yokemoto and Toshihiko Watanabe (eds), *原発災害はなぜ不均等な復興をもたらすのか—福島事故から「人間の復興」、地域再生へ* (*Why does nuclear disaster induce imbalanced reconstruction? : Toward the "Reconstruction of Human Lives" and Community Revival from the Fukushima Accident*) (Minerva Shobo 2015)

**Morishima A**, '原子力事故の被害者救済 (3) —損害賠償と補償 (Relief for Nuclear Accident Victims (3): Damage Compensation and Reparation)' (2011) 1888 *Toki no horei* 43

**Morita A**, '政府の援助の義務と電力会社のガバナンス (Government Duty for Assistance and Governance of Electricity Utility Companies)' (2011) 1433 *Jurist* 45

**Morris T**, 'UNHCR, IDPs and Clusters' (2006) 25 *Forced Migration Review* 54

**Morrissey J**, 'Environmental Change and Forced Migration: A State of the Art Review' (Refugee Studies Centre, University of Oxford 2009) Background Paper

——, 'Rethinking the "Debate on Environmental Refugees": From "Maximilists and Minimalists" to "Proponents and Critics"' (2012) 19 *Journal of Political Ecology* 36

**Morrow K**, 'The ECHR, Environment-Based Human Rights Claims and the Search for Standards' in Stephen J Turner and others (eds), *Environmental Rights* (1st edn, Cambridge University Press 2019)

**Moser B**, 'The IAEA Conventions on Early Notification of a Nuclear Accident and on Assistance in the Case of a Nuclear Accident or Radiological Emergency' in NEA/OECD and IAEA (eds), *International Nuclear Law in the Post-Chernobyl Period* (NEA/OECD 2006)

**Mosneaga A**, 'Restoring Livelihoods after Disasters: The Case of Fukushima's Nuclear Evacuees' (United Nations University 2015) Policy Brief No 2

——, 'Tackling Prolonged Displacement: Lessons on Durable Solutions from Fukushima.' (United Nations University 2015) Policy Brief No.1

**Nadesan MH**, 'Nuclear Governmentality: Governing Nuclear Security and Radiation Risk in Post-Fukushima Japan' (2019) 50 *Security Dialogue* 512

**Nadig A**, 'Forced Migration and Global Processes - Report of the Eighth Conference of the International Association for the Study of Forced Migration, Chiang Mai, Thailand, 5-9 January 2003 Report' (2003) 16 *Journal of Refugee Studies* 361

**Nagano F**, ‘福島原発事故と損害論（責任内容論）—平穩生活権侵害による損害賠償に限定して（Fukushima Nuclear Accident and Damage Theory (Liability Content Theory): On Damage Compensation for the Infringement of the Right to Peaceful Existence)’ (2021) 93(3) *Horitsu Jiho* 11

**Nanda VP**, ‘International Environmental Norms Applicable to Nuclear Activities, with Particular Focus on Decisions of International Tribunals and International Settlements’ (2006) 35(1) *Denver Journal of International Law and Policy* 47

**Naono A**, ‘The Origins of “Hibakusha” as a Scientific and Political Classification of the Survivor’ (2019) 39(3) *Japanese Studies* 333

**Nash SL**, ‘From Cancun to Paris: An Era of Policymaking on Climate Change and Migration’ (2018) 9 *Global Policy* 53

**Nasvit O**, ‘Legislation in Ukraine about the Radiological Consequences of the Chernobyl Accident’ in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998)

**Neri K**, ‘Catastrophes nucléaires et droits de l’homme. La question des règles régissant les opérations de secours’ in Kiara Neri (ed), *Le droit international et le nucléaire* (Bruylant 2021)

**Ninomiya J**, ‘原発避難者の「住まい」と法制度 (The "Dwelling" of Nuclear Evacuees and its Legal Framework)’ in Ryoichi Yoshimura and others (eds), Takehisa Awaji, *原発事故被害回復の法と政策 (Laws and Policies for Nuclear Accident Damage Reparation)* (Nihon Hyoron Sha 2018)

**Nomura T, Hokugo T and Takenaka C**, ‘Japan’s Nuclear Liability System’ in NEA/OECD (ed), *Japan’s compensation system for nuclear damage: as related to the TEPCO Fukushima Daiichi nuclear accident*. (NEA/OECD 2012) 15

**O’Driscoll M**, ‘The Origins and Early History of Euratom, 1955-1968’ in European Parliament (ed), *The European Parliament and the Euratom Treaty: Past, Present and Future* (European Parliament 2002)

**Ohtsuru A and others**, ‘Incidence of Thyroid Cancer Among Children and Young Adults in Fukushima, Japan, Screened With 2 Rounds of Ultrasonography Within 5 Years of the 2011 Fukushima Daiichi Nuclear Power Station Accident’ (2019) 145 *JAMA Otolaryngology–Head & Neck Surgery* 4

**Oono A**, ‘山村の高齢化と限界集落 (Mountainous Aging Society and Marginal Communities)’ (1991) No. July 1991 Keizai

**Osaka E**, ‘原賠法改正問題 (The Issues related to the Reform of the Nuclear Compensation Act)’ in Takehisa Awaji and others (eds), *原発事故被害回復の法と政策 (Laws and Policies for Nuclear Accident Damage Reparation)* (Nihon Hyoron Sha 2018)

——, ‘東電の責任 (The Liability of TEPCO)’ in Takehisa Awaji, Ryoichi Yoshimura, Kenji Shimoyama, Eri Osaka, and Masafumi Yokemoto (eds), *原発事故被害回復の法と政策 (Laws and Policies for Nuclear Accident Damage Reparation)* (Nihon Hyoron Sha 2018)

——, ‘特集にあたって(Introductory Remarks)’ (2021) 51(1) 環境と公害(Research on Environmental Disruption) 9

**Oshima K and Yokemoto M**, ‘福島原発事故のコストをだれが負担するのか—再稼働の動きのもとで進行する責任のあいまい化と東電救済 (Who Will Shoulder the Costs of the Fukushima Nuclear Accident? Obscuring Responsibility and Rescuing TEPCO)’ (2014) 44 (1) 環境と公害(Research on Environmental Disruption) 4 (Translation of the title by the journal)

**Otsuka T**, ‘福島第一原発事故による損害賠償と賠償支援機構法—不法行為法学の観点から (Fukushima Daiichi Nuclear Accident Damage Compensation and Compensation Facilitation Corporation Act - From the Perspective of Tort Law Studies)’ (2011) 1433 Jurist 39

——, ‘福島第一原子力発電所事故による損害賠償 (Damage Compensation Related to Fukushima Daiichi Nuclear Power Plant Accident)’, *震災・原発事故と環境法 (Earthquake Disaster, Nuclear Accident and Environmental Law)* (Minjiho Kenkyukai 2013)

——, ‘パネルディスカッション 福島事故賠償の在り方を踏まえた原子力損害賠償制度の課題 (Panel Discussion on Issues of Nuclear Damage Compensation System Including How to Deal with Fukushima Accident Compensation)’, *原子力損害賠償の現状と課題 (Current Status and Issues on Nuclear Damage Compensation)* (Shoji Homu 2015)

——, ‘福島原発訴訟判決における権利侵害・過失及びリスク論について (The Infringed Rights, the Negligence, and the Risk Theory in Fukushima Nuclear Suits Rulings)’ (2021) 93(3) Horitsu Jiho 11

**Ozasa K and others**, ‘Studies of the Mortality of Atomic Bomb Survivors, Report 14, 1950–2003: An Overview of Cancer and Noncancer Diseases’ (2012) 177 Radiation Research 229

**Pallemaerts M**, ‘The Human Rights to a Healthy Environment as a Substantive Right’ in

Maguelonne Déjeant-Pons and Marc Pallemarts (eds), *Human rights and the environment* (Council of Europe Publishing 2002)

**Peck J**, ‘Measuring Justice for Nature: Issues in Evaluating and Litigating Natural Resources Damages’ (1999) 14 *Journal of Land Use & Environmental Law* 275

**Pelzer N**, ‘The Present State of Research Carried Out by the English-Speaking Section of the Centre for Studies and Research’, in Hague Academy of International Law (ed), *The Hazards Arising out of the Peaceful Use of Nuclear Energy* (Martinus Nijhoff Publishers 1993)

——, ‘Learning the Hard Way: Did the Lessons Taught by the Chernobyl Nuclear Accident Contribute to Improving Nuclear Law’, *International Nuclear Law in the Post-Chernobyl Period* (OECD/IAEA, 2006)

——, ‘Safer Nuclear Energy Through a Higher Degree of Internationalisation? International Involvement Versus National Sovereignty’ (2013) 91 *Nuclear Law Bulletin* 43

**Peplow M**, ‘Special Report: Counting the Dead’ (2006) 440 *Nature* 982

**Pierce DA and others**, ‘Studies of the Mortality of Atomic Bomb Survivors. Report 12, Part I. Cancer: 1950—1990’ (2012) 178 *Radiation Research* AV61

**Piguet E**, ‘Climate Change and Forced Migration’ (UNHCR 2008) *Research Paper No.* 153

**Popov A**, ‘Euratom Competence in the Areas of Nuclear Security and Nuclear Safety: An Impossible Parallel?’ (2018) 101 *Nuclear Law Bulletin* 63

**Prieur M**, ‘人権の観点から見た破局的な原子力事故の管理 (Destructive Nuclear Accident Management From the Perspective of Human Rights)’ (2015) 49(2) *比較法学* (Comparative Law Review) 244

——, ‘Draft Convention on the International Status of Environmentally- Displaced Persons’ (International Centre of Comparative Environmental Law 2016) Report submitted to Executive Committee of the Warsaw International Mechanism for Loss and Damage, UNFCCC

**Prieur M and others**, ‘Draft Convention on the International Status of Environmentally- Displaced Persons’ (2008) 12 *Revue européenne de droit de l’environnement* 395

**Quénivet NNR**, ‘Introduction’ in Roberta Arnold and Noëlle NR Quénivet (eds), *International Humanitarian Law and Human Rights Law: Towards a New Merger in International Law* (Martinus Nijhoff Publishers 2008)

**Quénivet NNR and Lopes C**, ‘Individuals as Subjects of International Humanitarian Law and Human Rights Law’ in Roberta Arnold and Noëlle NR Quénivet (eds), *International Humanitarian Law and Human Rights Law: Towards a New Merger in International Law* (Martinus Nijhoff Publishers 2008)

**Quiroga CM**, ‘The Role of International Tribunals: Law-Making or Creative Interpretation?’ in Dinah Shelton (ed), *The Oxford Handbook of International Human Rights Law* (Oxford University Press 2013)

**Rainer RH and Szasz PC**, ‘The Law and Practices of the International Atomic Energy Agency 1970-1980 (Supplement 1 to the 1970 Edition)’ (IAEA 1993)

**Ramcharan BG**, ‘The Concept and Dimension of the Right to Life’ in Bertrand G Ramcharan (ed), *The Right to Life in International Law* (Martinus Nijhoff Publishers 1985)

——, ‘The Law-Making Process: From Declaration to Treaty to Custom to Prevention’ in Dinah Shelton (ed), *The Oxford Handbook of International Human Rights Law* (Oxford University Press 2013)

**Rautenbach J, Tonhauser W and Wetherall A**, ‘Overview of the International Legal Framework Governing the Safe and Peaceful Uses of Nuclear Energy - Some Practical Steps -’ in NEA/OECD and IAEA, *International Nuclear Law in the Post-Chernobyl Period* (NEA/OECD 2006)

**Reyners P**, ‘Le droit nucléaire confronté au droit de l’environnement – Autonomie ou complémentarité?’ (2007) 1 *Revue québécoise de droit international* 149

**Reyners P and Lellouche E**, ‘Regulation and Control by International Organisations in the Context of a Nuclear Accident: The International Atomic Energy Agency and the OECD Nuclear Energy Agency’ in Peter Cameron, Leigh Hancher and Wolfgang Kühn (eds), *Nuclear Energy Law After Chernobyl* (Graham & Trotman and International Bar Association 1988)

**Richards LM**, ‘Fallout Suits and Human Rights: Disrupting the Technocratic Narrative’ (2013) 38 *Peace & Change* 56

**Richardson D and others**, ‘Ionizing Radiation and Leukemia Mortality among Japanese Atomic Bomb Survivors, 1950-2000’ (2009) 172 *Radiation Research* 368

**Richardson DB and others**, ‘Risk of Cancer from Occupational Exposure to Ionising Radiation: Retrospective Cohort Study of Workers in France, the United Kingdom, and the

United States (INWORKS)' (2015) 351 BMJ h5359

**Rietiker D**, 'Between Prosperity and Destruction: A Modern Interpretation of the Right to Peaceful Use of Nuclear Energy in Light of the Protection of Human Rights and Future Generations' in Jonathan L Black-Branch and Dieter Fleck (eds), *Nuclear Non-Proliferation in International Law - Volume III* (TMC Asser Press 2016)

**Rieu A-M**, 'Thinking after Fukushima. Epistemic Shift in Social Sciences' (2013) 11 Asia Europe Journal 65

**Robbins M**, 'Powerful States, Customary Law and the Erosion of Human Rights Through Regional Enforcement' (2005) 35 California Western International Law Journal 275

**Rodley NS**, 'The Role and Impact of Treaty Bodies' in Dinah Shelton (ed), *The Oxford Handbook of International Human Rights Law* (Oxford University Press 2013)

**Rodriguez-Rivera LE**, 'Is the Human Right to Environment Recognised under International Law - It Depends on the Source' (2001) 12 Colorado Journal of International Environmental Law and Policy 1

——, 'The Human Right to Environment and the Peaceful Use of Nuclear Energy' (2006) 35 Denver Journal of International Law and Policy 173

**Romi R**, 'La "transversalité", caractéristique, moteur et frein du droit de l'environnement.', *Confluence. Mélanges en l'honneur de J. Morand-Deville* (Montchrestien 2007)

**Rose T and Sweeting T**, 'How Safe Is Nuclear Power? A Statistical Study Suggests Less than Expected' (2016) 72(2) Bulletin of the Atomic Scientists 112

**Ryabzev IA and Imanaka T**, 'Legislation and Research Activity in Russia about the Radiological Consequences of the Chernobyl Accident' in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998)

**Saito O**, '慰謝料の現代的課題 (Current Issues over Solatia Payment)' (2012) 74 Shiho (Private Law) 324

**Schlütter B**, 'Aspects of Human Rights Interpretation by the UN Treaty Bodies' in Helen Keller and Geir Ulfstein (eds), *UN Human Rights Treaty Bodies: Law and Legitimacy* (Cambridge

University Press 2012)

**Schwartz JA**, ‘International Nuclear Third Party Liability Law: The Response to Chernobyl’ in NEA/OECD and IAEA, *International Nuclear Law in the Post-Chernobyl Period* (NEA/OECD 2006)

**Shelton D**, ‘What Happened in Rio to Human Rights?’ (1992) 3 Yearbook of International Environmental Law 75

——, ‘Certitude et incertitude scientifiques’ (1998) 23 *Revue juridique de l’environnement* 39

——, ‘Environmental Rights’ in Philip Alston (ed), *Peoples’ Rights* (Oxford University Press 2001)

——, ‘Human Rights and the Environment: What Specific Environmental Rights Have Been Recognised?’ (2006) 35(1) *Denver Journal of International Law and Policy* 129

——, ‘Developing Substantive Environmental Rights’ (2010) 1 *Journal of Human Rights and the Environment* 89

**Shelton D and Gould A**, ‘Positive and Negative Obligations’ in Dinah Shelton (ed), *The Oxford Handbook of International Human Rights Law* (Oxford University Press 2013)

**Shimizu N**, ‘Human Insecurity Caused by the Dysfunction of the State: New Security Issues in Post-Fukushima Japan’ (2015) 3(2) *Asian Journal of Peacebuilding* 165

**Shimoyama K**, ‘原発事故・原子力安全規制と国家賠償責任 (Nuclear Accident, Nuclear Safety Regulation, and State Liability for Compensation)’ in T Awaji, R Yoshimura and Masafumi Yokemoto (eds), *福島原発事故 賠償の研究 (Fukushima Nuclear Accident: The Compensation Study)* (Nihon Hyoron Sha 2018)

**Shiomi Y**, ‘中島肇著「原発賠償 中間指針の考え方」を読んで (Book Review: Interim Guidelines on the Determination of the Scope of Nuclear Damage, Written by Hajime Nakajima)’ (2013) 1009 *NBL* 40

——, ‘福島原発賠償に関する中間指針等を踏まえた損害賠償法理の構築 (Construction of Damage Compensation Legal Principles Based on the Interim Guidelines and Other Instructions Related to Fukushima Nuclear Damage Compensation)’ in Takehisa Awaji, Ryoichi Yoshimura and Masafumi Yokemoto (eds), *福島原発事故 賠償の研究 (Fukushima Nuclear Accident: The Compensation Study)* (Nihon Hyoron Sha 2015)



——, ‘損害算定の考え方 (The View on Damage Assessment)’ in Takehisa Awaji and others (eds), *原発事故被害回復の法と政策 (Laws and Policies on Nuclear Accident Damage Reparation)* (Nihon Hyoron Sha 2018)

——, ‘原子力損害賠償の現状と課題 (The Nuclear Damage Compensation System and How It Should Be Improved)’ (2020) 49 環境と公害 (Research on Environmental Disruption) 3

**Shirabe M**, ‘ICRP 勧告における放射線防護基準の変遷と我が国の対応 (The Evolution of ICRP Recommendations on Radiation Protection Norms and the Response of the Japanese Government)’ (2016) 86(12) *Kagaku* 1264

**Shirabe M, Hasegawa R and Fassert C**, ‘From Risk Communication to Participatory Radiation Risk Assessment’ (United Nations University 2015) Fukushima Global Communication Programme Working Paper Series, No.21, December 2015.

**Shiroyama H**, ‘Nuclear Safety Regulation in Japan and Impacts of the Fukushima Daiichi Accident’ in Joonhong Ahn and others (eds), *Reflections on the Fukushima Daiichi Nuclear Accident: Toward Social-Scientific Literacy and Engineering Resilience* (Springer International Publishing 2015)

**Shrader-Frechette K and Persson L**, ‘Ethical, Logical and Scientific Problems with the New ICRP Proposals’ (2002) 22 *Journal of Radiological Protection: Official Journal of the Society for Radiological Protection* 149

**Simma B**, ‘Self-Contained Regimes’ (1985) 16 *Netherlands Yearbook of International Law* 111

**Simma B and Pulkowski D**, ‘Of Planets and the Universe: Self-Contained Regimes in International Law’ (2006) 17(3) *European Journal of International Law* 483

**Slater DH, Morioka R and Danzuka H**, ‘Miro-Politics of Radiation’ (2014) 46 *Critical Asian Studies* 485

**Stavropoulou M**, ‘Drowned in Definitions?’ (2008) 31 *Forced Migration Review* 11

**Sternglass EJ**, ‘The Death of All Children: A Footnote to the A.B.M Controversy’ (1969) September *Esquire* 1a

——, ‘Environmental Radiation and Human Health’ (1972) in Lucien M. Le Cam, Jerzy Neyman and Elizabeth L. Scott (eds), *Proceedings of the Sixth Berkeley Symposium on*

*Mathematical Statistics and Probability, Volume 6: Effects of Pollution on Health* (University of California Press 1972)

**Stewart A, Webb J and Hewitt D**, ‘A Survey of Childhood Malignancies’ (1958) 1 *British Medical Journal* 1495

**Stoiber C**, ‘Inside Nuclear Baseball: Reflections on the Development of the Safety Conventions’ (2018) 100 *Nuclear Law Bulletin* 61

**Strohl P**, ‘Bilan de recherches de la section de langue française’ in Hague Academy of International Law (ed), *The Hazards Arising out of the Peaceful Use of Nuclear Energy* (Martinus Nijhoff Publishers 1993)

**Suhrke A**, ‘Pressure Points: Environmental Degradation, Migration and Conflict’ (1991) Prepared for the Workshop “Environmental Change, Population Displacement and Acute Conflict”, held in Ottawa, Canada in June 1991

**Suhrke A and Visentin A**, ‘The Environmental Refugee: A New Approach’ (1991) 2 *Ecodecision* 73

**Takahashi H**, ‘One Minute after the Detonation of the Atomic Bomb: The Erased Effects of Residual Radiation’ (2009) 19 *Historia Scientiarum: International Journal of the History of Science Society of Japan* 146

**Takahashi M**, ‘自主避難者の社会的・心理的特性—放射線恐怖症という「誤解」 (Social and Psychological Characteristic of Self-Evacuees: “Misunderstanding” of Radiophobia)’ in Institute of Disaster Area Revitalization (Kansai Gakuin University), JCN and SAFRAN (eds), *原発避難白書 (White Paper on Nuclear Evacuation)* (Jinbun Shoin 2015)

**Takahashi S**, ‘原子力損害賠償法の法的諸問題 (Some Legal Issues Pertaining to Nuclear Damage Compensation Law)’ (2014) 14 *Journal of Public Policy Studies* 86

**Takahashi Y**, ‘The Financial Support by the Nuclear Damage Compensation Facilitation Corporation’ in NEA/OECD (ed), *Japan’s Compensation System for Nuclear Damage: As Related to the TEPCO Fukushima Daiichi Nuclear Accident*. (NEA/OECD 2012)

**Takase M**, ‘原発 ADR の現状と課題 (The Current Status and Issues of Nuclear Accident ADR)’ in Takehisa Awaji, Ryoichi Yoshimura and Masafumi Yokemoto (eds), *福島原発事故賠償の研究 (Fukushima Nuclear Accident: the Compensation Study)* (Nihon Hyoron Sha 2015)

**Tanaka Y**, ‘原子力損害賠償の法政策的検討 (The Legal Policy Review of Nuclear Damage Compensation)’ in Hitotsubashi University Environmental Law Policy Course (ed), *原子力損害賠償の現状と課題 (Current Status and Issues on Nuclear Damage Compensation)* (Shoji Homu 2015)

**Tanguy P**, ‘Three Decades of Nuclear Safety: Nuclear Plant Safety Has Not Been a Static Concept’ (1988) 2 IAEA Bulletin 51

**Taylor LS**, ‘The Basis For Standards For Radiation Protection’ (1956) 46 Journal of the Washington Academy of Sciences 69

——, ‘Will Radiation Control Be by Reason or Regulation?’ (1988) 55 Health Physics 133

**Toki H and others**, ‘Relationship between Environmental Radiation and Radioactivity and Childhood Thyroid Cancer Found in Fukushima Health Management Survey’ (2020) 10 Scientific Reports (Nature) 4074

**Topçu S**, ‘Organiser l’irresponsabilité? La gestion (inter)nationale des dégâts d’un accident nucléaire comme régime discursif’ (2014) 49 Ecologie & politique 95

——, ‘Catastrophes nucléaires et « normalisation » des zones contaminées : enjeux politiques, économiques, sanitaires, démocratiques et éthiques.’ (2016) No.8 – Mai 2016. La Note de la Fondation de l’Ecologie Politique 12

**Tsujiuchi T**, ‘深刻さつづく原発事故被災者の精神的苦痛 - 帰還をめぐる苦悩とストレス (The Lasting Serious Psychological Suffering of Accident Victims: Agony and Stress Around the Issue of Return)’ (2014) Special Issue 852: イチエフ・クライシス (Fukushima Daiichi Crisis) Sekai 103

**Tsukui S**, ‘原発避難者の住まいをめぐる法制度の欠落 (Deficiency of Legislation Concerning the Housing of Nuclear Evacuees)’ in Institute of Disaster Area Revitalization, Regrowth and Governance, JCN and SAFRAN (eds), *原発避難白書 (White Paper on Nuclear Evacuation)* (Jinbun Shoin 2015)

**Tsunoda H**, ‘原発避難自治体の「町外コミュニティ」構想と自治体再建の課題 (The Concept of “Out-of-Town Communities” Proposed by Nuclear Evacuation Municipalities and the Challenges of Municipality Reconstruction)’ (Jichiroren Institute of Local Government 2015) Research and Report No. 107

**Turner SJ**, ‘Introduction: A Brief History of Environmental Rights and the Development of

Standards' in Stephen J Turner and others (eds), *Environmental Rights: The Development of Standards* (Cambridge University Press 2019)

**Tykhyi V**, 'Chernobyl Sufferers in Ukraine and Their Social Problems: Short Outline' in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998)

**Ueki T**, '東日本大震災と福島原発事故をめぐる国際法上の問題点 (Issues Related to Great East Japan Disaster and Fukushima Nuclear Accident from the Perspective of International Law)' (2011) 1427 *Jurist* 108

**Utatsu N**, '原子力損害賠償法における責任集中原則と国家補償 (The Exclusive Liability Principle and State Compensation in Nuclear Damage Compensation Law)' (2012) 74 *General Insurance Studies* 111

**Vasak K**, 'A 30-Year Struggle: The Sustained Efforts to Give Force of Law to the Universal Declaration of Human Rights' (1977) 11 *The UNESCO Courier: a Window Open on the World* 29

**Vasquez-Maignan X**, 'The Japanese Nuclear Liability Regime in the Context of the International Nuclear Liability Principles' in NEA/OECD (ed), *Japan's Compensation System for Nuclear Damage: As Related to the TEPCO Fukushima Daiichi Nuclear Accident* (NEA/OECD 2012)

**Vlassopoulos CA**, 'Defining Environmental Migration in the Climate Change Era: Problem, Consequence or Solution?' in Thomas Faist and Jeanette Schade (eds), *Disentangling Migration and Climate Change: Methodologies, Political Discourses and Human Rights* (Springer 2013)

**Walker SJ and Wellock TR**, 'A Short History of Nuclear Regulation, 1946-2009' (US Nuclear Regulatory Commission 2010)

**Watanabe S**, '原子力損害賠償と経済学—法と経済学の観点から (Nuclear Damage Compensation and Economics: From the Perspective of Law and Economics)' (2015) 150 *NBL* 38

**Watanabe T**, '「風評被害」の賠償 (Compensation for "Rumour-Related" Damage)' in Takehisa Awaji, Ryoichi Yoshimura and Masafumi Yokemoto (eds), *福島原発事故 賠償の研究 (Fukushima Nuclear Accident: the Compensation Study)* (Nihon Hyoron Sha 2015)

**Watanabe T and others**, ‘Hiroshima Survivors Exposed to Very Low Doses of A-Bomb Primary Radiation Showed a High Risk for Cancers’ (2008) 13 *Environmental Health and Preventive Medicine* 264

**Weiss EB**, ‘In Fairness to Future Generations and Sustainable Development’ (1992) 8 *American University Journal of International Law and Policy* 19

**Wojcik A**, ‘Reflections on Effects of Low Doses and Risk Inference Based on the UNSCEAR 2021 Report on “Biological Mechanisms Relevant for the Inference of Cancer Risks from Low-Dose and Low-Dose-Rate Radiation”’ (2022) 42 *J. Radiol. Prot.*

**Wynne B**, ‘Knowledges in Context’ (1991) 16 (1) *Science, Technology and Human Values* 111.

**Yablokov AV, Nesterenko VB and Nesterenko AV**, ‘Chernobyl: Consequences of the Catastrophe for People and the Environment’ (2009) 1181 *Annals of the New York Academy of Sciences*

**Yaginuma M**, ‘東海村 JCO ウラン加工工場臨界事故を振り返る一周辺住民の健康管理の在り方を中心に—(A Retrospective Look at the Tokai-Mura Uranium Reprocessing Plant Criticality Accident: Focus on Health Management of Local Residents)’ (2013) 338 *Rippo to Chosa (Legislation and Study)* 131

**Yamamoto H, Hayashi K and Scherb H**, ‘Association between the Detection Rate of Thyroid Cancer and the External Radiation Dose-Rate after the Nuclear Power Plant Accidents in Fukushima, Japan’ (2019) 98 *Medicine* e17165

**Yaroshinskaya A**, ‘Impact of Radiation on the Population during the First Weeks and Months after the Chernobyl Accident and Health State of the Population 10 Years Later’ in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998)

——, ‘Problems of Social Assistance to the Chernobyl Sufferers in Russia’ in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998)

**Yokemoto M**, ‘不均等な復興とは何か (What Is Imbalanced Reconstruction?)’ in Masafumi Yokemoto and Toshihiko Watanabe (eds), *原発災害はなぜ不均等な復興をもたらすのか—福島事故から「人間の復興」、地域再生へ* (*Why does nuclear disaster induce imbalanced*

*reconstruction? : Toward the “Reconstruction of Human Lives” and Community Revival from the Fukushima Accident*) (Minerva Shobo 2015)

——, ‘避難者の「ふるさとの喪失」は償われているか (Is the Evacuees’ “Loss of Hometown” Compensated?)’ in Takehisa Awaji, Ryoichi Yoshimura and Masafumi Yokemoto (eds), *福島原発事故 賠償の研究 (Fukushima Nuclear Accident: The Compensation Study)* (Nihon Hyoron Sha 2015)

——, ‘「ふるさとの喪失」被害とその回復措置 (The Damage Related to “Loss of Hometown” and Its Remedy Measures)’ in Takehisa Awaji and others, *原発事故被害回復の法と政策 (Laws and Policies for Nuclear Accident Damage Reparation)* (Nihon Hyoron Sha 2018)

——, ‘福島原発事故による「ふるさとの喪失」をどう償うべきか—司法に問われる役割 (How to Compensate “Loss of Hometown” Caused by Fukushima Nuclear Accident: The Role of the Justice in Question)’ (2018) 2375/2376 Hanrei Jiho 241

——, ‘福島原発事故における「賠償政策」—政府の復興方針は賠償指針・基準にどう影響を与えてきたか—(Compensation Policies Regarding the Fukushima Nuclear Accident: How Have Government Reconstruction Policies Affected Compensation Guidelines and Standards?; Translation by the Author)’ (2020) 71 Business Research 1

——, ‘原子力損害賠償と集団訴訟—「ふるさとの喪失」被害を中心に (Nuclear Damage Compensation and Group Actions: Focus on the “Loss of Hometown” Damage)’ (2021) 26(3) Gakujutsu no doko 38

**Yokemoto M and Hiraoka M**, ‘原発賠償の仕組みと問題点—生活再建と地域再生に向けた課題 (The System and the Problems of Nuclear Compensation: the Issues related to the Reconstruction of Lives and the Restoration of Communities)’ in Masafumi Yokemoto and Toshihiko Watanabe (eds), *原発災害はなぜ不均等な復興をもたらすのか—福島事故から「人間の復興」、地域再生へ (Why does nuclear disaster induce imbalanced reconstruction? : Toward the “Reconstruction of Human Lives” and Community Revival from the Fukushima Accident)* (Minerva Shobo 2015)

**Yonekura T**, ‘「福島原発避難者訴訟」における損害論 (Damage Theory at “Fukushima Nuclear Accident Evacuees Lawsuits”)’ (2013) 43(2) 環境と公害 (Research on Environmental Disruption) 36

**Yoshida K**, ‘チェルノブイリ原発事故調査からの「居住福祉法 (民法)」的示唆—福島

第一原発問題との決定的な相違 (The Suggestion from the “Residential Welfare Act (Public Law)” of the Chernobyl Nuclear Accident Survey: The Definitive Difference with the Issues of the Fukushima Dai-ichi Nuclear Accident)’ (2014) 1026 NBL 33

——, ‘福島原発放射能問題と災害復興—福島原賠訴訟の法政策学的考察 (Fukushima Nuclear Accident Radiation Problems and Disaster Recovery: The Legal and Political Analysis of Fukushima Nuclear Damage Compensation Lawsuits)’ in Takehisa Awaji and others, *原発事故被害回復の法と政策 (Laws and Policies for Nuclear Accident Damage Reparation)* (Nihon Hyoron Sha 2018)

**Yoshimura R**, ‘原子力損害賠償紛争審査会「中間指針」の性格—審議経過から見えてくるもの (The Character of the Dispute Reconciliation Committee for Nuclear Damage Compensation’s “Interim Guideline” - What We Can Observe from the Meeting Proceedings)’ (2014) 86 Horitsu Jiho 134

——, ‘福島第一原発事故被害の完全救済に向けて (Efforts Toward Complete Relief for Fukushima Victims)’ (2014) 44 (1) 環境と公害 (Research on Environmental Disruption) 28

——, ‘避難者に対する慰謝料 (Solatia Payments for Evacuees)’ in Takehisa Awaji, Ryoichi Yoshimura and Masafumi Yokemoto (eds), *福島原発事故 賠償の研究 (Fukushima Nuclear Accident: The Compensation Study)* (Nihon Hyoron Sha 2015)

——, ‘「自主的避難者 (区域外避難者)」と「滞在者」の損害 (Damages Related to “Self (Out-of-Zone) Evacuees” and “Stayers”)’ in Takehisa Awaji, Ryoichi Yoshimura and Masafumi Yokemoto (eds), *福島原発事故 賠償の研究 (Fukushima Nuclear Accident: The Compensation Study)* (Nihon Hyoron Sha 2015)

——, ‘福島原発事故賠償集団訴訟群馬判決の検討 (A Study on the Gunma Court Decision in the Collective Lawsuit for Fukushima Nuclear Accident Compensation)’ (2017) 46(4) 環境と公害 (Research on Environmental Disruption) 59 (Translation of the title by the journal)

——, ‘福島原発事故賠償訴訟における「損害論」—集団訴訟七判決の比較検討 (The “Damage Theory” at Fukushima Nuclear Accident Compensation Lawsuits: Comparative Analysis of Seven Group Action Rulings)’ (2018) 2375/2376 Hanrei Jiho 252

——, ‘福島原発事故賠償訴訟のいま—事故から10年を経過して (The Current Status of Fukushima Nuclear Accident Compensation Lawsuits: 10 Years after the Accident) Translation by R. Hasegawa’ (2021) 93(3) Horitsu Jiho 4

**Yuasa M**, ‘Whistle in the Graveyard: Safety Discourse and Hiroshima/Nagasaki Authority in

Post-Fukushima Japan’, *Japan’s 3/11 disaster as seen from Hiroshima: a multidisciplinary approach* (Soeisha/Sanseidoshoten 2013)

**Zerbib JC**, ‘Tchernobyl, effets sanitaires et environnementaux’ (2015) 37 *Les cahiers de Global Chance* 42

**Zetter R**, ‘Legal and Normative Frameworks’ (2008) 31 *Forced Migration Review* 62

———, ‘The Role of Legal and Normative Frameworks for the Protection of Environmentally Displaced Persons.’ in Frank Laczko and Christine Aghazarm (eds), *Migration, Environment, and Climate Change: Assessing the Evidence* (IOM 2009)

**Zgersky M**, ‘Legal Regime of the Chernobyl Problems in the USSR, Belarus, Russia and the Ukraine’ in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998)

**Zickgraf C**, ‘Immobility’ in Robert McLeman and François Gemenne (eds), *Routledge Handbook of Environmental Displacement and Migration* (Routledge 2018)

**Ziegler R (Ruvi)**, ‘International Humanitarian Law and Refugee Protection’ in Cathryn Costello, Michelle Foster and Jane McAdam (eds), *The Oxford Handbook of International Refugee Law* (Oxford University Press 2021)

### **Reports, Policy Papers, and Guidelines**

**Académie nationale de médecine/Académie des sciences**, ‘La relation dose-effet et l’estimation des effets cancérigènes des faibles doses de rayonnements ionisants’ (French Academy of Science 2005)

**AEC**, ‘Theoretical Possibilities and Consequences of Major Accidents in Large Nuclear Power Plants: A Study of Possible Consequences If Certain Assumed Accidents, Theoretically Possible but Highly Improbable, Were to Occur in Large Nuclear Power Plants’ (US Atomic Energy Commission 1957) (WASH-740 Report)

**Autorité de sûreté nucléaire (ASN)**, ‘Policy Elements for Post-Accident Management in the Event of Nuclear Accident’ (French Nuclear Safety Authority 2012)

———, ‘Maîtrise des activités au voisinage des installations nucléaires de base’ (French Nuclear Safety Authority 2016) Guide N°15



**Boilley D**, ‘Fukushima cinq ans après, retour à l’anormale’ (ACRO 2016) <[http://fukushima.eu.org/wp-content/uploads/2016/03/Fukushima\\_retour\\_a\\_lanormale\\_ACRO\\_2016.pdf](http://fukushima.eu.org/wp-content/uploads/2016/03/Fukushima_retour_a_lanormale_ACRO_2016.pdf)> accessed 8 February 2023

——, ‘Fukushima, deux ans après, retour à l’anormale’ (ACRO 2013) <<https://www.acro.eu.org/fukushima-deux-ans-apres-retour-a-lanormal/>> accessed 8 February 2023

**Brookings-Bern Project on Internal Displacement**, ‘Protecting Internally Displaced Persons: A Manual for Law and Policymakers’ (Brookings Institute 2008)

**Cabinet Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company**, ‘Interim Report’ (The Cabinet of Japan 2011)

——, ‘Final Report’ (The Cabinet of Japan 2012)

**Cabinet Secretariat**, ‘政府・東京電力統合対策室合同記者会見（平成23年5月2日）（The Government/TEPCO Joint Press Conference Held on 2 May 2011）’ (2 May 2011)

——, ‘Report from the Working Group on Risk Management of Exposure to Low-Dose Radiation’ (Government of Japan 2011) 22 December 2011

**CCPR**, ‘General Comment No. 6: Article 6 (Right to Life)’ (Human Rights Committee 1982) 30 April 1982

——, ‘General Comment No.14: Article 6 (Right to Life); Nuclear Weapons and the Right to Life’ (Human Rights Committee 1984) UN Doc HRI/GEN/1/Rev.9 (Vol. I) (9 November 1984)

——, ‘General Comment No.18: Non-Discrimination’ (Human Rights Committee 1989) (10 November 1989)

——, ‘Concluding Observations on the Sixth Periodic Report of Japan’ (Human Rights Committee 2014) UN Doc CCPR/C/JPN/CO/6 (20 August 2014)

——, ‘General Comment No. 36; Article 6: Right to Life’ (Human Rights Committee 2018) UN Doc CCPR/C/GC/36 (30 October 2018)

**CESCR**, ‘General Comment No.14: The Right to the Highest Attainable Standard of Health (Article 12 of the International Covenant on Economic, Social and Cultural Rights)’ (Committee on Economic, Social and Cultural Rights 2000) UN Doc E/C.12/2000/4 (11 August 2000)

——, ‘Consideration of Reports Submitted by States Parties Under Articles 16 and 17 of the

Covenant: Concluding Observations of the Committee on Economic, Social and Cultural Rights’ (Committee on Economic, Social and Cultural Rights 2001) UN Doc E/C.12/1/Add.67 (24 September 2001)

——, ‘Concluding Observations on the Third Periodic Report of Japan, Adopted by the Committee at Its Fiftieth Session (29 April-17 May 2013)’ (Committee on Economic, Social and Cultural Rights 2013) UN Doc E/C.12/JPN/CO/3 (10 June 2013)

**Codex Alimentarius Commission**, ‘General Standard for Contaminants and Toxins in Foods and Feeds’ (FAO/WHO 2009) CODEX STAN 193-1995

**CODIRPA**, ‘La gestion post-accidentelle d’un accident nucléaire: les nouveaux zonages’ (Comité directeur pour la gestion post-accidentelle d’un accident nucléaire/French Advisory Committee for Post-Accident Management of a Nuclear Accident 2022)

——, ‘Recommandations pour la gestion post-accidentelle d’un accident nucléaire’ (French Comité directeur pour la gestion post-accidentelle d’un accident nucléaire/French Advisory Committee for Post-Accident Management of a Nuclear Accident 2022)

**CRIDEAU-OMIJ (University of Limoges)**, ‘Draft Convention on the Status of Environmentally Displaced Persons’ (CIDCE 2013) Third Version

——, ‘Draft Convention on the Status of Environmentally Displaced Persons’ (CIDCE 2018) Fourth Version

**Directorate-General for Energy, ENCO and UJV**, *Review of Current Off-Site Nuclear Emergency Preparedness and Response Arrangements in EU Member States and Neighbouring Countries: Final Report* (European Commission 2014)

**Dispute Reconciliation Committee for Nuclear Damage Compensation**, ‘東京電力株式会社福島第一、第二原子力発電所事故による原子力損害の範囲の判定等に関する中間指針 (Interim Guidelines on Determination of the Scope of Nuclear Damage resulting from the Accident at the Tokyo Electric Power Company Fukushima Daiichi and Daini Nuclear Power Plants)’ (MEXT, 2011)

——, ‘東京電力株式会社福島第一、第二原子力発電所事故による原子力損害の範囲の判定等に関する中間指針第二次追補 (政府による避難区域等の見直し等に係る損害について) (Second Supplement to Interim Guidelines on Determination of the Scope of Nuclear Damage resulting from the Accident at the Tokyo Electric Power Company Fukushima Daiichi and Daini Nuclear Power Plants (concerning Damages related to Review of Evacuation Areas

by Government Instructions, etc.))’ (MEXT 2012)

——, ‘原子力損害賠償紛争解決センター活動状況報告書—令和3年における状況について (Activity Report for Nuclear Damage ADR Centre: The Status in 2021)’ (MEXT 2022) <[https://www.mext.go.jp/a\\_menu/genshi\\_baisho/jiko\\_baisho/detail/pdf/20200318-mxt\\_san-gen02-hokoku.pdf](https://www.mext.go.jp/a_menu/genshi_baisho/jiko_baisho/detail/pdf/20200318-mxt_san-gen02-hokoku.pdf)> accessed 1 May 2020

**European Court of Human Rights**, ‘Practical Guide on Admissibility Criteria’ (Council of Europe 2011)

**El-Hinnawi E**, ‘Environmental Refugees’ (UN Environment Programme 1985)

**EPA**, ‘Manual of Protective Action Guides and Protective Actions for Nuclear Incidents’ (US Environmental Protection Agency 1992) EPA-400-R-92-001

——, ‘PAG Manual: Protective Action Guides and Planning Guidance for Radiological Incidents’ (US Environmental Protection Agency 2017) EPA-400/R-17/001

**Fischer D**, ‘History of the International Atomic Energy Agency: The First Forty Years’ (IAEA 1997)

**Foresight**, ‘Migration and Global Environmental Change: Future Challenges and Opportunities’ (The Government Office of Science, UK 2011) Final Project Report

**Futaba Town (Fukushima)**, ‘双葉町復興まちづくり計画 (第3次) (The 3rd Futaba Town Reconstruction Town Building Plan)’ (Futaba Town, Fukushima, 2022)

**Global Protection Cluster Working Group**, ‘Handbook for the Protection of Internally Displaced Persons’ (IASC/UNHCR 2010)

**Government of Japan**, ‘Convention on Nuclear Safety: National Report of Japan for the Fifth Review Meeting’ (2010) Report submitted to the IAEA 5th Review Meeting of the Contracting Parties

——, ‘Report of Japanese Government to the IAEA Ministerial Conference on Nuclear Safety - The Accident at TEPCO’s Fukushima Nuclear Power Stations -’ (Nuclear Emergency Response Headquarters 2011)

**Guterres A**, ‘Opening Statement by Mr. António Guterres, United Nations High Commissioner for Refugees, at the 60th Session of the Executive Committee of the High Commissioner’s Programme (ExCom)’ (UNHCR, Geneva, 28 September 2009)

**HERCA and WENRA**, ‘HERCA-WENRA Approach for a Better Cross-Border Coordination of Protective Actions during the Early Phase of a Nuclear Accident’ (Hheads of the European Radiological Protection Competent Authorities/Western European Nuclear Regulators’ Association 2014)

**Human Rights Now**, ‘東日本大震災の被災者(避難所・自宅居住)の方々の 権利保障のために当面配慮し、実現されるべきこと (Recommendations For the Protection of Rights of Persons Affected by the Great East Japan Disaster (Evacuees and Stayers))’ (Human Rights Now 2011) 24 April 2011 <[http://hrn.or.jp/activity2/shinsai\\_02.pdf](http://hrn.or.jp/activity2/shinsai_02.pdf)> accessed 16 February 2023

**IAEA**, ‘Planning for Off-Site Response to Radiation Accidents in Nuclear Facilities’ (International Atomic Energy Agency 1981) Safety Series No. 55

——, ‘Principles and Techniques for Post-Accident Assessment and Recovery in a Contaminated Environment of a Nuclear Facility’, (International Atomic Energy Agency 1989) Safety Series No.97

——, ‘The Safety of Nuclear Installations’ (International Atomic Energy Agency 1993) Safety Series No. 110

——, ‘Basic Safety Principles for Nuclear Power Plants’ (International Atomic Energy Agency 1999) 75-INSAG-3 Rev. 1

——, ‘Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety’ (International Atomic Energy Agency 2000) General Safety Requirements No. GS-R-1

——, ‘IAEA Safety Requirement: Preparedness and Response for a Nuclear or Radiological Emergency’: (International Atomic Energy Agency, jointly sponsored by FAO, ILO, OECD/NEA, PAHO, OCHA and WHO 2002) IAEA Safety Standards Series, No. GS-R-2

——, ‘Application of the Concepts of Exclusion, Exemption and Clearance’ (International Atomic Energy Agency 2004) Safety Standards Series No. RS-G-1.7

——, ‘Chernobyl: The True Scale of the Accident’ *IAEA Press Release* (5 September 2005) <<https://www.iaea.org/newscenter/pressreleases/chernobyl-true-scale-accident>> accessed 26 April 2023

——, ‘Chernobyl’s Legacy: Health, Environmental and Socio-Economic Impacts and

Recommendations to the Governments of Belarus, the Russian Federation and Ukraine: The Chernobyl Forum 2003-2005' (The Chernobyl Forum 2006) Second Revised Version

——, 'Fundamental Safety Principles' (International Atomic Energy Agency 2006) Safety Fundamentals No. SF-1

——, 'Arrangements for Preparedness for a Nuclear or Radiological Emergency' (International Atomic Energy Agency 2007) Safety Guide GS-G-2.1

——, 'Remediation Process for Areas Affected by Past Activities and Accidents' (International Atomic Energy Agency 2007) Safety Guide WS-G-3.1

——, 'Integrated Regulatory Review Service (IRRS) to Japan, Mission Report (25 to 30 June 2007)' (International Atomic Energy Agency 2007) IAEA-NSNI-IRRS-2007/01

——, 'Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency' (International Atomic Energy Agency 2011) General Safety Guide GSG-2

——, 'Actions to Protect the Public in an Emergency Due to Severe Conditions at a Light Water Reactor' (International Atomic Energy Agency 2013) EPR-NPP-PPA (2013)

——, 'Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards' (International Atomic Energy Agency 2014) GSR Part 3

——, 'Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (2012 Edition): Specific Safety Guide' (International Atomic Energy Agency 2014) IAEA Safety Standards Series No. SSG-26

——, 'Final Report: The Follow-Up IAEA International Mission on Remediation of Large Contaminated Areas Off-Site the Fukushima Daiichi Nuclear Power Plant, Tokyo and Fukushima Prefecture, Japan 14-21 October 2013' (International Atomic Energy Agency 2014) NE/NEFW/2013

——, 'Preparedness and Response for a Nuclear or Radiological Emergency' (International Atomic Energy Agency 2015) General Safety Requirements GSR Part 7

——, 'The Fukushima Daiichi Accident: Technical Volume 3/5 Emergency Preparedness and Response' (International Atomic Energy Agency 2015)

——, 'Guidelines Regarding National Reports under the Convention on Nuclear Safety' (International Atomic Energy Agency 2015) INFCIRC/572/Rev.5

——, ‘Governmental, Legal and Regulatory Framework for Safety’ (International Atomic Energy Agency 2016) General Safety Requirements GSR Part 1 (Rev.1)

——, ‘The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage — Explanatory Texts’ (International Atomic Energy Agency 2017) Text IAEA International Law Series No. 3 (Revised)

——, ‘Arrangements for the Termination of a Nuclear or Radiological Emergency’ (International Atomic Energy Agency 2018) General Safety Guide GSG-11

——, ‘IAEA Safety Glossary: 2018 Edition’ (International Atomic Energy Agency 2019)

——, ‘Review Report: IAEA Follow-up Review of Progress Made on Management of ALPS Treated Water and the Report of the Subcommittee on Handling of ALPS Treated Water at TEPCO’s Fukushima Daiichi Nuclear Power Station’ (International Atomic Energy Agency 2020) 2 April 2020

——, ‘Long Term Structure of the IAEA Safety Standards and Current Status’ (International Atomic Energy Agency 2021)

——, ‘Remediation Strategy and Process for Areas Affected by Past Activities or Events’ (International Atomic Energy Agency 2022) GSG-15

**IAEA and NEA/OECD**, ‘INES: The International Nuclear and Radiological Event Scale User’s Manual’ (International Atomic Energy Agency 2013)

**IASC**, ‘Policy Paper: Protection of Internally Displaced Persons’ (Inter-Agency Standing Committee 1999)

——, ‘IASC Framework on Durable Solutions for Internally Displaced Persons’ (Inter-Agency Standing Committee/The Brookings-Bern Project on Internal Displacement 2010)

——, ‘IASC Operational Guidelines on the Protection of Persons in Situations of Natural Disasters’ (Inter-Agency Standing Committee/The Brookings-Bern Project on Internal Displacement 2011)

**ICRP**, ‘International Recommendations on Radiological Protection. Revised by the International Commission on Radiological Protection at the Sixth International Congress of Radiology, London, July 1950’ (1951) 24 The British Journal of Radiology 46

- , ‘Recommendations of the International Commission on Radiological Protection’ (1955) Suppl. 6 The British Journal of Radiology
- , ‘Recommendations of the International Commission on Radiological Protection. ICRP Publication 1.’ (Pergamon Press 1959)
- , ‘Recommendations of the International Commission on Radiological Protection. ICRP Publication 9.’ (Pergamon Press 1966)
- , ‘Implications of Commission Recommendations That Doses Be Kept as Low as Readily Achievable. ICRP Publication 22.’ (Pergamon Press 1973)
- , ‘Report on the Task Group on Reference Man. ICRP Publication 23.’ (Pergamon Press 1975)
- , ‘Recommendations of the International Commission on Radiological Protection. ICRP Publication 26.’ (Pergamon Press 1977) Ann. ICRP 1 (3)
- , ‘Protection of the Public in the Event of Major Radiation Accidents: Principles for Planning. ICRP Publication 40.’ (Pergamon Press 1984) Ann. ICRP 14 (2)
- , ‘1990 Recommendations of the International Commission on Radiological Protection. ICRP Publication 60.’ (ICRP 1991) Ann. ICRP 21 (1-3).
- , ‘Basic Anatomical and Physiological Data for Use in Radiological Protection Reference Values. ICRP Publication 89.’ (Pergamon Press 2002) ICRP 32 (3-4)
- , ‘Scope of Radiological Protection Control Measures. ICRP Publication 104.’ (2007) Ann. ICRP 37 (5)
- , ‘The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.’ (Elsevier 2007) Ann. ICRP 37 (2-4)
- , ‘Application of the Commission’s Recommendations for the Protection of People in Emergency Exposure Situations. ICRP Publication 109.’ (Elsevier 2009) Ann. ICRP 39 (1)
- , ‘Application of the Commission’s Recommendations to the Protection of People Living in Long-Term Contaminated Areas after a Nuclear Accident or a Radiation Emergency. ICRP Publication 111.’ (Elsevier 2009) Ann. ICRP 39 (3).
- , ‘Ethical Foundations of the System of Radiological Protection. ICRP Publication 138.’

(ICRP 2018) Ann. ICRP 47(1)

——, ‘Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident. ICRP Publication 146.’ (ICRP 2020) Ann. ICRP 49 (4)

——, ‘ICRP 2021 Annual Report’ (International Commission on Radiological Protection 2022)

**ILC**, ‘Draft Articles on State Responsibility’ (1976) (A/CN.4/SER.A/1976/Add.1 (Part 2)) Yearbook of the International Law Commission, vol. II, Part Two (para 78)

——, ‘Second Report on International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law, by Mr. Robert Q. Quentin-Baxter, Special Rapporteur’ (UN International Law Commission 1981) UN Doc A/CN.4/346/Add.1

——, ‘Draft Articles on Prevention of Transboundary Harm from Hazardous Activities’ (2001) (A/56/10) Report of the International Law Commission: Fifty-third session (para 97)

——, ‘Report of the International Law Commission: Fifty-third session’ (UN International Law Commission 2001) UN Doc A/56/10

——, ‘Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising Out of Hazardous Activities’ (2006) (A/61/10) Report of the International Law Commission: Fifty-eighth session (para 66)

——, ‘Report of the International Law Commission: Fifty-eighth session’ (UN International Law Commission 2006) UN Doc A/61/10

——, ‘Protection of Persons in the Event of Disasters: Memorandum by the Secretariat’ (UN International Law Commission 2007) UN Doc A/CN.4/590

——, ‘Report of the International Law Commission: Fifty-ninth session’ (UN International Law Commission 2007) UN Doc A/62/10

——, ‘Sixth Report on the Protection of Persons in the Event of Disasters, by Mr Eduardo Valencia-Ospina, Special Rapporteur’ (UN International Law Commission 2013) UN Doc A.CN.4/662

——, ‘Draft Articles on the Protection of Persons in the Event of Disasters’ (2016) (A/71/10) Report of the International Law Commission: Sixty-eighth session (para 48)

——, ‘Report of the International Law Commission: Sixty-eighth session’ (UN International



Law Commission 2016) UN Doc A/71/10

——, ‘Report of the International Law Commission: Seventy-first session’ (UN International Law Commission 2019) UN Doc A/74/10

**IOM**, ‘Ecological Migrants in Belarus: Returning Home after Chernobyl?’ (International Organization for Migration 1997)

——, ‘IOM Outlook on Migration, Environment and Climate Change’ (International Organization for Migration 2014)

**IPPNW and GFS**, ‘Health Effects of Chernobyl: 25 Years after the Reactor Catastrophe’ (International Physicians for the Prevention of Nuclear War and Gesellschaft für Strahlenschutz 2011)

**IRSN**, ‘Examen de la méthode d’analyse coût-bénéfice pour la sûreté’ (IRSN 2007) DSR No 157

——, ‘Méthodologie appliquée par l’Irsn pour l’estimation des coûts d’accidents nucléaires en France.’ (IRSN 2013) PRP-CRI/SESUC/2013-00261

**Japan Medical Association**, ‘文部科学省「福島県内の学校の校舎・校庭等の利用判断における暫定的考え方」に対する日本医師会の見解 (The Opinion of the Japan Medical Association on the MEXT’s “Provisional View on the Use of School Building/Schoolyard, Etc. in Fukushima Prefecture”)’ (2011) 12 May 2011

**JCER**, ‘Accident Cleanup Costs Rising to 35-80 Trillion Yen in 40 Years’ (Japan Center for Economic Research 2019)

**JELI**, ‘原子力損害賠償に関する国内外の検討 (Deliberation on Nuclear Damage Liability Law in and outside Japan)’ (Japanese Energy Law Research Institute 2017)

**JFBA**, ‘Statement Concerning the Government’s “Provisional Guideline for the Utilization of School Buildings, Grounds, and Related Facilities in Fukushima Prefecture”’ (Japan Federation of Bar Associations 2011) 22 April 2011

——, *原発事故・損害賠償マニュアル (Nuclear Accident Damage Compensation Manual)* (Nihon Kajo Shuppan 2011)

——, ‘東京電力福島第一、第二原子力発電所事故による原子力損害の範囲の判定等に関する中間指針に向けての意見書 (Opinion Paper for the Interim Guideline in Assessing the Scope of Nuclear Damage from the TEPCO Fukushima Daiichi and Daini Nuclear Power

Plant Accidents)’ (Japan Federation of Bar Associations 2011) 23 June 2011

——, ‘東京電力株式会社が行う原発事故被害者への損害賠償手続に関する会長声明 (President’s Statement Regarding the Damage Compensation Procedure for Nuclear Accident Victims Fixed by TEPCO)’ (Japan Federation of Bar Associations 2011) 16 September 2011

——, ‘東京電力第一、第二原子力発電所事故における避難区域外の避難者及び居住者に対する損害賠償に関する指針についての意見書 (Opinion Paper in Relation to the Guideline on Damage Compensation for the Evacuees and Residents in Out-of-Zone Areas in the Context of the TEPCO Fukushima Daiichi and Daini Nuclear Power Plant Accidents)’ (Japan Federation of Bar Associations 2011) 24 November 2011

——, ‘福島第一原子力発電所事故による損害賠償の枠組みについての意見書 (Opinion Paper on the Framework of Fukushima Daiichi Nuclear Power Plant Accident Damage Compensation)’ (Japan Federation of Bar Associations 2011) 17 June 2011

——, ‘原発事故子ども・被災者支援法に基づく基本方針に関する意見 (Opinion on the Basic Framework Related to the Nuclear Accident Victims and Children Support Law)’ (Japan Federation of Bar Associations 2012) 20 December 2012

——, ‘福島の復興再生と福島原発事故被害者の援護のための特別立法制定に関する意見書 (Opinion Paper Concerning the Enactment of Special Acts on Fukushima Reconstruction and Revitalization and Nuclear Accident Victims’ Support)’ (Japan Federation of Bar Associations 2012) 16 February 2012

——, ‘「原子力災害による被災者支援施策パッケージ～子どもをはじめとする自主避難者等の支援の拡充に向けて～」に関する会長声明 (President’s Statement Regarding “The Package of Support Measures for Nuclear Disaster Victims: For the Purpose of Widening the Support for Self-Evacuees Including Children”)’ (Japan Federation of Bar Associations 2013) 22 March 2013

——, ‘「被災者生活支援等施策の推進に関する基本的な方針 (案)」に関する会長声明 (President’s Statement Regarding “The (Draft) Basic Framework Regarding the Promotion of Disaster Victims Life Support Measures”)’ (Japan Federation of Bar Associations 2013) 11 September 2013

——, ‘避難住民の帰還に当たっての線量基準に関する会長声明 (President’s Statement Regarding the Dose Standard for the Return of Evacuees)’ (Japan Federation of Bar Associations 2014) 31 January 2014

**Koskenniemi M**, ‘Study on the Function and Scope of the Lex Specialis Rule and the Question of “Self-Contained Regimes”’: Preliminary Report by Martti Koskenniemi, Chairman of the Study Group’ (UN International Law Commission 2004) A/CN.4/ILC(LVI)/SG/FIL/CRD.1 (7 May 2004)

**Kikima H**, ‘広島救護被爆者手帳交付訴訟の地裁判決についての談話 (About the District Court Decision Concerning the Issuance of Hiroshima Rescue Hibakusha Health Book Legal Action)’ (Japan Federation of Democratic Medical Institutions (Min-Iren) 2009) Statement on 31 March 2009

**Kingdom of Belgium**, ‘Seventh Meeting of the Contracting Parties to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management’ (Federal Agency for Nuclear Control (FANC) 2020) National Report

**MEXT**, ‘福島県内の学校の校舎・校庭等の利用判断における暫定的考え方について (Provisional View Regarding the Use of School Buildings and Shoolyards in Fukushima Prefecture)’ (Japan Ministry of Education, Culture, Sports, Science and Technology 2011) 19 April 2011

——, ‘福島県内における児童生徒等が学校等において受ける線量低減に向けた当面の対応について (Provisional Measures to Reduce Radiation Doses Received by Children and Students at Schools, Etc. in Fukushima Prefecture)’ (Japan Ministry of Education, Culture, Sports, Science and Technology 2011) 27 May 2011

**METI**, ‘東電改革提言 (TEPCO Reform Recommendations)’ (TEPCO Reform Committee/Japan Ministry of Economy, Trade and Industry 2016)

——, ‘エネルギーに関する年次報告 (エネルギー白書 2019) (Annual Report on Energy/The 2019 White Paper on Energy)’ (Japan Ministry of Economy, Trade and Industry 2019)

——, ‘避難指示区域の見直しに伴う賠償基準の考え方について (The Concept of Compensation Standards Following the Reorganisation of Evacuation Zones)’ (Japan Ministry of Economy, Trade and Industry 2012) 19 April 2011

**MHLW**, ‘原爆症認定審査の現状について (The Current Situation of Atomic Bomb Illness Certification Assessment)’ (Japan Ministry of Health, Labour and Welfare 2011) Support Doc No.2 submitted to the Fifth Study Group Meeting on the Atomic Bomb Sickness Certification System on 15 July 2011

——, ‘原爆症認定について (On the Atomic Bomb Illness Certification)’ (Ministry of Health, Labour and Welfare 2014) June 2014;

——, ‘「電離放射線障害の業務上外に関する検討会」の検討結果及び労災認定について (The View on Industrial Accident Recognition for Radiation Exposure and Leukaemia)’

(Ministry of Health, Labour and Welfare 2015) 20 October 2015

——, ‘原子爆弾被爆者援護施策の概要及び対象地域について (The Summary of Atomic Bomb Hibakusha Support Policies and the Eligible Area)’ (Ministry of Health, Labour and Welfare 2020) Supporting Doc No.2 to the First Study Group Meeting on the “Special Zone for Health Check-up” (16 November 2020)

**Ministère de l’intérieur**, ‘Déclinaison du plan national de réponse à un accident nucléaire ou radiologique majeur’ (French Ministry of Interior 2014)

——, ‘Plans particuliers d’intervention : Centres nucléaires de production d’électricité d’EDF’ (French Ministry of Interior 2017) Tome 2 de la déclinaison du plan national de réponse à un accident nucléaire ou radiologique majeur

**NAIIC**, ‘Report of the National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission’ (The National Diet of Japan 2012)

**Nansen Initiative**, ‘Agenda for the Protection of Cross-Border Displaced Persons in the Context of Disasters and Climate Change’ (Nansen Initiative 2015)

**National Research Council/National Academy of Sciences**, ‘The Biological Effects of Atomic Radiation: A Report to the Public’ (U.S. National Academy of Sciences 1956) (BEAR Report)

——, ‘Effects on Populations of Exposure to Low Levels of Ionizing Radiation’ (U.S. National Academy of Sciences 1972) (BEIR Report)

——, ‘Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2’ (U.S. National Academy of Science 2006) (BEIR VII Report)

**NCRP**, ‘Insert to Accompany National Bureau of Standards Handbook 59, Permissible Dose from External Sources of Ionizing Radiations’ (U.S. National Committee on Radiation Protection and Measurement 1957)

**NEA/OECD**, ‘Liability and Compensation for Nuclear Damage - An International Overview’ (Nuclear Energy Agency 1994)

——, ‘Responsabilité et réparation des dommages nucléaires - Une perspective internationale’ (Nuclear Energy Agency 1994)

——, ‘Austria - Federal Act on Civil Liability for Damage Caused by Radioactivity (Atomic Liability Act 1999 - AtomHG 1999)’ (1999) Supplement 63 Nuclear Law Bulletin

——, ‘Nuclear Electricity Generation: What Are the External Costs?’ (Nuclear Energy Agency

2003)

——, ‘Regulatory and Institutional Framework in Japan against the Background of Fukushima’ (2011) 87 Nuclear Law Bulletin 120

——, *Japan’s Compensation System for Nuclear Damage: As Related to the TEPCO Fukushima Daiichi Nuclear Accident*. (Nuclear Energy Agency 2012)

——, ‘Nuclear Legislation in OECD and NEA Countries: United States (2016 Update)’ (Nuclear Energy Agency 2016)

**NERHQ**, ‘Report of Japanese Government to the IAEA Ministerial Conference on Nuclear Safety - The Accident at TEPCO’s Fukushima Nuclear Power Stations -’ (Government of Japan 2011)

——, ‘ステップ2の完了を受けた警戒区域及び避難指示区域の見直しに関する基本的考え方及び今後の検討課題について (The Basic View and Future Reflections on Restricted Zone and Evacuation Zones after the Termination of Step 2)’ (Nuclear Emergency Response Headquarters/Government of Japan 2011) 26 December 2011

——, ‘伊達市における特定避難勧奨地点の解除について (Termination of Radiation Hotspot Designation in Date City)’ (Nuclear Emergency Response Headquarters/Government of Japan 2012) 14 December 2012

——, ‘川内村における特定避難勧奨地点の解除について (Termination of Radiation Hotspot Designation in Kawauchi Village)’ (Nuclear Emergency Response Headquarters/Government of Japan 2012) 14 December 2012

——, ‘原子力災害からの福島復興の加速に向けて (Toward the Acceleration of Fukushima Reconstruction from the Nuclear Disaster)’ (Nuclear Emergency Response Headquarters/Government of Japan 2013) 20 December 2013

——, ‘南相馬市における特定避難勧奨地点の解除について (Termination of Radiation Hotspot Designation in Minamisoma City)’ (Nuclear Emergency Response Headquarters/Government of Japan 2014) 24 December 2014

——, ‘「原子力災害からの福島復興の加速に向けて」改訂 (Revised Version: Toward the Acceleration of Fukushima Reconstruction from the Nuclear Disaster)’ (Nuclear Emergency Response Headquarters/Government of Japan 2015) 12 June 2015

**NRA**, ‘Practical Measures for Evacuees to Return Their Homes’ (Japan Nuclear Regulation Authority 2013)

**NRC and FEMA (US)**, ‘Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants’ (US Nuclear Regulatory Commission/Federal Emergency Management Agency 1980) NUREG-0654/FEMA-REP-1

**NRC, iDMC and Brookings-LSE**, ‘National Instruments on Internal Displacement: A Guide to Their Development’ (Internal Displacement Monitoring Centre/Norwegian Refugee Council 2013)

**NSC**, ‘発電用軽水型原子炉施設に関する安全設計審査指針 (Regulatory Guide for Reviewing Safety Design of Light Water Nuclear Power Reactor Facilities)’ (Nuclear Safety Commission 1977) 14 June 1977, as amended

——, ‘原子力施設等の防災対策について (Regulatory Guide: Emergency Preparedness for Nuclear Facilities)’ (Nuclear Safety Commission 1980) as amended

——, ‘原子力緊急事態解除宣言等に対する技術的助言に関する基本的考え方について (Basic Views on the Technical Advice Related to the Declaration of the End of Nuclear Emergency)’ (Nuclear Safety Commission 2004) 27 August 2004

——, ‘今後の避難解除、復興に向けた放射線防護に関する基本的な考え方について (Basic Concept on Radiological Protection for the Future Lifting of Evacuation Orders and Reconstruction)’ (Nuclear Safety Commission 2011) 19 July 2011

——, ‘東京電力株式会社福島第一原子力発電所事故における緊急防護措置の解除に関する考え方について (The View on the Termination of Emergency Protection Measures Related to TEPCO Fukushima Daiichi Nuclear Power Plant Accident)’ (Nuclear Safety Commission 2011) 4 August 2011

**OCHA**, ‘Chernobyl: A Continuing Catastrophe’ (United Nations 2000)

——, ‘Glossary of Humanitarian Terms in Relation to the Protection of Civilians in Armed Conflict’ (UN Office for the Coordination of Humanitarian Affairs 2004)

**OECD**, ‘Recommendation of the Council on Guiding Principles Concerning International Economic Aspects of Environmental Policies’ (Organisation for Economic Co-operation and Development 1972) C(72)128 (26 May 1972)

**OHCHR**, ‘Human Rights: A Compilation of International Instruments’ (Office of the UN High Commissioner for Human Rights 2002) UN Doc ST/HR/1/Rev. 6 (Vol. I/Part 2)

——, ‘Japan Must Halt Returns to Fukushima, Radiation Remains a Concern, Says UN Rights

Expert' *UN Office of the High Commissioner for Human Rights* (25 October 2018) Press Release

——, 'Japan Must Step Up Efforts to Solve Human Rights Fallout from Fukushima Disaster: UN Experts' *UN Office of the High Commissioner for Human Rights* (11 March 2021) Press Release

——, 'Japan: UN Experts Say Deeply Disappointed by Decision to Discharge Fukushima Water' *UN Office of the High Commissioner for Human Rights* (15 April 2021) Press Release

——, 'United Nations Human Rights Report 2020' (Office of the UN High Commissioner for Human Rights 2021)

**OHCHR Europe**, 'Making A Difference: An Introduction to Human Rights' (2018)

**Reconstruction Agency**, '住民意向調査速報版（双葉町）の公表について (Futaba Town Residents Survey: Preliminary Report)' (Japan Reconstruction Agency 2019) published 27 December 2019

**Reconstruction Agency, Fukushima Prefecture and Tamura city**, '田村市住民意向調査調査結果 (Tamura City Residents Survey: Results)' (Japan Reconstruction Agency 2013) published 5 February 2013

**Science and Technology Agency (STA)**, '原子力損害賠償制度（改訂版）(Nuclear Damage Compensation System [Revised Version])' (Japan Science and Technology Agency 1991)

**Secrétariat général de la défense et de la sécurité nationale**, 'National Response Plan: Major Nuclear or Radiological Accidents' (SGDSN/French Secretariat-General for National Defence and Security 2014) Number 200/SGDSN/PSE/PSN-February 2014

**Stockholm International Peace Research Institute**, *SIPRI Yearbook 2022: Armaments, Disarmament and International Security* (Oxford University Press 2022)

**UNFCCC**, 'Report of the Conference of the Parties on Its Sixteenth Session, Held in Cancun from 29 November to 10 December 2010 (The Cancun Agreements)' (UN Framework Convention on Climate Change 2011) UN Doc FCCC/CP/2010/7/Add.1 (15 March 2011)

——, 'Report of the Conference of the Parties on Its Twenty-First Session, Held in Paris from 30 November to 13 December 2015 (The Paris Agreement)' (UN Framework Convention on Climate Change 2016) UN Doc FCCC/CP/2015/10/Add.1 (29 January 2016)

**UN**, 'Report of the United Nations Conference on the Human Development' (United Nations 1973) UN doc A/Conf.48/14/Rev.1

——, ‘Annan Urges Continued International Support for Victims of Chernobyl Disaster’ *UN Press Release* (United Nations 2004) 26 April 2004

**UNCHR**, ‘Human Rights and the Environment: Final Report Prepared by Mrs. Fatma Zohra Ksentini, Sepcial Rapporteur’ (UN Commission on Human Rights, 6 July 1994) UN Doc E/CN.4/Sub.2/1994/9

——, ‘Internally Displaced Persons: Compilation and Analysis of Legal Norms: Report of the Representative of the Secretary-General, Francis M. Deng, Submitted Pursuant to Commission on Human Rights Resolution 1995/57’ (UN Commission on Human Rights 1995) UN Doc E/CN.4/1996/52/Add.2 (5 December 1995)

——, ‘Report of the Representative of the Secretary-General, Mr. Francis M. Deng, Submitted Pursuant to Commission Resolution 1997/39 Addendum: Guiding Principles on Internal Displacement’ (11 February 1998) UN Doc E/CN.4/1998/53/Add.2

**UNDP**, ‘National Post-Disaster Recovery Planning and Coordination’ (UNDP 2016) A Guidance Note

**UNDP and UNICEF**, ‘The Human Consequences of the Chernobyl Nuclear Accident: A Strategy for Recovery.’ (2002)

**UNDRR**, ‘Sendai Framework for Disaster Risk Reduction 2015-2030’ (United Nations 2015)

**UNEP**, ‘Register of International Treaties and Other Agreements in the Field of the Environment’ (UN Environment Programme 2005) UN Doc UNEP/Env.Law/2005/3

**UNGA**, ‘Universal Declaration of Human Rights’ (UN General Assembly 1948) UN Res 217A(III), UN Doc A/810 (10 December 1948)

——, ‘Res 428 (V) Statute of the Office of the United Nations High Commissioner for Refugees’ (UN General Assembly 1950) UN Doc A/RES/428(V) (14 December 1950)

——, ‘Report of the World Commission on Environment and Development: “Our Common Future” (Brundtland Report)’ (UN General Assembly 1987) UN Doc A/42/427 (4 August 1987)

——, ‘Report of the United Nations Conference on Environment and Development: Annex I Rio Declaration on Environment and Development’ (UN General Assembly 1992) UN Doc A/CONF.151/26 (Vol. I) (12 August 1992) (The Rio Declaration)

——, ‘Res 60/1 2005 World Summit Outcome’ (UN General Assembly 2005) UN Doc



A/RES/60/1 (16 September 2005)

——, ‘Res 69/283 Sendai Framework for Disaster Risk Reduction 2015–2030’ (UN General Assembly 2015) UN Doc A/RES/69/283 (23 June 2015)

——, ‘Res 70/1 Transforming Our World: The 2030 Agenda for Sustainable Development’ (UN General Assembly 2015) UN Doc A/RES/70/1 (25 September 2015)

——, ‘One Humanity: Shared Responsibility: Report of the Secretary-General for the World Humanitarian Summit’ (UN General Assembly 2016) UN Doc A/70/709 (2 February 2016)

——, ‘Res 73/195 Global Compact for Safe, Orderly, and Regular Migration’ (UN General Assembly 2019) UN Doc A/RES/73/195 (11 January 2019)

——, ‘Res 76/300 The Human Right to a Clean, Healthy and Sustainable Environment’ (UN General Assembly 2022) UN Doc A/RES/76/300 (1 August 2022)

**UNHCR**, ‘Handbook: Voluntary Repatriation: International Protection’ (UN High Commissioner for Refugees 1996)

——, ‘Climate Change, Natural Disasters and Human Displacement: A UNHCR Perspective’ (UN High Commissioner for Refugees 2009)

——, ‘Convention and Protocol Relating to the Status of Refugees: With an Introductory Note by the Office of the United Nations High Commissioner for Refugees’ (UN High Commissioner for Refugees 2010)

——, ‘Summary of Deliberations on Climate Change and Displacement’ (UN High Commissioner for Refugees 2011)

——, ‘Refugee Protection: A Guide to International Refugee Law (Handbook for Parliamentarians)’ (UN High Commissioner for Refugees and the Inter-Parliamentary Union 2017)

**UNHRC**, ‘Code of Conduct for Special Procedures Mandate-Holders of the Human Rights Council’ (Human Rights Council 2007) UN Doc A/HRC/RES/5/2 (18 June 2007)

——, ‘Report of the Special Rapporteur on Adequate Housing as a Component of the Right to an Adequate Standard of Living, Miloon Kothari’ (Human Rights Council 2007) UN Doc A/HRC/4/18 (5 February 2007)

——, ‘Report of the Representative of the Secretary-General on the Human Rights of Internally Displaced Persons, Walter Kälin: Addendum on Protection of Internally Displaced Persons in Situations of Natural Disasters’ (Human Rights Council 2009) UN Doc A/HRC/10/13/Add.1 (5 March 2009)

——, ‘Report of the Representative of the Secretary-General on the Human Rights of Internally Displaced Persons, Walter Kälin, Addendum: Framework on Durable Solutions for Internally Displaced Persons’ (Human Rights Council 2010) UN Doc A/HRC/13/21/Add.4 (9 February 2010)

——, ‘Report of the Special Rapporteur on the Right of Everyone to the Enjoyment of the Highest Attainable Standard of Physical and Mental Health, Anand Grover’ (Human Rights Council 2013) UN Doc A/HRC/23/41/Add.3 (2 May 2013)

——, ‘Report of the Special Rapporteur on the Right of Everyone to the Enjoyment of the Highest Attainable Standard of Physical and Mental Health, Anand Grover. Addendum: Mission to Japan: Comments by the State on the Report of the Special Rapporteur’ (Human Rights Council 2013) UN Doc A/HRC/23/41/Add.5 (24 May 2013)

——, ‘Report of the Independent Expert on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment, John H. Knox; Addendum: Mission to Costa Rica’ (Human Rights Council 2014) UN Doc A/HRC/25/53/Add.1 (8 April 2014)

——, ‘Final research-based report of the Human Rights Council Advisory Committee on best practices and main challenges in the promotion and protection of human rights in post-disaster and post-conflict situations’ (Human Rights Council 2015) UN Doc A/HRC/28/76 (10 February 2015)

——, ‘Joint Communication from Special Procedures (The Special Rapporteur on Toxics and Human Rights; The Special Rapporteur on the Right to Health; The Special Rapporteur on the Human Rights of IDPs)’ (Human Rights Council 2017) JPN 2/2017 (20 March 2017)

——, ‘Report of the Working Group on the Universal Periodic Review: Japan’ (Human Rights Council 2018) UN Doc A/HRC/37/15 (4 January 2018)

——, ‘Report of the Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment’ (Human Rights Council 2018) UN Doc A/HRC/37/59 (24 January 2018)

——, ‘Joint Communication from Special Procedures (The Special Rapporteur on Toxics and Human Rights; The Special Rapporteur on the Human Rights of IDPs)’ (Human Rights Council 2018) JPN 6/2018 (5 September 2018)

——, ‘Report of the Special Rapporteur on the Implications for Human Rights of the Environmentally Sound Management and Disposal of Hazardous Substances and Wastes’ (Human Rights Council 2018) UN Doc A/73/567 (15 November 2018)

——, ‘Right to a Healthy Environment: Good Practices; Report of the Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment’ (Human Rights Council 2019) UN Doc A/HRC/43/53 (30 December 2019)

——, ‘Joint Communication from Special Procedures (The Special Rapporteur on Toxics and Human Rights; The Special Rapporteur on Human Rights and the Environment; the Special Rapporteur on the Right to Food; the Special Rapporteur on Freedom of Peaceful Assembly and of Association; The Special Rapporteur on the Right to Health; The Special Rapporteur on the Human Rights of IDPs; the Special Rapporteur on the Rights to Water and Sanitation)’ (Human Rights Council 2021) JPN 1/2021 (13 January 2021)

——, ‘Resolution Adopted by the Human Rights Council on 8 October 2021’ (Human Rights Council 2021) UN Doc A/HRC/RES/48/13 (18 October 2021)

——, ‘The Right to a Clean, Healthy and Sustainable Environment: Non-Toxic Environment - Report of the Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment’ (Human Rights Council, Assembly 2022) A/HRC/49/53 (12 January 2022)

**UNIDNDR**, ‘Yokohama Strategy and Plan of Action for a Safer World: Guidelines for Natural Disaster Prevention, Preparedness and Mitigation’ (UN International Decade for Natural Disaster Reduction 1994) The World Conference on Natural Disaster Reduction, Yokohama, Japan 23-27 May 1994

**UNISDR**, ‘Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters’ (UN International Strategy for Disaster Reduction 2005) The World Conference on Disaster Reduction, Kobe, Hyogo, Japan 18-22 January 2005

**UNSCEAR**, ‘Sources and Effects of Ionizing Radiation: UNSCEAR 2000 Report to the General Assembly, with Scientific Annexes. Volume II: Effects. Annex J (Exposure and Effects

of the Chernobyl Accident)' (UN Scientific Committee on the Effects of Atomic Radiation 2000)

——, 'Sources and Effects of Ionizing Radiation: UNSCEAR 2008 Report to the General Assembly with Scientific Annexes. Volume II: Effects. Annex D (Health Effects Due to Radiation from the Chernobyl Accident)' (UN Scientific Committee on the Effects of Atomic Radiation 2008)

——, 'Biological Mechanisms of Radiation Actions at Low Doses: A White Paper to Guide the Scientific Committee's Future Programme of Work' (UN Scientific Committee on the Effects of Atomic Radiation 2012)

——, 'Sources, Effects and Risks of Ionizing Radiation: United Nations Scientific Committee on the Effects of Atomic Radiation : UNSCEAR 2013 Report to the General Assembly with Scientific Annexes.' (UN Scientific Committee on the Effects of Atomic Radiation 2013) Vol I Scientific Annex A

**WHO**, 'Effect of Radiation on Human Heredity: Investigation of Areas of High Natural Radiation (First Report of the Expert Committee on Radiation)' (World Health Organization 1958) EB23/24

——, 'Twelfth World Health Assembly, Geneva, 12-19 May 1959: Resolutions and Decisions: Plenary Meetings: Verbatim Records: Committees: Minutes and Reports: Annexes' (World Health Organization 1959)

——, 'Medical Supervision in Radiation Work (Second Report of the Expert Committee on Radiation)' (World Health Organization 1960)

——, 'Radiation Hazards in Perspective (Third Report of the Expert Committee on Radiation)' (World Health Organization 1962)

——, 'Guidelines for Iodine Prophylaxis Following Nuclear Accidents' (World Health Organization 1999) WHO/SDE/PHE/99.6

——, 'Health Effects of the Chernobyl Accident and Special Health Care Programmes' (World Health Organization 2006)

——, 'Use of Potassium Iodide for Thyroid Protection during Nuclear or Radiological Emergencies' (World Health Organization 2011)

——, ‘Iodine Thyroid Blocking: Guidelines for Use in Planning and Responding to Radiological and Nuclear Emergencies’ (World Health Organization 2017)

**WNWR Project**, ‘The World Nuclear Waste Report 2019 - Focus Europe’ (The World Nuclear Waste Report Project 2019) <[www.worldnuclearwastereport.org](http://www.worldnuclearwastereport.org)> accessed 9 April 2023

## **Thesis, Conference Papers, Web Articles, Press Articles, and Letters**

### *Thesis*

**Foasso C**, ‘Histoire de la sûreté de l’énergie nucléaire civile en France (1945-2000) : Technique d’ingénieur, processus d’expertise, question de société’ (Doctoral Thesis, History, Lyon 2 University, 2003)

**Kojima R**. ‘Reconstruire dans l’après-Fukushima: responsabiliser et vulnérabiliser par le risque’ (Doctoral Thesis, Geography, University Paris-Est 2020)

**Magniny V**, ‘Les réfugiés de l’environnement. Hypothèse juridique à propos d’une menace écologique.’ (Doctoral Thesis, Public Law, University Paris I Panthéon-Sorbonne 1999)

### *Conference Papers*

**CIDCE (Limoges) and Waseda University Institute of Comparative Law**, ‘Recommendations on Human Rights and Medical Management in Nuclear Disasters’ (2015) Report submitted to the 3rd United Nations World Conference on Disaster Risk Reduction, 14-18 March 2015, Seidai (Japan), available at <[https://cidce.org/wp-content/uploads/2016/08/Recommendations-on-human-rights-and-medical-management-in-nuclear-disasters\\_14.III\\_2017\\_EN.pdf](https://cidce.org/wp-content/uploads/2016/08/Recommendations-on-human-rights-and-medical-management-in-nuclear-disasters_14.III_2017_EN.pdf)> accessed 9 April 2021

**Gofman JW**, ‘Assessing Chernobyl’s Cancer Consequences: Application of Four “Laws” of Radiation Carcinogenesis’ (1986) The 192nd National Meeting of the American Chemical Society: Symposium on Low-Level Radiation Division of Chemical Health and Safety, 9 September 1986, Anaheim, California (USA),

**Gofman JW and Tamplin AR**, ‘Low Dose Radiation, Chromosomes, and Cancer’ (1969) IEEE Nuclear Science Symposium, 29 October 1969, San Francisco (USA)

**Hasegawa R and others**, ‘Politics of Zoning: Making Risks (In)Visible and Manageable in Disasters’ (The SDN 2017) The 16th Annual Meeting of the Science and Democracy Network (SDN), Harvard University, 29 June-1 July 2017, Cambridge (USA)

**Kobayashi T**, ‘福島第一原発事故に伴う海洋汚染に関する研究 (The Study on Marine Pollution Related to the Fukushima Daiichi Nuclear Accident)’ (Japan Atomic Energy Agency 2017) Presentation at the 8th Fukushima Radiation Measure Forum, held on 19 July 2017

**Kunsch P**, ‘Externalities and Internalisation of Radioactive Waste Producing Activities: The Analogy With Environmental Practices’ (2001) The 8th International Conference on Radioactive Waste Management and Environmental Remediation (ICEM’01), 30 Sep-4 Oct 2001, Bruges (Belgium)

**Pascucci-Cahen L and Patrick M**, ‘Massive Radiological Releases Profoundly Differ from Controlled Releases’ (IRSN 2012) Forum Eurosafe 2012, 5-6 November 2012, Brussels (Belgium)

### *Web Articles*

**Brumfiel G**, ‘Fukushima Reaches Cold Shutdown’ (2011) Nature <<https://doi.org/10.1038/nature.2011.9674>> accessed 7 February 2023

**Castles S**, ‘Confronting the Realities of Forced Migration’ (2004) Migration Information Source <<https://www.migrationpolicy.org/article/confronting-realities-forced-migration>> accessed 25 June 2018

**Fassert C and Kasperski T**, ‘Risques nucléaires : À quand la fin du monopole des experts internationaux ?’ (2021) The Conversation <<http://theconversation.com/risques-nucleaires-a-quand-la-fin-du-monopole-des-experts-internationaux-159410>> accessed 9 April 2023

**Hasegawa R**, ‘Five Years on for Fukushima’s IDPs: Life with Radiological Risk and without a Community Safety Net’ (Internal Displacement Monitoring Centre (iDMC) - Norwegian Refugee Council 2016) Expert Opinion: March 2016 <<https://reliefweb.int/report/japan/five-years-fukushima-s-idps-life-radiological-risk-and-without-community-safety-net>> accessed 12 March 2023

——, ‘L’ Accident nucléaire de Fukushima à l’épreuve du droit international : quel cadre normatif pour la protection des personnes déplacées par des catastrophes ?’ (Laboratoire d’analyse critique des modernités (Paris 8/Tsukuba University) 2021) 22 April 2021 <<https://laboratoireanalysecritiquedesmodernites.wordpress.com/2021/04/22/article-1/>> accessed 13 October 2021

**Miyahara T**, ‘NPT 2010 Review Conference Report: Facts Revealed by Joint Suits for

Certification of Atomic Bomb Sickness’ (Japan Association of Lawyers Against Nuclear Arms (JALANA) 2010) <[https://www.hankaku-j.org/data/07/npt\\_005\\_en.html](https://www.hankaku-j.org/data/07/npt_005_en.html)> accessed 20 April 2022

**Naito M**, ‘The Trials for Recognition of A-Bomb Injuries and the Feelings of Hibakusha’ (Japan Association of Lawyers Against Nuclear Arms (JALANA) 2013) <[http://www.hankaku-j.org/data/07/oslo\\_201305\\_004.pdf](http://www.hankaku-j.org/data/07/oslo_201305_004.pdf)> accessed 9 April 2023

**Normile D**, ‘Japan Plans to Release Fukushima’s Wastewater into the Ocean’ (2021) *Science* <<https://www.science.org/content/article/japan-plans-release-fukushima-s-contaminated-water-ocean>> accessed 5 December 2022

**Okubo K**, ‘About the Atomic Bomb Disease Recognition Trials’ (Japan Association of Lawyers Against Nuclear Arms (JALANA) 2007) <[https://www.hankaku-j.org/data/06/002\\_en.html](https://www.hankaku-j.org/data/06/002_en.html)> accessed 21 April 2022

### *Press Articles*

**Asahi Shimbun**, ‘原発事故の放出セシウム、原爆の 168 倍 保安院公表 (The Caesium Released from the Nuclear Accident Amounts to 168 Times of Atomic Bomb, NISA Reports)’ *Asahi Shimbun* (Tokyo, 27 August 2011)

——, ‘紛争審 2 委員、電力系研究所から報酬 原発事故賠償 (Nuclear Accident Damage Compensation: Two Members of the Reconciliation Committee Receiving Remuneration from Electricity-Industry Related Research Institute)’ *Asahi Shimbun* (Tokyo, 23 September 2011)

——, ‘Government to Lift Fukushima Evacuation Order for 1st Time’ *Asahi Shimbun* (Tokyo, 24 February 2014)

——, ‘福島県、拡散予測データ消去を謝罪 受信容量確保が理由 (Fukushima Prefecture Apologises for Deleting SPEEDI Data Due to Limited Data Stock Capacity)’ *Asahi Shimbun* (20 April 2012)

——, ‘「今でも避難したい」福島市民の 34% 市調査」) (34% of Residents in Fukushima City Still Wish to Evacuate, the City’s Survey Found)’ *Asahi Shimbun* (17 September 2012)

——, ‘Second Group of Fukushima Residents Given OK to Return Home in Evacuation Zone’ *Asahi Shimbun* (Tokyo, 18 August 2014)

**BBC News**, ‘Japan Storm: Nine Million People Told to Evacuate as Super Typhoon Nanmadol Hits’ *British Broadcasting Corporation* (19 September 2022) <<https://www.bbc.com/news/world-asia-62952942>> accessed 26 April 2023

**Bellet R**, ‘Accident nucléaire : le patron de l’IRSN remet en question « le principe de précaution maximale »’ *Le Journal du Dimanche* (Paris, 5 March 2016)

**Collet P**, ‘Le Difficile encadrement de l’urbanisation autour des sites nucléaires’ *Actu Environnement* (Paris, 13 January 2014) <<https://www.actu-environnement.com/ae/dossiers/risques-industriels/urbanisation-sites-nucleraires.php>> accessed 18 April 2023.

**Fujiwara A**, ‘福島田村市 4月1日避難解除 「官僚は頭がいいんです」、判断押し切る (Evacuation Order Will Be Lifted on 1 April in Tamura City, Fukushima. “Ministry Officials Are Clever”, the Government Decision Pushed Through)’ *Mainichi Shimbun* (4 November 2011)

**Minpo Newspaper**, ‘国の賠償責任を認めない判決 原発事故集団訴訟の上告審 (Judgment Not Recognising State Liability for Damages at Appeal Trial of Nuclear Power Plant Accident Group Action Lawsuit)’ *Fukushima Minpo Newspaper* (18 June 2022)

**OurPlanet-TV**, ‘「20 ミリシーベルト基準」撤回を～福島のパウダーが文科省に要請行動 (Fukushima Parents Protest at MEXT, Demanding the Cancellation of “the 20 MSv Criterion”’ *ourplanet-tv.org* (24 March 2011)

**Perrine M**, ‘Des chercheurs sur le nucléaire s’inquiètent après le licenciement d’une spécialiste de Fukushima’ *Le Monde* (Paris, 6 January 2021)

**Richard Bellet**, ‘Accident nucléaire : le patron de l’IRSN remet en question « le principe de précaution maximale »’ *Le Journal du Dimanche* (Paris, 5 March 2016)

**Sekine S**, ‘福島の帰還基準、避難者増を恐れて強化せず 民主政権時 (The Dose Criteria for Return of Evacuees Were Not Lowered From the Fear of Increasing the Number of Evacuees)’ *Asahi Shimbun* (Tokyo, 25 May 2013)

**Shimizu M**, ‘避難勧奨地点 指定基準にばらつき 住民「納得できない」 (“Not Convinced”, Residents Complains the Incoherent Criteria for the Designation of Hotspots)’ *Mainichi Shimbun* (4 November 2011)

**The Economist**, ‘Little to Fear but Fear Itself’ (2005) *The Economist* (8 September 2005)

**Tokyo Shimbun**, ‘原発ADR、打ち切り急増 東電の和解拒否で昨年からの (The Cancellation of Nuclear Accident ADR Settlements Increases Since Last Year Due to TEPCO’s Refusal)’ *Tokyo Shimbun* (Tokyo, 12 August 2019)

**Tsuchie H**, ‘東日本大震災5年 原発事故原告1万2,539人 訴訟全国31件 (Five Years from the Great East Japan Disaster: 31 Group Legal Actions Across Japan and 12,539 Nuclear Accident Plaintiffs)’ *Mainichi Shimbun* (16 March 2016)

**Yoshida N**, ‘避難指示解除区域の住民帰還頭打ち 福島第一原発事故被災地、移住率3割にとどまる (The Return of Evacuees to the Former Evacuation Zone Hit the Ceiling, the Rate of Inhabitation at 30% in the Affected Areas of the Fukushima Daiichi Nuclear Accident)’ *Kahoku Shimpo* (Sendai, 14 September 2022)



*Letters*

**Pauling LC**, 'Letter from Linus Pauling to Dwight D. Eisenhower' (19 February 1958)  
<<http://scarc.library.oregonstate.edu/coll/pauling/peace/corr/corr108.1-lp-eisenhower-19580219-transcript.html>> accessed 20 November 2020



# Annexes

## 1. List of Cases

### 1.1 International Jurisdiction

#### *International Court of Justice (ICJ)*

*S.S. Wimbledon* [1923] PCIJ Rep Series A, No. 1

*Corfu Channel (U.K. v. Albania)* (Merits) [1949] ICJ Rep 4

*Case concerning United States Diplomatic and Consular Staff in Tehran (United States of America v. Iran)* (Judgement) [1980] ICJ Rep 3

*Request for an Examination of the Situation in Accordance with Paragraph 63 of the Court's Judgment of 20 December 1974 in the Nuclear Tests (New Zealand v. France) Case* (Order) [1995] ICJ Rep 288 (Dissenting Opinion of Judge Weeramantry 317)

*Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Rep 226

*Gabčíkovo-Nagymaros Project (Hungary v. Slovakia)* (Judgment) [1997] ICJ Rep 7

*Pulp Mills on the River Uruguay (Argentina v. Uruguay)* (Judgement) [2010] ICJ Rep 14

*Case Concerning Ahmadou Sadio Diallo (Republic of Guinea v. Democratic Republic of the Congo)* (Merits) [2010] ICJ Rep 639

#### *Court of Justice of the European Union (CJEU)*

Case C-180/96 *UK v Commission* [1996] ECR I-3903

Case C-183/95 *Affish BV v Rijksdienst voor de Keuring van Vee en Vlees* [1997] ECR I-4315

Case C-284/95 *Safety hi-Tech Srl v S.&T. Srl* [1998] ECR I-04301

Case C-341/95 *Gianni Bettati v Safety hi-Tech Srl* [1998] ECR I-04355

Case C-180/96 *United Kingdom v Commission* ('the BSE judgement') [1998] ECR I-2265

Case C-157/96 *National Farmers' Union and Others* [1998] ECR I-2211

Case C-473/98 *Kemikalieinspektionen v Toolex Alpha AB* [2000] ECR I-05681

Cases T-70/99 *Alpharma Inc. v Council* [2002] ECR II-3495

Case T-13/99 *Pfizer Animal Health v Council* [2002] ECR II-3305

Case T-74/00 *Artegodan v Commission/Artegodan GmbH and Others v Commission* [2002] II-ECR 4945

Case C-29/99, *Commission v Council* [2002] ECR I-11221

Case C-236/01 *Monsanto Agricoltura Italia* [2003] ECR I-08105

### ***European Court of Human Rights (ECtHR)***

*“Relating to certain aspects of the laws on the use of language in education in Belgium” v. Belgium (the “Belgian linguistic case”)* App no 1474/62; 1677/62; 1691/62; 1769/63; 1994/63; 2126/64 (ECtHR, 23 July 1968)

*Marckx v. Belgium* App no 6833/74 (ECtHR, 13 June 1979)

*Lopez Ostra v. Spain* App no 16798/90 (ECtHR, 9 December 1994)

*Balmer-Schafroth and Others v. Switzerland* App no. 22110/93 (ECtHR, 26 August 1997)

*L.C.B. v. UK* App no 23413/94, 21825/93 and 23414/94 (ECtHR, 9 June 1998)

*Guerra and Others v. Italy* App no. 116/1996/735/932 (ECtHR, 19 February 1998)

*McGinley and Egan v. UK* App no 21825/93 and 23414/94 (ECtHR, 9 June 1998)

*Athanassoglou and others vs Switzerland* App no. 27644/95 (ECtHR, 6 April 2000)

*Öneryildiz v. Turkey* App no 48939/99 (ECtHR, 30 November 2004)

*Ilascu and others v. Moldova and Russia* App no 48787/99 (ECtHR, 8 July 2004)

*Dogan and others v Turkey* App nos 8803-8811/02, 8813/02 and 8815-8819/02 (ECtHR, 29 June 2004)

*Case of Roche v The United Kingdom* App no. 32555/96 (ECtHR, 19 October 2005)

*Budayeva and others v. Russia* App nos 15339/02, 21166/02, 20058/02, 11673/02 and 15343/02 (ECtHR, 20 March 2008)

*Băcilă v Roumania* App no 19234/04 (ECtHR, 30 March 2010)

*Di Sarno and others v Italy* App no 30765/08 (ECtHR, 10 January 2012)

### ***World Trade Organization (WTO) Appellate Body***

WTO, *EC Measures Concerning Meat and Meat Products (Hormones)* (16 January 1998)  
WT/DS26/AB/R and WT/DS48/AB/R

### ***Other International Arbitration Decisions***

*Trail Smelter Case (United States v. Canada)* (1938 and 1941) 3 RIAA 1905

*Iron Rhine case (Arbitration regarding the Iron Rhine (“Ijzeren Rijn”) Railway (Belgium v. Netherlands))* (2005) 27 RIAA 35

## **1.2 National Jurisdiction**

### ***FRANCE***

#### **a. Cour de Cassation**

Cass. Soc., 11 May 2010, n°09-42.241, Bull. civ. V, n°106, D. 2010, 2048

Cass. Soc., 25 Sep 2013, n°12-12.883, 12-13.307, Bull. civ. V, n°208

Cass. Soc., 3 mars 2015, n°13-21.832 ... 13-21.865, Bull. civ. V, n°40

Cass. Soc., 11 septembre 2019, n°17-24.888, publié au bulletin

Cass. Soc., 13 Oct 2021, n°20-16.584, n°20-16.598 and n°20-16.599, publié au bulletin

Cass. Soc., 13 Oct 2021, pourvoi n°20-16.617, 20-16.585, 20-16.584, 20-16.593 et 20-16.583

Cass. Soc., 8 févr. 2023, pourvoi n° 20-23.312, publié au bulletin

#### **b. Conseil d'État**

CE 2e et 7e ch.-réunies, 28 Mar 2022, n° 453378

CE 2e et 7e ch.-réunies, 20 Sep 2022, n° 451129

#### **c. Cour d'Appel**

CA Paris, 18<sup>e</sup> ch. C, 18 septembre 2008, n° 07/00454

CA Bordeaux, ch. soc. sect. A, 7 avril 2009, n° 08/04212

CA Paris, 1 décembre 2011, n°12-17.667 à 12-17.706, 12-20.912, 12-18.365 à 12-18.401, 12-12.883, 12-13.307

CA Nancy, 16 septembre 2016, n° 15/00584

CA Metz, 7 juillet 2017, n° 17/00829, 17/00537, 17/00793

CA Douai, 29 janvier 2021, n° 20/00255

**d. Conseil des Prud'hommes**

Cons. Prud'h. Longwy, 6 février 2015, n° 13-00174

Cons. Prud'h. Forbach, 30 juin 2016

**JAPAN**

**a. District Court Decisions**

Tokyo District Court, 7 December 1963, Hanrei Jiho 355, 17 (“Shimoda Case”)

Osaka District Court, 12 May 2006 (“Certified *Hibakusha*” status recognition lawsuit)

Hiroshima District Court, 4 August 2006 (“Certified *Hibakusha*” status recognition lawsuit)

Hiroshima District Court, 25 March 2009 (*Hibakusha* status recognition lawsuit)

Fukushima District Court, 26 August 2014 (Fukushima accident evacuee’s suicide case)

Maebashi District Court, 17 March 2017, Hanrei Jihou (2017) 2339 (Fukushima accident Gunma group action)

Chiba District Court, 22 September 2017, LEX/DB25449077 (Fukushima accident Chiba group action)

Fukushima District Court, 10 October 2017 (Fukushima *Nariwai* (Livelihood) group action)

Tokyo District Court, 7 February 2018, LEX/DB 25549758 (Fukushima accident Odaka group action)

Kyoto District Court, 15 March 2018, 2375/2376 Hanrei Jiho 14 (Fukushima accident Kyoto group action)

Tokyo District Court, 16 March 2018 (Fukushima accident Shutoken group action)

Fukushima District Court (Iwaki branch), 22 March 2018 (Fukushima accident Hama-dori (Iwaki Evacuee) group action)

Tokyo District Court, 19 September 2019, Hanrei Jiho (2020) 2431/2432, 5 (TEPCO Criminal Trial)

Sapporo District Court, 10 March 2020 (Fukushima accident Hokkaido group action)

Hiroshima District Court, 29 July 2020 (Hiroshima black rain lawsuit)

Fukushima District Court, 1 March 2021 (Fukushima accident “Against Radiation Exposure of Children” group action)

Tokyo District Court, 12 July 2021 (Fukushima accident “Revocation of the 20 mSv/year Criteria” action)

#### **b. High Court Decisions**

Sendai High Court, 12 March 2020, LEX/DB25565316 (Hama-dori Evacuees Group Action)

Tokyo High Court, 17 March 2020, LEX/DB25570904 (“To-Live-in-Odaka” Group Action)

Sendai High Court, 30 September 2020, LEX/DB25571153 (Fukushima *Nariwai* (Livelihood) group action)

Tokyo High Court, 21 January 2021 (Gunma group action)

Sendai High Court, 26 January 2021 (Naka-dori Group Action)

Tokyo High Court, 19 February 2021 (Chiba group action)

Hiroshima High Court, 14 July 2021 (Hiroshima Black Rain lawsuit)

Takamatsu High Court, 29 September 2021 (Ehime Group Action)

#### **c. Supreme Court Decisions**

Supreme Court, 18 July 2000 (“Nagasaki A-Bomb Matsuya Case”)

Supreme Court, 18 December 2017 (Nagasaki Black Rain Group Action)

Supreme Court, 21 November 2019 (Nagasaki Black Rain Group Action)

Supreme Court, 2 March 2022 (Fukushima *Nariwai* (Livelihood) Group Action, Gunma Group Action, and Chiba Group Action)

Supreme Court, 7 March 2022 (Hama-dori Evacuees Group Action, “To-Live-in-Odaka” Group Action, and Naka-dori Group Action)

Supreme Court, 30 March 2022 (Ehime Group Action)

#### ***United Kingdom***

England and Wales High Court (Administrative Court), *Greenpeace Ltd v. Secretary of State for Trade and Industry* [2007] EWHC 311 (Admin) (15 February 2007)

***United States***

US District Court for the District of Columbia, *Pauling v. McElroy*, 164 F. Supp. 390 (D.D.C. 1958)

US Court of Appeals, District of Columbia Circuit, *Pauling v. McElroy*, 278 F.2d 252 (D.C. Cir. 1960)



## **2. List of Legislations and Agreements**

### **2.1 International Conventions and Treaties**

#### ***Human Rights Related Agreements***

Geneva Convention for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field (adopted 12 August 1949, entered into force 21 October 1950) 75 UNTS 31 (First Geneva Convention)

Convention for the Amelioration of the Condition of Wounded, Sick and Shipwrecked Members of Armed Forces at Sea (adopted 12 August 1949, entered into force 21 October 1950) 75 UNTS 85 (Second Geneva Convention)

Geneva Convention relative to the Treatment of Prisoners of War (adopted 12 August 1949, entered into force 21 October 1950) 75 UNTS 135 (Third Geneva Convention)

Geneva Convention relative to the Protection of Civilian Persons in Time of War (12 August 1949, entered into force 21 October 1950) 75 UNTS 287 (Fourth Geneva Convention)

Convention for the Protection of Human Rights and Fundamental Freedoms (adopted 4 November 1950, entered into force 3 September 1953) 213 UNTS 221 (European Convention on Human Rights - ECHR)

Convention Relating to the Status of Refugees (adopted 28 July 1951, entered into force 22 April 1954) 189 UNTS 137 (Refugee Convention)

International Convention on the Elimination of All Forms of Racial Discrimination (adopted 7 March 1966, entered into force 4 January 1969) 660 UNTS 195

International Covenant on Economic, Social and Cultural Rights (adopted 16 December 1966, entered into force 3 January 1976) 993 UNTS 3 (ICESCR)

International Covenant on Civil and Political Rights (adopted 16 December 1966, entered into force 23 March 1976) 999 UNTS 171 (ICCPR)

Protocol Relating to the Status of Refugees (adopted 31 January 1967, entered into force 4 October 1967) 606 UNTS 267 (Protocol to Refugee Convention)

OAU Convention governing the specific aspects of refugee problems in Africa (adopted 10 September 1969, entered into force 20 June 1974) 1001 UNTS 45

Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I) (adopted 8 June 1977, entered into force on 7 December 1978) 1125 UNTS 3

Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of Non-International Armed Conflicts (Protocol II) (adopted 8 June 1977, entered into force 7 December 1978) 1125 UNTS 609

Convention on the Elimination of All Forms of Discrimination against Women (adopted 18 December 1979, entered into force 3 September 1981) 1249 UNTS 13

Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (adopted 10 December 1984, entered into force 26 June 1987) 1465 UNTS 85

Additional Protocol to the American Convention on Human Rights in the Area of Economic, Social and Cultural Rights (Protocol of San Salvador) (adopted 17 November 1988, entered into force 16 November 1999) OAS Treaty Series No 69 (1988)

Convention on the Rights of the Child (adopted 20 November 1989, entry into force 2 September 1990) 1577 UNTS 3 (CRC)

International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families (adopted 18 December 1990, entered into force 1 July 2003) 2220 UNTS 3

Rome Statue of the International Criminal Court (adopted 17 July 1998, entered into force 1 July 2002) 2187 UNTS 3 (Rome Statute)

Arab Charter on Human Rights (adopted 22 May 2004, entered into force 15 March 2008)

Convention on the Rights of Persons with Disabilities (adopted 13 December 2006, entered into force 3 May 2008) 2515 UNTS 3

International Convention for the Protection of All Persons from Enforced Disappearance (adopted 20 December 2006, entered into force 23 December 2010) 2716 UNTS 3

African Union Convention for the Protection and Assistance of Internally Displaced Persons in Africa (adopted 22 October 2009, entered into force 6 December 2012) (Kampala Convention)

### ***Environment Related Agreements***

Convention on the Prevention of Marine Pollution by Dumping of Waste and other Matter (adopted 19 December 1972, entered into force 30 August 1975) 1046 UNTS 120 (London Convention)

Convention for the Prevention of Marine Pollution from Land-Based Sources (adopted 4 June 1974, entered into force 6 May 1978) 1546 UNTS 103

United Nations Convention on the Law of the Sea (10 December 1982, entered into force 16 November 1994) 1833 UNTS 397 (UNCLOS)

Vienna Convention for the Protection of the Ozone Layer (adopted 22 March 1985, entered into force 22 September 1988) 26 ILM 1529

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (adopted 22 March 1989, entry into force 5 May 1992) 1673 UNTS 57

Convention on Environmental Impact Assessment in a Transboundary Context (adopted 25 February 1991, entered into force 10 September 1997) 1989 UNTS 309 (Espoo Convention)

Convention on the Transboundary Effects of Industrial Accidents (adopted 17 March 1992, entry into force 19 April 2000) 2105 UNTS 457

UN Framework Convention on Climate Change (adopted on 9 May 1992, entered into force 21 March 1994) 31 ILM 851

Convention for the Protection of the Marine Environment of the North East Atlantic (adopted 22 September 1992, entered into force 25 March 1998) 2354 UNTS 67 (OSPAR Convention)

Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (7 November 1996, entered into force 24 March 2006) 36 ILM 1 (London Protocol)

Tampere Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations (adopted 18 June 1998, entered into force 8 January 2005) 2296 UNTS 5

Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention) (adopted 25 June 1998, entered into force 30 October 2001) 2161 UNTS 447

Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context (adopted 21 May 2003, entered into force 11 July 2010) 2685 UNTS 140 (Kiev Protocol)

### ***Nuclear Energy Related Agreements***

Convention (No. 115) concerning the Protection of Workers against Ionising Radiations

(adopted 22 June 1960, entered into force 17 June 1962) 6208 UNTS 40

Convention on Third Party Liability in the Field of Nuclear Energy (adopted 29 July 1960, entered into force 1 April 1968) 956 UNTS 251 (Paris Convention)

Vienna Convention on Civil Liability for Nuclear Damage (adopted on 21 May 1963, entered into force on 12 November 1977) 1063 UNTS 265 (Vienna Convention)

Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (adopted 26 September 1986, entered into force 27 October 1986) 1457 UNTS 133

Convention on Early Notification of a Nuclear Accident (adopted 26 September 1986, entered into force 27 October 1986) 1439 UNTS 275

Convention on Nuclear Safety (adopted on 20 September 1994, entered into force on 24 October 1996) 1963 UNTS 293 (CNS)

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (adopted 5 September 1997, entered into force 18 June 2001) (Joint Convention) 2153 UNTS 303

Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage (adopted 12 September 1997, entered into force 4 October 2003) 2241 UNTS 270

Convention on Supplementary Compensation for Nuclear Damage (adopted 12 September 1997, entered into force 15 April 2015) 36 ILM 1473 (CSC)

Protocol to Amend the Paris Convention on Third Party Liability in the Field of Nuclear Energy (adopted 12 February 2004, entered into force 1 January 2022)

### ***EU Related Treaties***

Treaty establishing the European Atomic Energy Community [1957] (the Euratom Treaty)

Treaty establishing the European Economic Community [1957] (EEC Treaty)

Treaty on European Union [2007] (TEU) (Maastricht Treaty)

Treaty on the Functioning of the European Union [2007] (TFEU)

Charter of Fundamental Rights of the European Union [2000] (CFR)

### ***Other Agreements***

Convention on International Civil Aviation (adopted 7 December 1944, entered into force 4

April 1947) 1184 UNTS 3 (Chicago Convention)

Agreement concerning the International Carriage of Dangerous Goods by Road (adopted 30 September 1957, entered into force 29 January 1968) UNECE Doc. ECE/TRANS/215 (Vol. I and II) (ADR)

International Convention for the Safety of Life at Sea (adopted 1 November 1974, entered into force 25 May 1980) 1184, 1185 UNTS 2 (SOLAS)

## **2.2 International Declarations and Outcome Documents**

Universal Declaration of Human Rights (10 December 1948) UNGA Res 217 A(III) (UDHR)

Stockholm Declaration on the Human Environment (1972) Report of the UN Conference on the Human Environment (A/Conf.48/14/Rev.1)

Cartagena Declaration on Refugees (22 November 1984) OAS Doc OEA/Ser.L/V/II.66/doc.10, rev. 1, at 190-93 (1984-85), 17 April 1998

Rio Declaration on Environment and Development (12 August 1992) Report of the UN Conference on Environment and Development (A/CONF.151/26 (Vol. I))

Yokohama Strategy and Plan of Action for a Safer World: Guidelines for natural disaster prevention, preparedness and mitigation (1994) Report of the World Conference on Natural Disaster Reduction (A/CONF.172/9)

Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters (2005) Report of the World Conference on Disaster Reduction (A/CONF.206/6)

World Summit Outcome (16 September 2005) UNGA Res 60/1

The Cancun Agreement (11 December 2010), UNFCCC COP16 Cancun Outcome Document (FCCC/CP/2010/7/Add.1)

Sendai Framework for Disaster Risk Reduction 2015-2030 (3 June 2015) UNGA Res 69/283

The Paris Agreement (22 April 2016), UNFCCC COP 21 Paris Outcome Document (FCCC/CP/2015/10/Add.1)

## **2.3 EU Legislation (Directive)**

Council Regulation (Euratom) 2016/52 of 15 January 2016 laying down maximum permitted levels of radioactive contamination of food and feed following a nuclear accident or any other case of radiological emergency OJ L13/2

Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations OJ L 172/18

Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionizing radiation OJ L13/1

## **2.4 National Legislation**

### ***AUSTRIA***

Federal Act on Civil Liability for Damage Caused by Radioactivity (Atomic Liability Act 1999 - AtomHG 1999)/Bundesgesetz über die zivilrechtliche Haftung für Schäden durch Radioaktivität [AtomHG 1999] Bundesgesetzblatt Teil I [BGB1 I] No. 170/1998

### ***FRANCE***

Loi n° 98-1194 du 23 décembre 1998 de financement de la sécurité sociale pour 1999, JO n° 300 du 27 décembre 1998

Loi n° 2004-811 du 13 août 2004 relative à la modernisation de la sécurité civile

Loi constitutionnelle n° 2005-205 du 1 mars 2005 relative à la Charte de l'environnement, JO n° 51 du 2 mars 2005

Loi n°2006-686 du 13 juin 2006 relative à la transparence et à la sécurité en matière nucléaire  
Article R 1333-93 du code de la santé publique, modifié par Décret no 2018-434 du 4 juin 2018

### ***JAPAN***

Atomic Bomb Survivors Medical Care Act (Act No.41 of 31 March 1957)

Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors (Act No. 166 of 10 June 1957) (Reactor Regulation Act)

Act on the Prevention of Radiation Hazards due to Radioisotopes, etc. (Act No. 167 of 10 June 1957) (Radiation Protection Act)

Act on Technical Standards for Prevention of Radiation Hazard in 1958 (No 162 of 21 May 1958)

Act on Compensation for Nuclear Damage (Act No. 147 of 17 June 1961) (Compensation Act)

Basic Act on Disaster Management (Act No. 223 of 15 November 1961) (Disaster Basic Act)

Act on Contract for Indemnification of Nuclear Damage Compensation (Act No. 148 of 17 June 1961) (Indemnity Agreements Act)

Act on Special Measures for Atomic Bomb Survivors of 1968 (Act No. 53 of 20 May 1968)

Atomic Bomb Survivors' Support Act (Act No. 117 of 16 December 1994)

Basic Act on Central Government Reform (Act No.103 of 1998)

Act on Special Measures Concerning Nuclear Emergency Preparedness (Act No. 156 of 17 December 1999) (Nuclear Emergency Act)

Basic Act on Reconstruction in Response to the Great East Japan Earthquake (Act No. 76 of 24 June 2011)

Nuclear Damage Compensation Facilitation Corporation Act (Act No. 94 of 3 August 2011)

Act on Special Measures Concerning the Handling of Environmental Pollution by Radioactive Materials Discharged by the Nuclear Power Station Accident Associated with the Tohoku District-Off the Pacific Ocean Earthquake that Occurred on March 11, 2011 (Act No.110 of 30 August 2011) (The Decontamination Act)

Act on Special Measures for the Reconstruction and Revitalization of Fukushima (Act No. 25 of March 31, 2012) (The Reconstruction Act)

Act on Promotion of Support Measures for the Lives of Disaster Victims to Protect and Support Children and Other Residents Suffering Damage due to Tokyo Electric Power Company's Nuclear Accident (Act No. 48 of 27 June 2012) (Nuclear Accident Victims and Children Support Act)

Act Concerning Measures to Achieve Prompt and Assured Compensation for Nuclear Damage Arising from the Nuclear Plant Accident following the Great East Japan Earthquake and Exceptions to the Extinctive Prescription, etc. of the Right to Claim Compensation for Nuclear Damage" (No 97 of 11 December 2013) (Act on Special Cases for Extinctive Prescription on Nuclear Damage)

## ***US***

Atomic Energy Act of 1946, Pub. L. 79-585, 60 Stat. 755

Atomic Energy Act of 1954, Pub. L. 83-703, 68 Stat. 919

Price-Anderson Act of 1957, Pub. L. 85-256, 42 U.S.C. 2210

Energy Reorganization Act of 1974, Pub. L 93-438, 88 Stat. 1233

***Former USSR***

**a. Soviet Union**

Concept of Living in Districts Affected by the Accident at the Chernobyl NPP (N164), 8 April 1991

Law on Social Protection of Citizens Exposed to Radiation as a Result of the Accident at the Chernobyl NPP', 12 May 1991

**b. Russian Federation**

Law 'On Social Protection of Citizens Affected by Radiation in Consequence of the Accident at the Chernobyl NPP' (N1244-1), 15 May 1991

Government Decree 'On Regime of Territories Exposed to Radioactive Contamination in Consequence of the Accident at the Chernobyl NPP, 25 December 1992

**c. Belarus**

Concept of People's Living in Regions Affected by the Chernobyl NPP Catastrophe, 19 December 1990

Law on Social Protection of Citizens Affected by the Catastrophe at the Chernobyl NPP', 12 February 1991

Law on Legal Regime of Territories Exposed to Radioactive Contamination in Consequence of the Catastrophe at the Chernobyl NPP, 12 November 1991

**d. Ukraine**

Concept of Population Residence on the Territories of Ukrainian SSR with Increased levels of Radioactive Contamination as a Result of the Chernobyl Accident, 27 February 1991

Law 'On the Legal Regime of the Territories Exposed to Radioactive Contamination in Consequence of the Catastrophe at the Chernobyl NPP', 27 February 1991

Law on the Status and Social Protection of Citizens Affected by the Accident at the Chernobyl NPP', 28 February 1991



### 3. Résumé de thèse en français

#### La protection des personnes à la suite de catastrophes nucléaires : le cas des déplacés environnementaux et des personnes piégées à Fukushima

##### Introduction

Les accidents nucléaires sont des phénomènes relativement récents dans l'histoire. Le programme nucléaire civil n'a débuté qu'au milieu des années 1950, après la fin de la Seconde Guerre mondiale. Avant cela, et depuis la découverte de la fission nucléaire en 1938, l'énergie atomique avait été exploitée uniquement à des fins militaires. Les premières bombes atomiques ont été conçues par les États-Unis et larguées sur Hiroshima et Nagasaki à la fin de la Seconde Guerre mondiale en 1945. Il s'agissait de la première utilisation d'armes nucléaires contre des humains, ce qui a coûté immédiatement la vie à 210 000 personnes et à 600 000 autres par la suite à cause de l'exposition aux radiations résiduelles émises par les bombes<sup>1</sup>. L'utilisation civile de l'énergie nucléaire a été annoncée lors du discours « Atomes pour la paix », prononcé par Dwight D. Eisenhower, alors le Président des États-Unis, devant l'Assemblée générale des Nations unies en 1953. Ce discours représentait une première tentative américaine de freiner la prolifération mondiale des armes nucléaires au début de la Guerre froide, avec des tensions croissantes et une course aux armements nucléaires entre les États-Unis et l'Union soviétique et leurs alliés respectifs. La stratégie consistait à offrir la technologie de la fission à des fins « pacifiques » aux pays non nucléarisés en échange de l'abandon de la fabrication de bombes atomiques. Bien qu'il n'ait pas atteint son objectif premier – l'endiguement nucléaire<sup>2</sup> – le discours a conduit à la création de l'Agence internationale de l'énergie atomique (AIEA) en 1957, avec pour mission de mettre en œuvre la proposition « Atomes pour la paix » : la promotion de l'énergie nucléaire civile et la dissuasion du développement nucléaire militaire

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<sup>1</sup> Source : Site internet de la ville de Nagasaki

<[http://nagasakipeace.jp/content/files/minimini/english/e\\_gaiyou.pdf](http://nagasakipeace.jp/content/files/minimini/english/e_gaiyou.pdf)> consulté le 28 février 2023, et également . Tatsujiro Suzuki, *核兵器と原発 日本が抱える「核」のジレンマ (Armes nucléaires et centrales nucléaires : Le dilemme "atomique" du Japon)* (Kodansha Gendai Shinsho 2017). Suzuki est l'ancien vice-président de la Commission japonaise de l'énergie atomique du *Cabinet Office* et actuellement directeur du Centre de recherche pour l'abolition des armes nucléaires à l'Université de Nagasaki.

<sup>2</sup> Le concept de « l'endiguement » - *containment* – a été introduit par un diplomate Américain, George F. Kennan, sous pseudonyme « X » dans un article de Foreign Affairs en 1947. Voir X (George F. Kennan), 'The Sources of Soviet Conduct' (1947) 25 Foreign Affairs 566.

dans le monde. La naissance du programme nucléaire civil a donc un lien indéniable avec l'utilisation militaire de l'atome et la non-prolifération.

Depuis lors, le monde a connu deux accidents majeurs, à Tchernobyl et à Fukushima, ainsi que plusieurs autres accidents avec des impacts plus locaux<sup>3</sup>. L'accident de Tchernobyl, survenu dans l'ex-Union soviétique en 1986, aurait libéré 1,000-8,000 petabecquerels (PBq;  $10^{15}$  Bq) de radioactivité,<sup>4</sup> soit l'équivalent de « l'explosion simultanée de 500 bombes A »<sup>5</sup>. Près de 8,4 millions de personnes au Belarus, en Ukraine et en Russie ont été exposées aux retombées radioactives<sup>6</sup> qui ont également touché 40 % de la surface totale de l'Europe, en particulier la Suède, la Norvège, la Finlande, l'Autriche et la Bulgarie<sup>7</sup>. Certains scientifiques ont estimé que l'accident aurait provoqué près d'un million de cas de cancers radio-induits et près de 20 000 cas de leucémies radio-induites parmi les personnes exposées<sup>8</sup>. L'accident a également déraciné au moins 350 000 habitants et contraint 7 millions d'autres à vivre dans les territoires contaminés<sup>9</sup>. Des sociologues ont ainsi décrit Tchernobyl comme « non pas un événement, un accident, mais plutôt la nouvelle condition humaine des millions de survivants

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<sup>3</sup> AIEA et OCDE/AEN, « INES : The International Nuclear and Radiological Event Scale User's Manual » (AIEA 2013) 152-153. Selon le rapport, Kyshtym (Russie) en 1957, Windscale Pile (Royaume-Uni) en 1957, Three Mile Island (États-Unis) en 1979, Goiânia (Brésil) en 1987, Tokaimura (Japon) en 1999, Saint Laurent des Eaux (France) en 1980, Fleurus (Belgique) en 2006 sont répertoriés comme des accidents de l'échelle 4-6 de l'INES ayant des conséquences plus larges ou locales sur les personnes et l'environnement.

<sup>4</sup> UNSCEAR, 'Sources and Effects of Ionizing Radiation: UNSCEAR 2000 Report to the General Assembly, with Scientific Annexes. Volume II: Effects. Annex J (Exposure and Effects of the Chernobyl Accident)' (UN Scientific Committee on the Effects of Atomic Radiation 2000) 519.

<sup>5</sup> Xue Hanqin, *Transboundary Damage in International Law* (University Press 2003) 22.

<sup>6</sup> ONU, « Annan Urges Continued International Support for Victims of Chernobyl Disaster » *Communiqué de presse de l'ONU* (26 avril 2004) <<https://news.un.org/en/story/2004/04/101382-annan-urges-continued-international-support-victims-chernobyl-disaster>> consulté le 26 avril 2022.

<sup>7</sup> Ian Fairlie et David Sumner, *The Other Report on Chernobyl (TORCH) : An Independent Scientific Evaluation of the Health-Related Effects of the Chernobyl Nuclear Disaster with Critical Analyses of Recent IAEA/WHO Reports* (Les Verts/ALE au Parlement européen 2006).

<sup>8</sup> John W Gofman, *Assessing Chernobyl's Cancer Consequences : Application of Four 'Laws' of Radiation Carcinogenesis* (1986) The 192nd National Meeting of the American Chemical Society : Symposium on Low-Level Radiation Division of Chemical Health and Safety, Anaheim, Californie, 9 septembre 1986. Gofman était un biophysicien américain de l'université de Californie à Berkeley qui avait également participé au projet Manhattan, le programme américain de développement de la bombe nucléaire pendant la Seconde Guerre mondiale. Son étude sur les retombées de Tchernobyl a conclu que les estimations de l'UNSCEAR en matière de cancer et de leucémie étaient au moins de 16 à 25 fois trop faibles.

<sup>9</sup> PNUD et UNICEF, *The Human Consequences of the Chernobyl Nuclear Accident: A Strategy for Recovery* (PNUD et UNICEF 2002) ; OCHA, *Chernobyl : A Continuing Catastrophe* (Nations unies 2000).

condamnés à vivre dans des territoires durablement contaminés<sup>10</sup> ». De même, l'accident nucléaire de Fukushima, qui s'est produit 25 ans plus tard au Japon, a libéré une quantité de radioactivité équivalente à la moitié des rejets de Tchernobyl<sup>11</sup>, dont la quantité de césium-137 était à elle seule 168 fois supérieure à celle de la bombe A larguée sur Hiroshima<sup>12</sup>. L'accident a imposé le déplacement d'au moins 160 000 habitants et conduit 1,6 million d'autres à vivre dans les territoires contaminés<sup>13</sup>.

Ce qui différencie les catastrophes nucléaires des autres catastrophes est la radioactivité. La Cour internationale de justice (CIJ) a reconnu la nature pernicieuse et destructrice des effets des radiations sur l'homme et l'environnement dans l'avis consultatif de 1996 sur la *Licéité de la menace ou de l'emploi d'armes nucléaires* en déclarant :

« Le rayonnement libéré par une explosion nucléaire aurait des effets préjudiciables sur la santé, l'agriculture, les ressources naturelles et la démographie, et cela sur des espaces considérables. [...] Le rayonnement ionisant est susceptible de porter atteinte à l'environnement, à la chaîne alimentaire et à l'écosystème marin dans l'avenir, et de provoquer des tares et des maladies chez les générations futures. [...] il est impératif que la Cour tienne compte des caractéristiques uniques de l'arme nucléaire, et en particulier de sa puissance destructrice, de sa capacité d'*infliger des souffrances indicibles à l'homme*, ainsi que de son pouvoir de *causer des dommages aux générations à venir*<sup>14</sup> »  
[Nous soulignons].

Bien que cette déclaration ait été faite dans le contexte de l'utilisation d'armes nucléaires, les radiations émises dans le cadre d'un accident dans une centrale nucléaire auraient les mêmes effets sur la santé publique et l'environnement.

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<sup>10</sup> Guillaume Grandazzi et Frédérick Lemarchand, "Avant-Propos" dans Galia Ackerman, Guillaume Grandazzi et Frédérick Lemarchand (eds), *Les silences de Tchernobyl : L'avenir contaminé* (Frontières, Autrement 2006) 7.

<sup>11</sup> IRSN, "Impact Environnemental d'un Accident Nucléaire : Comparaison Entre Tchernobyl et Fukushima" (French Institute for Radiological Protection and Nuclear Safety 2013) Website post on 1 March 2013 <<https://www.irsn.fr/savoir-comprendre/environnement/impact-environnemental-dun-accident-nucleaire-comparaison-entre?dId=5d0cc222-c748-41ea-bae7-33f47b490598&dwId=ebe35772-4442-413c-b628-068fde521abe#.XKydLqTgqUk>> accessed 21 April 2023.

<sup>12</sup> Asahi Shimbun, "原発事故の放出セシウム、原爆の168倍 保安院公表 (Le césium libéré par l'accident nucléaire équivaut à 168 fois la bombe atomique, selon la NISA)" *Asahi Shimbun* (Tokyo, 27 août 2011) <<https://www.asahi.com/special/10005/TKY201108260665.html>> consulté le 28 février 2023. Selon l'article, l'Agence de sûreté nucléaire et industrielle (NISA) du ministère de l'Économie, du Commerce et de l'Industrie (METI), l'un des régulateurs nucléaires avant l'accident, a rapporté que l'accident avait émis 15 000 téra Becquerels (TBq) de césium-137 au total, tandis que la bombe atomique d'Hiroshima avait libéré 89 TBq.

<sup>13</sup> Nobuhiro Sawano, 本拠役立つ「汚染地図」(Une "carte de la contamination" réellement utile) (Shueisha e-Shinsho 2014).

<sup>14</sup> CIJ, 8 juillet 1996, *Licéité de la menace ou de l'emploi d'armes nucléaires*, avis consultatif, C.I.J. Recueil 1996, para 35-36

Comme l'a souligné la CIJ, la radioactivité échappe largement aux notions d'espace et de temps, contaminant l'environnement bien au-delà des frontières nationales et provoquant des effets délétères sur la santé des personnes exposées des décennies plus tard, ainsi que des effets sur leur descendance. Une fois absorbées par le sol, les surfaces et les forêts, les substances radioactives sont très difficiles à éliminer et restent toxiques pendant longtemps : un produit de fission courant des centrales nucléaires, le césium 137, par exemple, a une demi-vie de 30 ans<sup>15</sup>. Ainsi, après un grave accident nucléaire, certaines zones contaminées deviennent *de facto* des zones interdites à toute occupation humaine. De nombreux habitants perdent non seulement leur maison, mais aussi leur ville entière en raison de la contamination. Les effets des catastrophes nucléaires majeures sont, comme l'a décrit un spécialiste du droit nucléaire, presque comparables à ceux des guerres<sup>16</sup> où les pays peuvent « perdre une partie de leur territoire »<sup>17</sup>. Michaël Ferrier, écrivain français et professeur de littérature à Tokyo, a ingénieusement appelé la vie après une catastrophe nucléaire une « demi-vie », une vie en suspension à perpétuité : « une existence amputée (amputée de ses plaisirs les plus simples : savourer une salade sans crainte, rester en souriant sous la pluie)<sup>18</sup> », « une mort à crédit. Une longue existence de somnambule, toute une vie dans les limbes. On n'est déjà plus dans la vie, pas encore dans la survie<sup>19</sup> ».

Face à ces effets cataclysmiques, comment les populations sont-elles aujourd'hui protégées par leurs gouvernements et la communauté internationale ? Quelles sont les normes de protection appliquées en cas de catastrophe nucléaire ? Sont-elles adéquates ou suffisamment solides pour protéger les citoyens des effets nocifs des radiations en cas d'accidents graves ? Sont-elles différentes des normes de protection appliquées en cas d'autres catastrophes causées par l'homme ou de catastrophes naturelles ? Cette recherche doctorale propose de répondre à

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<sup>15</sup> La demi-vie est le temps nécessaire pour que la moitié de la valeur initiale d'un élément radioactif se désintègre naturellement.

<sup>16</sup> Norbert Pelzer, « The Present State of Research Carried Out by the English-Speaking Section of the Centre for Studies and Research », in Centre d'étude et de recherche de droit international et de relations internationales, *Les risques résultant de l'utilisation pacifique de l'énergie nucléaire* (Académie de droit international de la Haye, Martinus Nijhoff Publishers 1993) 270.

<sup>17</sup> CIPR, *Application of the Commission's Recommendations for the Protection of People in Emergency Exposure Situations. ICRP Publication 109*. (Elsevier 2009) Ann. CIPR 39 (3) 30.

<sup>18</sup> Michaël Ferrier, *Fukushima : Récit d'un Désastre* (Gallimard 2013) 293. Ferrier utilise ici le terme « demi-vie » par analogie avec la demi-vie de la radioactivité.

<sup>19</sup> *ibid* 294.

ces questions en prenant comme étude de cas l'accident de la centrale nucléaire de Fukushima survenu en mars 2011 au Japon.

Le cas a été choisi parce qu'il offre une occasion unique d'étudier la gestion d'une catastrophe nucléaire réelle par un pays, acteur majeur du nucléaire civil<sup>20</sup>, qui s'aligne sur les normes internationales de sûreté nucléaire établies par l'AIEA et la Commission internationale de protection radiologique (CIPR). L'étude de cas de Fukushima permet notamment à notre thèse de reposer sur une vision réaliste de la façon dont les citoyens sont protégés d'une catastrophe nucléaire majeure par leurs gouvernements aujourd'hui. La réponse de Fukushima est d'ailleurs devenue, depuis, le modèle pour les plans d'urgence nucléaire et post-accidentels de nombreux pays nucléaires. Il s'agit donc d'un cas idéal pour illustrer la norme actuelle « par défaut » en matière de gestion et de protection contre les catastrophes nucléaires.

En outre, le cas de Fukushima aide à démêler, malgré certaines spécificités nationales, les principes fondamentaux sous-jacents, ou ce que Christine Fassert et Reiko Hasegawa appellent les « fondements implicites » du cadre nucléaire – un ensemble d'hypothèses communes, d'éléments qui ne sont pas clairement énoncés mais toujours sous-jacents – adoptés par de nombreux pays nucléaires et par les institutions nucléaires internationales.<sup>21</sup> L'accident de Fukushima offre en effet une rare opportunité d'accéder à des informations sensibles sur certaines des décisions clés du gouvernement et sur les discussions à huis clos entre les membres du *Cabinet* (le Gouvernement), les fonctionnaires des ministères<sup>22</sup>, l'opérateur et les fonctionnaires locaux pendant la phase d'urgence, comme cela n'avait jamais été le cas auparavant lors de l'accident de Tchernobyl et d'autres accidents nucléaires. Cela est dû en grande partie au système politique démocratique du pays, où l'accès à l'information et la liberté d'expression sont garantis par les lois nationales et la Constitution, qui obligent le gouvernement à divulguer certaines informations sensibles sur demande et à faire preuve de transparence et de responsabilité dans ses actions. Par conséquent, les rapports et communications officiels ainsi que la littérature académique sont abondants sur l'accident, et

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<sup>20</sup> Au moment de l'accident, le Japon disposait d'un total de 54 réacteurs nucléaires d'une puissance totale de 48 847 MW, ce qui fait du pays la troisième puissance nucléaire civile au monde après les États-Unis (98 réacteurs) et la France (58 réacteurs). Pourtant, le Japon n'est pas une puissance nucléaire militaire.

<sup>21</sup> Christine Fassert et Reiko Hasegawa, *Projet de recherche SHINRAI : L'accident du 3/11 et ses conséquences sociales : Case Studies from Fukushima Prefecture* (IRSN/Sciences Po (Médialab) 2019) 139.

<sup>22</sup> Notamment, les ministères en charge de la gestion post-accidentelle : Ministère de l'économie, du commerce et de l'industrie (METI), Ministère de l'éducation, de la culture, des sports, des sciences et de la technologie (MEXT) et Ministère de l'environnement (MoE).

s'ajoutent aux trois rapports d'enquête complets sur la catastrophe rendus par le *Diet* (le Parlement), le *Cabinet* et la société civile<sup>23</sup>. Plus important encore, cette accessibilité est pleinement exploitée par l'auteur de cette thèse, dont la langue maternelle est le japonais et qui parle couramment l'anglais et le français.

L'originalité de cette recherche doctorale réside dans le fait que l'analyse n'est pas seulement basée sur des sources secondaires d'information mais aussi sur des sources primaires, constituées de données d'entretiens sur le terrain. L'auteur de cette thèse a réalisé plus de 60 entretiens avec des personnes affectées, évacuées ou celles restées sur place, des responsables municipaux et gouvernementaux, des ONG, des experts et des universitaires au Japon entre 2012 et 2018 dans le cadre de deux projets de recherche<sup>24</sup> : un projet de recherche conjoint franco-japonais, DEVAST (2011-2013),<sup>25</sup> financé par l'Agence nationale de la recherche (ANR), et un autre projet de recherche collaboratif franco-japonais, SHINRAI (2015-2018),<sup>26</sup> entre Sciences Po, Tokyo Institute of Technology (Tokyo Tech), et l'Institut de radioprotection et de sûreté nucléaire (IRSN)<sup>27</sup>. Cela permet à cette recherche doctorale d'acquérir une compréhension approfondie de la situation spécifique et de l'expérience des victimes de

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<sup>23</sup> NAHC, *Report of the National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission* (The National Diet of Japan 2012) ; Cabinet Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company, *Final Report* (The Cabinet of Japan 2012) ; Cabinet Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company, *Interim Report* (The Cabinet of Japan 2011) ; Rebuild Japan Initiative Foundation, 福島原発事故独立検証委員会：調査・検証報告書 (*La commission indépendante d'investigation sur l'accident nucléaire de Fukushima : Rapport d'investigation*) (Discover 21 2012).

<sup>24</sup> Le questionnaire et la liste de ces entretiens sur le terrain sont consignés dans les rapports de projet respectifs : Reiko Hasegawa, *Disaster Evacuation from Japan's 2011 Tsunami Disaster and the Fukushima Nuclear Accident* (IDDRI 2013) IDDRI Study No.05/13 ; Fassert et Hasegawa (n 21). ; l'Enquête de terrain a été réalisée avec Christine Fassert (socio-anthropologue à l'Irsn à l'époque) et Rina Kojima (post-doctorante au LATTIS/Université Gustave Eiffel)

<sup>25</sup> Le projet Disaster Evacuation and Risk Perception in Democracies (DEVAST) est une étude visant à examiner deux types de déplacements de population, l'un suite au tsunami de 2011 au Japon et l'autre suite à l'accident nucléaire de Fukushima, et à faire une analyse comparative entre eux. Le projet a été mis en œuvre par l'IDDRI-Sciences Po en France, le Tokyo Institute of Technology (Tokyo Tech) et l'Université de Waseda au Japon.

<sup>26</sup> SHINRAI signifie *confiance* en japonais. Le projet vise à examiner les conséquences sociales de l'accident de Fukushima en se focalisant sur la confiance (ou perte de confiance) des citoyens envers les autorités publiques et les experts à la suite de l'accident nucléaire ainsi qu'en examinant la question du retour des populations dans les zones touchées par la catastrophe.

<sup>27</sup> L'Institut de radioprotection et de sûreté nucléaire est un institut d'expertise publique qui a pour mission d'apporter une expertise technique aux pouvoirs publics, notamment à l'Autorité de sûreté nucléaire (ASN), et au grand public.

l'accident nucléaire, induites par la catastrophe, et plus important encore, par les politiques post-accidentelles mises en œuvre par le gouvernement.

Mais la particularité principale de cette thèse de doctorat réside probablement dans la manière dont elle aborde les catastrophes nucléaires. En effet, elle représente l'une des rares tentatives concrètes d'identifier les victimes de catastrophes nucléaires (VCN, ci-après) comme des déplacés environnementaux et des personnes « piégées » dans les territoires contaminés, et de définir et théoriser le déplacement et l'immobilité forcée liés aux catastrophes nucléaires à partir du cadre normatif des migrations forcées – des migrations environnementales en particulier – qui est fondé sur les principes du droit humanitaire, des droits de l'homme et de l'environnement.

En effet, les instances internationales humanitaires (en particulier, celles impliquées dans la protection des personnes déplacées par de catastrophes) et les organisations des droits de l'homme sont restées longtemps silencieuses sur la gestion des catastrophes nucléaires et le risque nucléaire civil en général. De même, les accidents nucléaires ont rarement été abordés dans les débats académiques sur les migrations forcées et les droits de l'homme, ce qui a entraîné un déficit de connaissances permettant de comprendre la situation et les besoins spécifiques des victimes de catastrophes nucléaires (VCN). Face à ce manque, les institutions nucléaires internationales se sont imposées comme les seules autorités légitimes pour établir les normes de protection et prendre en charge le cas des personnes touchées par les catastrophes nucléaires. L'accident de Fukushima a bouleversé ce *statu quo* : les instances des droits de l'homme des Nations unies sont intervenues et ont dressé un bilan sévère non seulement de la gestion de l'accident nucléaire de Fukushima par le gouvernement japonais, mais aussi du cadre réglementaire nucléaire lui-même. Bien que ces critiques n'aient pas entraîné un changement immédiat ou une révision du modèle de gestion des catastrophes nucléaires établi par les autorités nucléaires internationales et nationales, elles constituent une première étape importante pour modifier la façon de voir et de traiter les accidents nucléaires, en particulier en ce qui concerne la protection de leurs victimes, à laquelle cette thèse entend apporter une contribution importante.

Finalement, la thèse remet en question l'application systématique et la légitimité des normes de réglementation nucléaire dans la protection des individus en cas de catastrophes nucléaires en s'appuyant sur d'autres principes de droit international et régimes normatifs. En substance, cette recherche tente d'induire un changement de paradigme – qu'elle formule

comme la « dé-nucléarisation » – dans la conceptualisation et le cadre normatif et institutionnel concernant le traitement des catastrophes nucléaires et la protection de leurs victimes.

Pour réaliser cette *dénucléarisation*, cette thèse de doctorat propose un nouvel ensemble de normes qui comblerait le vide de protection dans le cadre normatif nucléaire actuel. Cette proposition n'a toutefois pas l'intention de formuler des projets d'articles d'une convention ou d'un document normatif, ni de faire une recommandation politique ou de donner des conseils pratiques et administratifs sur la manière de mettre en œuvre et de financer les mesures de protection. Cette proposition normative vise plutôt à contribuer à une nouvelle réflexion internationale et à l'élaboration de politiques pour la protection des personnes lors de catastrophes nucléaires en identifiant les principes normatifs clés et les actions jugées indispensables pour respecter, protéger et garantir les droits des VCN.

## **I. La protection dans la controverse : le cas de Fukushima**

L'accident de la centrale nucléaire de Fukushima Daiichi (n°1) (ci-après F1NPP) s'est produit le 11 mars 2011 lorsqu'un tremblement de terre de magnitude 9,0 a frappé la côte Pacifique du nord-est du Japon, déclenchant un tsunami massif qui a causé des dommages irréparables à l'installation. La centrale nucléaire de Fukushima est située dans la préfecture de Fukushima, sur la côte Pacifique, à 230 km au nord de Tokyo (voir la figure 1 ci-dessous). Équipée de six réacteurs à eau bouillante (REB), elle était l'une des plus grandes centrales nucléaires au monde avec une capacité de production totale de 4 696 MW.<sup>28</sup> En service depuis près de 40 ans, elle était également l'une des plus anciennes installations nucléaires du pays, exploitée par la principale compagnie d'électricité privée du pays, Tokyo Electric Power Company (TEPCO, ci-après). La centrale a perdu toute alimentation électrique après que les générateurs diesel de secours placés au sous-sol ont été submergés par le tsunami, ce qui a entraîné la perte de contrôle du système de refroidissement du cœur du réacteur. Cela a entraîné la fusion de trois réacteurs nucléaires, trois explosions hydrogène-air et un rejet massif de substances radioactives dans l'environnement. L'accident a été classé au niveau 7 (accident majeur) selon l'échelle internationale des événements nucléaires et radiologiques (INES), définie par l'Agence internationale de l'énergie atomique (AIEA) et l'Agence de l'énergie nucléaire de l'Organisation de coopération et de développement économiques (AEN/OCDE).

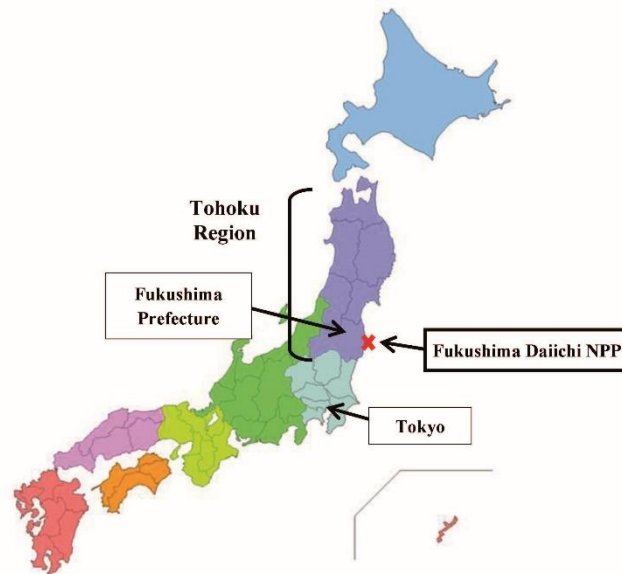
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<sup>28</sup> NAIIC (n 23).



Pour le seul césium, l'accident a libéré entre 33 et 50 % des retombées de Tchernobyl.<sup>29</sup> Cela a fait de cet accident la pire catastrophe nucléaire que le monde ait jamais connue après l'accident de Tchernobyl en 1986 (également classé au niveau 7).

Figure 1: Carte du Japon et de la centrale de Fukushima Daiichi



Face à cet accident, le gouvernement japonais, connu pour son expertise et son efficacité dans la gestion des catastrophes naturelles, a été complètement débordé et est apparu démuni dans les jours qui ont suivi la catastrophe. Sa réponse d'urgence a été extrêmement chaotique, dans un état constant d'improvisation et de nombreuses décisions clés ont été prises à huis clos entre les membres du *Cabinet* sans qu'aucun compte-rendu de réunion n'ait été produit sur le contenu de ces discussions.<sup>30</sup> En outre, la protection des victimes de catastrophes nucléaires a été rapidement séparée du reste du cadre de secours mis en place pour cette triple

<sup>29</sup> IRSN (n 11).

<sup>30</sup> NAIIC (n 23). Selon le rapport, ce n'est qu'en janvier 2012, dix mois après l'accident, que le gouvernement a admis pour la première fois que les réunions officielles relatives à la catastrophe n'avaient pas fait l'objet d'un procès-verbal. Suite à un tollé général, le gouvernement a publié les procès-verbaux « reconstitués » de ces réunions en février-mars 2012. Ces procès-verbaux ont été rédigés rétrospectivement par des fonctionnaires des ministères concernés qui avaient assisté à la réunion, en se remémorant des informations provenant de leurs notes personnelles et d'autres membres présents, de sorte qu'il n'est pas certain qu'ils reflètent correctement ou suffisamment les discussions réelles.

catastrophe et régie par une série de décisions arbitraires et ad hoc prises par les autorités de réglementation nucléaire, sans l'accord du *Diet* (le Parlement) et parfois en contradiction avec certaines dispositions de la législation relative à la réglementation des radiations. Les autorités nucléaires ont justifié ces décisions en se référant exclusivement aux normes établies par les institutions nucléaires internationales telles que l'AIEA, la Commission internationale de protection radiologique (CIPR),<sup>31</sup> et le Comité scientifique des Nations unies pour l'étude des effets des rayonnements ionisants (UNSCEAR).<sup>32</sup>

Ces politiques post-accidentelles de Fukushima ont en fait aggravé la situation de la population touchée au lieu de la soulager et ont déclenché de nombreuses controverses et protestations, non seulement de la part des victimes, mais aussi de la part de la communauté scientifique et de la société civile dans son ensemble au Japon, dont certaines ont fini par être portées devant les tribunaux.

### **A : La controverse du choix des 20 mSv/an**

La plus controversée et la plus essentielle de ces politiques post-accidentelles est indéniablement le choix d'un niveau de référence<sup>33</sup> à 20 millisieverts par an (mSv). Selon la recommandation de la CIPR, en cas d'accident nucléaire, il est conseillé aux autorités compétentes de fixer le niveau de dose de référence (critère de "sécurité" en effet) qui devrait guider les mesures de protection et d'intervention en cas de catastrophe. Le gouvernement japonais a établi la dose de référence fixée à un seuil en fait 20 fois supérieure à la limite de dose annuelle pour le public (en temps normal). Selon la législation japonaise et les normes internationales de réglementation des rayonnements ionisants, la limite de dose publique est

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<sup>31</sup> La CIPR est une organisation internationale privée d'experts qui est considérée par beaucoup comme l'autorité internationale en matière de protection radiologique.

<sup>32</sup> L'UNSCEAR est une organisation des Nations unies qui compte 31 États membres (dont la plupart sont des puissances nucléaires) et qui publie des rapports sur les effets des rayonnements. Il est constitué de scientifiques sélectionnés et envoyés par les États membres. Contrairement à la CIPR, le comité ne formule aucune recommandation politique en matière de protection radiologique et est considéré aujourd'hui comme l'autorité scientifique internationale en matière d'effets des rayonnements.

<sup>33</sup> Le "niveau de référence" est le terme utilisé par la CIPR pour les situations d'exposition d'urgence ou existante et se distingue de la "limite de dose" qui ne s'applique qu'aux situations d'exposition planifiées (c'est-à-dire les situations "normales" sans urgence nucléaire). En réalité, le niveau de référence fonctionne de la même manière que la "limite de dose" ou le seuil dans les situations d'urgence. Il est généralement fixé à un niveau plus élevé que la limite de dose.

fixée à 1 mSv/an<sup>34</sup> et le niveau de dose de 20 mSv/an représente la limite de dose annuelle pour les travailleurs exposés professionnellement<sup>35</sup>.

Cette dose de référence de 20 mSv/an, d'abord établie comme référence provisoire permettant la tenue ou non des activités scolaires à Fukushima,<sup>36</sup> est rapidement devenue la valeur-seuil définitive permettant au gouvernement de déterminer une zone « sûre » pour que la population puisse y vivre ou y retourner, ainsi que de conditionner l'aide à la protection et l'indemnisation post-Fukushima. Ainsi, l'évacuation (relocalisation) des résidents n'a été ordonnée et assistée par les autorités que lorsque le niveau de radiation dans l'air de la zone dépassait 20 mSv/an. Cela signifie que les personnes vivant dans la zone contaminée<sup>37</sup> où le niveau de dose était inférieur à 20 mSv/an ont été invitées à rester sur place et n'ont pas bénéficié d'une aide à l'évacuation. En conséquence, certains résidents se sont retrouvés dans une situation de « captifs », retenus contre leur gré dans une zone où ils estimaient que leur vie et leur santé étaient en danger.

De même, après les opérations de décontamination, le retour des personnes évacuées dans les zones d'évacuation a été organisé et encouragé par les autorités dès que le niveau de

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<sup>34</sup> Selon la CIPR, la limite de dose annuelle pour l'exposition du public (1 mSv/an) est la dose effective d'un individu résultant d'expositions externes et internes, à l'exclusion des expositions médicales et professionnelles, et ne s'applique qu'aux situations d'exposition planifiées (c'est-à-dire, pas dans les situations d'urgence nucléaire). La dose effective est le terme utilisé par la CIPR pour désigner la dose d'exposition totale d'un corps entier résultant d'expositions externes et internes, ajustée en calculant le facteur de pondération pour les rayonnements (par exemple, pour les rayons X et les rayons gamma tels que le césium, le facteur est de 1) et le facteur de pondération pour les tissus (sensibilité de chaque tissu et organe) (par exemple, 0,12 pour l'estomac, 0,08 pour les gonades, etc).

<sup>35</sup> Pour la réglementation japonaise en matière de radiations, voir l'avis public du METI "実用発電用原子炉の設置、運転等に関する規則の規定に基づく線量限度等を定める告示" (Avis public sur la limite de dose sur la base de l'ordonnance pour les réacteurs commerciaux)" (No 187 of 21 March 2001) et l'avis public du MEXT "試験研究の用に供する原子炉等の設置、運転等に関する規則等の規定に基づき、線量限度等を定める告示の一部を改正する告示" (Avis public visant à modifier l'avis public sur la limite de dose sur la base de l'ordonnance pour les réacteurs au stade de la recherche et du développement) (n° 163 du 30 novembre 2005), toutes deux relatives à "核原料物質、核燃料物質及び原子炉の規制に関する法律" (loi sur la réglementation des matières premières nucléaires, des matières combustibles nucléaires et des réacteurs) n° 166 du 10 juin 1957, telle qu'amendée. Pour la réglementation internationale, voir CIPR, "Recommandations 2007 de la Commission internationale de protection radiologique. Publication 103 de la CIPR. (Elsevier 2007) Ann. CIPR 37 (2-4).

<sup>36</sup> MEXT, "福島県内の学校の校舎・校庭等の利用判断における暫定的考え方について" (Avis provisoire concernant l'utilisation des bâtiments scolaires et des cours de récréation dans la préfecture de Fukushima)" (Ministère de l'éducation, de la culture, des sports, de la science et de la technologie 2011) on 19 April 2011

<sup>37</sup> Le terme "zones contaminées" ou "territoire contaminé" est généralement utilisé dans cette thèse pour désigner les zones où la dose effective d'une personne, à l'exclusion de l'exposition médicale ou professionnelle et du rayonnement de fond naturel local normal, devrait dépasser 1 mSv par an conformément à la limite de dose publique.

radiation est tombé à 20 mSv/an ou moins. Ce retour a été favorisé par diverses incitations financières pour le logement et les services sociaux et médicaux, les communications officielles, la création d'emplois et l'arrêt progressif de l'aide à l'évacuation. Cela a en effet créé une situation dans laquelle certaines personnes évacuées ont été contraintes de rentrer chez elles contre leur gré en raison de l'absence d'aide de l'État à la réinstallation ou de solutions alternatives. Le régime d'indemnisation des dommages de Fukushima a donc été conçu en grande partie pour suivre et renforcer ces politiques.

La dose de référence de 20 mSv/an a ainsi suscité de vives controverses et protestations de la part des habitants concernés, de la société civile (en particulier des ONG de défense des droits de l'homme et de l'environnement) et de la communauté scientifique dans son ensemble. L'exemple le plus spectaculaire a été la démission du conseiller scientifique du gouvernement, Toshiso Kosako, en avril 2011, qui a tenu une conférence de presse pour annoncer sa démission et protester en larmes contre la décision du gouvernement d'appliquer la dose de référence de 20 mSv/an aux nourrissons et aux enfants de Fukushima<sup>38</sup>. Un mois plus tard, 650 habitants de Fukushima ont manifesté devant le ministère de l'éducation, de la culture, des sports, de la science et de la technologie (MEXT) pour demander l'annulation de cette politique<sup>39</sup>. L'association nationale des avocats, la *Japan Federation of Bar Associations (JFBA)*<sup>40</sup>, a également demandé au gouvernement d'abaisser le niveau de référence à 5 mSv/an conformément à la loi japonaise relative aux zones radiologiques contrôlées<sup>41</sup> et de suivre le précédent établi lors de l'accident de Tchernobyl où le niveau de référence avait été fixé à 5

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<sup>38</sup> Son discours lors de la conférence de presse, traduit en anglais, à <<http://japanfocus.org/events/view/83>> consulté le 23 mars 2023

<sup>39</sup> OurPlanet-TV, « 「20 ミリシーベルト基準」撤回を～福島のパウチらが文科省に要請行動」 (Les parents de Fukushima protestent auprès du MEXT, demandent l'annulation du "critère des 20 mSv") *ourplanet-tv.org* (24 mars 2011) <<https://www.ourplanet-tv.org/38326/>> consulté le 28 février 2023.

<sup>40</sup> Créée en 1949, la JFBA est la fédération autonome des 52 associations d'avocats du Japon. L'adhésion est obligatoire pour tous les avocats qui pratiquent le droit au Japon.

<sup>41</sup> La zone radiologique contrôlée (*Radiation Controlled Area* en anglais – RCA) est réglementée par des ordonnances ministérielles telles que l'ordonnance du MHLW sur la prévention des risques liés aux radiations ionisantes (ministère du travail n° 41 de 1972) (article 3), l'avis public du METI sur les limites de dose (n° 187 de 2001) (article 2), l'avis public du MEXT sur les limites de dose (n° 20 de 1988) (article 2), l'avis public du MEXT sur l'établissement des valeurs des radio-isotopes (n° 5 de 2000) (article 4), et d'autres encore. Selon ces ordonnances, la zone où la dose effective d'une personne (travailleur) due à des expositions externes et internes peut dépasser 1,3 mSv par trois mois (5,2 mSv par an) ou une densité de surface de radioactivité peut dépasser 4 Bq/cm<sup>2</sup> (40 000 Bq/m<sup>2</sup>), à l'exception des rayons alpha, doit être désignée comme RCA. Une fois désignée comme RCA, l'entrée est strictement interdite à toutes les personnes, à l'exception du personnel désigné et doté des équipements de sécurité.

mSv/an pour la réinstallation<sup>42</sup>. En fait, le niveau de référence de 5 mSv/an a également été suggéré par un membre du *Cabinet*, le ministre d'État chargé de la gestion des urgences nucléaires et de la préparation, Goshi Hosono, lors d'une réunion gouvernementale tenue en novembre 2011 et dont le contenu n'a pas été divulgué<sup>43</sup>. Toutefois, la proposition a finalement été rejetée par d'autres membres dudit *Cabinet* qui craignaient qu'un tel niveau de référence n'augmente le nombre d'évacués et, par conséquent, de paiements d'indemnités.

Face aux critiques croissantes, le gouvernement a tenté de justifier le choix du niveau de dose de 20 mSv/an en se référant systématiquement aux normes internationales établies par la CIPR, l'AIEA et l'UNSCEAR. En outre, il a insisté sur le fait que « le risque de développement d'un cancer dû aux rayonnements à des niveaux de 100 mSv ou inférieur est considéré comme si faible *selon le consensus international* que ce risque est masqué par les effets cancérigènes d'autres causes » (par exemple, le tabagisme, l'obésité et un régime alimentaire déséquilibré)<sup>44</sup>. En d'autres termes, la dose de référence de 20 mSv/an ne présente pratiquement aucun risque pour la santé.

La recommandation de la CIPR en cas d'urgence nucléaire est en effet de ne pas tenir compte de la limite de dose publique et de la remplacer par une dose de référence plus souple<sup>45</sup>. Plus précisément, elle suggère que cette dose de référence soit choisie dans la fourchette de 20 à 100 mSv pour la phase d'urgence et dans la fourchette de 1 à 20 mSv pour la phase post-

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<sup>42</sup> JFBA, « 「被災者生活支援等施策の推進に関する基本的な方針（案）」に関する会長声明 ” (Déclaration du président de JFBA concernant "le (projet de) cadre de base relatif à la promotion des mesures de soutien à la vie des victimes de catastrophes"). "避難住民の帰還に当たっての線量基準に関する会長声明” (Déclaration du président concernant la norme de dose pour le retour des évacués)” (Japan Federation of Bar Associations 2014) 31 janvier 2014.

<sup>43</sup> Shinichi Sekine, “福島の帰還基準、避難者増を恐れて強化せず 民主政権時” (Les critères de dose pour le retour des évacués n'ont pas été abaissés de peur d'augmenter le nombre d'évacués) " *Asahi Shimbun* (Tokyo, 25 mai 2013) <[http://www.asahi.com/shinsai\\_fukkou/articles/TKY201305250024.html](http://www.asahi.com/shinsai_fukkou/articles/TKY201305250024.html)> consulté le 2 février 2023.

<sup>44</sup> Secrétariat du Cabinet, 'Report from the Working Group on Risk Management of Exposure to Low-Dose Radiation' (Gouvernement du Japon 2011) 22 décembre 2011 5 <[https://www.cas.go.jp/jp/genpatsujiko/info/twg/Working\\_Group\\_Report.pdf](https://www.cas.go.jp/jp/genpatsujiko/info/twg/Working_Group_Report.pdf)> consulté le 7 janvier 2023. Les explications entre parenthèses et l'accentuation sont ajoutées par l'auteur de cette thèse.

<sup>45</sup> CIPR, "Recommandations 2007 de la Commission internationale de protection radiologique. Publication 103 de la CIPR. (n 35).

accidentelle.<sup>46</sup> Compte tenu de cet avis, le choix du gouvernement japonais de 20 mSv/an n'est pas, à proprement parler, en inconformité avec cette recommandation. Néanmoins, la CIPR adopte également le modèle linéaire sans seuil (LSS) qui suppose que les dommages biologiques causés par l'exposition aux rayonnements, le risque de cancer en particulier, sont proportionnels à la dose exposée (relation dose-réponse) même en dessous du seuil de 100 mSv<sup>47</sup>. Le modèle LNT implique qu'il n'existe pas de seuil en dessous duquel l'exposition aux rayonnements est inoffensive. De ce point de vue, la position du gouvernement japonais sur le risque lié aux faibles doses - le modèle du seuil - n'est donc pas conforme à la recommandation de la CIPR.

Les justifications du gouvernement n'ont donc pas convaincu la majorité des habitants concernés. Le taux de retour des personnes évacuées de Fukushima dans les anciennes zones d'évacuation témoigne de leur malaise face au niveau de dose de 20 mSv/an. Onze ans après l'accident, seuls 30 % des résidents sont rentrés chez eux.<sup>48</sup> De plus, la majorité de ces personnes sont des personnes âgées de plus de 60 ans qui ne sont pas accompagnées de leurs enfants et petits-enfants<sup>49</sup>. Les protestations contre les 20 mSv/an se sont également transformées en actions en justice.

## **B : Deux types de déplacement et d'immobilité forcée**

Cette politique de dose de référence de 20 mSv/an a généré un phénomène particulier de déplacement parmi la population touchée, qui constitue l'une des caractéristiques spécifiques des catastrophes nucléaires : deux types de déplacement humain et une situation d'immobilité

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<sup>46</sup> Dans sa dernière recommandation publiée après l'accident nucléaire de Fukushima, la CIPR a abaissé ces fourchettes de doses recommandées : pour la phase d'urgence, elle recommande désormais une dose de référence "inférieure à 20 mSv" et, pour la phase de récupération, "dans la moitié inférieure de la fourchette de 1 à 20 mSv/an" (c'est-à-dire la fourchette de 1 à 10 mSv/an). Voir CIPR, "Protection radiologique des personnes et de l'environnement en cas d'accident nucléaire majeur", publication 146 de la CIPR. Publication 146 de la CIPR. (CIPR 2020) Ann. CIPR 49 (4) 78.

<sup>47</sup> CIPR, "Recommandations 2007 de la Commission internationale de protection radiologique. Publication 103 de la CIPR. (n 35).

<sup>48</sup> Naofumi Yoshida, "避難指示解除区域の住民帰還頭打ち 福島第一原発事故被災地、移住率3割にとどまる" (Le retour des évacués dans l'ancienne zone d'évacuation a atteint le plafond, le taux d'habitation à 30 % dans les zones touchées par l'accident nucléaire de Fukushima Daiichi) *Kahoku Shimpo* (Sendai, 14 septembre 2022) <<https://kahoku.news/articles/20220913khn000045.html>> consulté le 28 février 2023.

<sup>49</sup> Reiko Hasegawa, "Five Years on for Fukushima's IDPs : Life with Radiological Risk and without a Community Safety Net" *Blog post (Expert Opinion), Internal Displacement Monitoring Centre (IDMC) - Norwegian Refugee Council* (March 2016).

forcée. Tout d'abord, l'accident de Fukushima a entraîné l'évacuation *obligatoire* des résidents sur ordre du gouvernement, d'une part, et l'évacuation *volontaire* des résidents, d'autre part. Comme mentionné précédemment, les zones d'évacuation obligatoire ont été définies par le gouvernement en utilisant le critère de dose de 20 mSv/an qui a donc remplacé les critères de distance provisoires initialement adoptés pendant la phase d'urgence. Cette mesure a contraint environ 110 000 résidents à quitter leur domicile, devenant ainsi des évacués obligatoires en vertu de l'ordre du gouvernement. De plus, cela a provoqué un autre type de mouvement en dehors des zones d'évacuation : l'évacuation spontanée des habitants qui n'étaient pas rassurés par le seuil de « sécurité » de 20 mSv/an. Appelés « évacués volontaires »,<sup>50</sup> « auto-évacués », ou « évacués hors zone », il s'agit des résidents vivant dans les zones contaminées en dehors des zones d'évacuation obligatoire qui ont fui de leur plein gré afin de se protéger, en particulier leurs enfants, de l'exposition aux radiations. Le nombre de ces évacués a été estimé entre 50 000 et 70 000, soit un tiers de l'ensemble des évacués (160 000) enregistrés par la préfecture de Fukushima.<sup>51</sup> Toutefois, ces personnes évacuées « hors zone » ont été traitées différemment que les personnes évacuées obligatoirement et n'ont pas bénéficié d'une assistance suffisante de la part des autorités. Dans certains cas, ils ont même été considérés comme des « rebelles » ou des « fauteurs de troubles » ayant désobéi aux instructions du gouvernement, faisant apparaître Fukushima comme une ville dangereuse aux yeux du grand public et mettant ainsi en péril l'effort collectif de reconstruction de Fukushima<sup>52</sup>.

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<sup>50</sup> Le terme "volontaire" est principalement utilisé par les autorités japonaises et les organisations nucléaires internationales telles que la CIPR et l'AIEA. Au cours des entretiens sur le terrain, nombre de ces personnes évacuées ont exprimé leur malaise face au terme "volontaire", car elles ont fui leur domicile en craignant pour leur vie ou celle de leurs enfants et ont donc été "contraintes" par la situation de fuir. Voir Hasegawa, "Disaster Evacuation from Japan's 2011 Tsunami Disaster and the Fukushima Nuclear Accident" (n 24) ; Reiko Hasegawa, "Returning Home after Fukushima : Displacement from a Nuclear Disaster and International Guidelines for Internally Displaced Persons". (OIM 2015) Série de notes politiques de l'OIM. Migration, environnement et changement climatique. Numéro 4, Vo.1, septembre 2015. <[http://publications.iom.int/system/files/pdf/policy\\_brief\\_series\\_issue4.pdf](http://publications.iom.int/system/files/pdf/policy_brief_series_issue4.pdf)> consulté le 24 octobre 2018 ; Fassett et Hasegawa (n 21).

<sup>51</sup> Il existe très peu de données officielles sur le nombre d'évacués "volontaires". Un rapport estimant ce nombre a été soumis à la réunion du comité de réconciliation du MEXT qui s'est tenue en novembre 2011. C'était la première fois, et l'une des rares fois, que la préfecture ou le gouvernement présentait officiellement le nombre d'évacués "volontaires". Voir le document d'appui (2-1) du 16e comité de conciliation des différends pour l'indemnisation des dommages nucléaires qui s'est tenu le 10 novembre 2011 au MEXT (en japonais uniquement) <[http://www.mext.go.jp/b\\_menu/shingi/chousa/kaihatu/016/shiryo/\\_icsFiles/afiefieldfile/2011/11/11/1313180\\_2\\_2.pdf](http://www.mext.go.jp/b_menu/shingi/chousa/kaihatu/016/shiryo/_icsFiles/afiefieldfile/2011/11/11/1313180_2_2.pdf)> consulté le 29 décembre 2022.

<sup>52</sup> Hasegawa, "Disaster Evacuation from Japan's 2011 Tsunami Disaster and the Fukushima Nuclear Accident" (n 24) ; Hasegawa, "Returning Home after Fukushima : Displacement from a Nuclear Disaster and International Guidelines for Internally Displaced Persons". (n 50) ; David H Slater, Rika Morioka et Haruka Danzuka, 'Micro-Politics of Radiation' (2014) 46 Critical Asian Studies 485.

L'accident a également engendré une autre forme de migration forcée, opposée au déplacement : l'immobilité forcée. Également appelée « déplacement sur place » par certains spécialistes<sup>53</sup>, il s'agit d'un aspect souvent oublié des migrations forcées, dans lequel des personnes sont « piégées » dans des zones à risque (par exemple, des territoires radiologiquement contaminés) contre leur volonté, faute de moyens ou de capacité de fuir. En effet, la décision du gouvernement japonais de n'évacuer que les zones présentant des niveaux de contamination supérieurs à 20 mSv/an a contraint de nombreuses personnes à rester dans les territoires contaminés contre leur gré. Lorsque ces résidents « piégés » ont protesté contre cette dose de référence et demandé une aide à l'évacuation, les autorités leur ont simplement dit de « vivre avec » car la situation radiologique de leur environnement ne présentait que peu de risques pour leur santé. Ainsi, ils ont été exclus non seulement de l'aide à l'évacuation, mais aussi de l'indemnisation des dommages (certains d'entre eux ont reçu plus tard une maigre indemnisation). Cela signifie que seuls quelques-uns de ceux qui disposaient de ressources financières, d'une certaine flexibilité professionnelle ou de liens familiaux ailleurs ont pu s'évacuer par eux-mêmes, devenant ainsi des évacués « volontaires ». Mais la plupart des habitants n'ont pas eu d'autre choix que de rester, même s'ils n'étaient pas rassurés par le critère de sécurité du gouvernement. La grande majorité des victimes de la catastrophe de Fukushima se sont retrouvées dans cette situation.

Le programme de secours et de protection post-accidentelle de Fukushima a donc été orienté vers les évacués obligatoires, négligeant largement les évacués « volontaires » et les résidents pris au piège dans l'environnement contaminé. En fait, les évacués obligatoires ne représentaient que 7 % de la population touchée par les retombées de Fukushima et vivant dans les territoires contaminés<sup>54</sup>. Ainsi, le programme post-accidentel n'a soulagé qu'une petite partie des victimes de l'accident, laissant de nombreuses personnes sans soutien adéquat et contraintes de vivre avec la contamination radiologique. La comparaison de deux cartes ci-dessous (figure 2) illustre bien cette divergence. La carte de droite représente les zones officielles d'évacuation de Fukushima et la carte de gauche montre la zone affectée par les radiations émises par l'accident. Comme le montrent ces deux cartes, les retombées de Fukushima ont touché un

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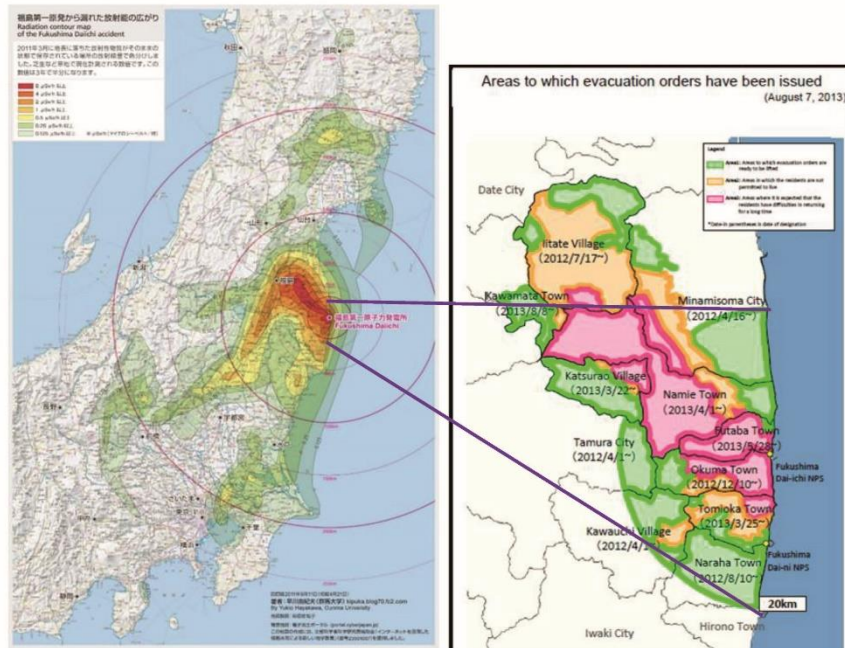
<sup>53</sup> Le terme a été introduit par Stephen C Lubkemann, "Involuntary Immobility : On a Theoretical Invisibility in Forced Migration Studies" (2008) 21 *Journal of Refugee Studies* 454.

<sup>54</sup> Selon Sawano, 1,6 million de personnes vivaient dans les territoires contaminés (avec des doses équivalentes à plus de 5,2 mSv/an) à la suite de l'accident de Fukushima. Le pourcentage (7 %) a donc été calculé à partir du nombre d'évacués obligatoires (110 000) sur 1,6 million. Voir Sawano (n 13).



territoire beaucoup plus vaste que les zones d'évacuation désignées par le gouvernement japonais.

Figure 2 : Comparaison des cartes : Retombées des radiations de Fukushima<sup>55</sup> et zones d'évacuation<sup>56</sup>



Ces éléments constituent une particularité de la gestion des catastrophes nucléaires. Lors de catastrophes ordinaires, telles que les conflits armés et les catastrophes naturelles, les gens fuient spontanément lorsqu'ils sentent leur vie menacée, et sont alors aidés par les gouvernements nationaux ou la communauté internationale. En revanche, en cas de catastrophe nucléaire, les gouvernements nationaux décident qui est en danger et qui a besoin d'être évacué et aidé, indépendamment de la perception des risques, de la volonté ou du contexte vécu par chaque individu. À cet égard, la gestion des catastrophes nucléaires est un dispositif « top-

<sup>55</sup> La carte a été publiée le 11 septembre 2011 par Yukio Hayakawa, professeur de géologie (volcanologie) à l'université de Gunma (Japon), et se trouve sur son site web <<http://kipuka.blog70.fc2.com/blog-category-20.html>> consulté le 31 janvier 2023.

<sup>56</sup> Source : Ministère japonais de l'économie, du commerce et de l'industrie (METI) <[https://www.meti.go.jp/english/earthquake/nuclear/roadmap/evacuation\\_areas.html](https://www.meti.go.jp/english/earthquake/nuclear/roadmap/evacuation_areas.html)> consulté le 29 mars 2023

down » centré sur l'État et orienté vers le collectif et non pas l'individu qui tend à exclure de nombreuses victimes au lieu de les inclure dans sa protection.

### **C : La contestation du « Statut Fukushima » et les défis juridiques**

La dose de référence de 20 mSv/an a finalement déterminé qui avait droit à la protection de l'État, c'est-à-dire qui étaient les victimes légitimes de l'accident aux yeux des autorités et de TEPCO<sup>57</sup>. Elle est également devenue la base fondamentale de ce que cette thèse appelle « le statut de Fukushima », qui donne accès à divers degrés d'indemnisation. Comme nous l'avons mentionné précédemment, le régime d'indemnisation de Fukushima a largement suivi les instructions d'évacuation et les politiques post-accidentelles du gouvernement, ce qui a entraîné la création de plusieurs catégories de statuts de victime avec des droits différents. Ainsi, les victimes ont été réparties en neuf catégories de statut d'indemnisation, dont six étaient directement liées aux ordres d'évacuation du gouvernement<sup>58</sup>.

L'aspect le plus notable de ce « statut Fukushima » est le très grand écart d'indemnisation entre les évacués obligatoires et le reste de la population touchée, y compris les évacués hors zone et les résidents piégés. Dans certains cas, cet écart est de 1 pour 45 entre des victimes qui vivent parfois dans des conditions radiologiques très similaires. Cela a déclenché un fort sentiment d'injustice, de jalousie et d'indignation parmi les personnes touchées, créant de profondes divisions et tensions à l'intérieur, à l'extérieur et entre les différentes zones et catégories de statut<sup>59</sup>. C'est ainsi qu'en 2014, trois ans après l'accident, les actions collectives en justice se sont organisées et multipliées à l'échelle nationale. Plus de 30 plaintes civiles en groupe impliquant 12 000 plaignants ont été déposées contre le TEPCO et

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<sup>57</sup> Reiko Hasegawa et autres, 'Politics of Zoning : Making Risks (In)Visible and Manageable in Disasters' (The SDN 2017) Conference Paper presented at the Science and Democracy Network (SDN) the 16th Annual Meeting, 29 June-1 July 2017, Harvard University, Cambridge (USA).

<sup>58</sup> Kenji Fukuda et Kenichirou Kawasaki, “子ども・被災者支援法の成立と現状” (The Enactment and Status of the Nuclear Disaster Victims' Support Act) dans Institute of Disaster Area Revitalization, Regrowth and Governance, JCN et SAFRAN (eds), *原発避難白書 (Livre blanc sur l'évacuation nucléaire)* (Jinbun Shoin 2015) ; Masafumi Yokemoto et Michiko Hiraoka, “原発賠償の仕組みと問題点—生活再建と地域再生に向けた課題” (The System and the Problems of Nuclear Compensation : The Issues Related to the Reconstruction of Lives and the Restoration of Communities) in Masafumi Yokemoto and Toshihiko Watanabe (eds), *原発災害はなぜ不均等な復興をもたらすのか—福島事故から「人間の復興」、地域再生へ (Pourquoi la catastrophe nucléaire induit-elle une reconstruction déséquilibrée ? : Toward the "Reconstruction of Human Lives" and Community Revival from the Fukushima Accident)* (Minerva Shobo 2015).

<sup>59</sup> Yokemoto et Hiraoka (n 54) ; Hasegawa, "Disaster Evacuation from Japan's 2011 Tsunami Disaster and the Fukushima Nuclear Accident" (n 24) ; Fassett et Hasegawa (n 21).

l'État dans tout le Japon, réclamant un montant total d'un milliard de dollars américains à titre de compensation pour diverses formes de dommages<sup>60</sup>. Outre ces procédures civiles, une action pénale contre les anciens dirigeants de TEPCO (l'ex-PDG et deux anciens vice-présidents) a également été intentée par 14 000 plaignants en juillet 2015.

Parmi ces actions, deux groupes ont spécifiquement contesté la validité juridique de la dose de référence de 20 mSv/an choisie par le Gouvernement. L'un de ces recours a été déposé auprès du tribunal de district de Fukushima par un groupe de 201 parents en juin 2015, sous le nom de « Group Action Against Radiation Exposure of Children »<sup>61</sup>, et l'autre a été déposé auprès du tribunal de district de Tokyo par 808 résidents de la ville de Minamisoma en avril 2015, sous le nom de « Group Action Against the 20 mSv/year »<sup>62</sup>. Les deux actions demandaient la rétractation des mesures gouvernementales décidées sur la base de la dose de référence de 20 mSv/an.

Malgré ces protestations et ces actions en justice, le Gouvernement a maintenu la dose de référence à 20 mSv/an et ne l'a pas modifiée jusqu'à aujourd'hui (plus de 10 ans après l'accident).

## **II. Le droit international et les catastrophes nucléaires : un conflit normatif**

À la recherche d'une validation internationale, le gouvernement japonais a également demandé à l'AIEA de réaliser une évaluation de sa politique post-accidentelle, en particulier pour les aspects liés à sa décision concernant la dose de référence de 20 mSv/an. En réponse, l'AIEA a mené une mission sur le terrain en octobre 2013 et a publié un rapport qui validait largement la dose de référence de 20 mSv/an, en soulignant que dans les situations post-accidentelles, « tout niveau de dose de rayonnement individuel compris entre 1 et 20 mSv par an est acceptable et conforme aux normes internationales et aux recommandations des

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<sup>60</sup> Hironori Tsuchie, “東日本大震災5年 原発事故原告1万2,539人 訴訟全国31件” (Cinq ans après la catastrophe du Grand Est du Japon : 31 Group Legal Actions Across Japan and 12,539 Nuclear Accident Plaintiffs) *Mainichi Shimbun* (16 mars 2016).

<sup>61</sup> Traduction de 子ども脱被ばく裁判 par R. Hasegawa. Le site de l'équipe du plaignant (en japonais uniquement) <<https://fukushima-sokaisaiban.blogspot.com/>> consulté le 28 mars 2023.

<sup>62</sup> Traduction de 南相馬・避難20ミリシーベルト基準撤回訴訟 par R. Hasegawa. Le site web de l'équipe du plaignant (en japonais uniquement) <<http://minamisouma.blogspot.com/>> consulté le 28 mars 2023

organisations internationales compétentes, par exemple la CIPR, l'AIEA, l'UNSCEAR et l'Organisation mondiale de la santé (OMS) »<sup>63</sup>. L'UNSCEAR a également publié un rapport sur l'accident de Fukushima en 2013 concluant, deux ans seulement après l'accident, qu'aucun effet sanitaire lié aux rayonnements n'était à craindre pour la population à l'avenir<sup>64</sup>. Cette déclaration a été faite en dépit du fait que les doses d'exposition initiales des résidents touchés restent largement inconnues des autorités japonaises.<sup>65</sup> Ces déclarations répètent le discours sur l'accident de Tchernobyl, les rapports de l'AIEA et de l'UNSCEAR ont identifié l'effet sanitaire le plus important de l'accident comme relevant de problèmes psychologiques au sein de la population touchée en raison de la peur injustifiée et de la stigmatisation liées à l'exposition aux rayonnements.

Cependant, en parallèle, les politiques du gouvernement japonais à Fukushima ont été sévèrement critiquées par d'autres organisations internationales, à savoir le Conseil des droits de l'homme des Nations unies et les organes des traités des Nations unies relatifs aux droits de l'homme, tels que le Comité des droits de l'homme (CCPR) et le Comité des droits économiques, sociaux et culturels (CESCR). Au Japon, des organisations d'experts juridiques telles que le JFBA et Human Rights Now (HRN)<sup>66</sup> ont appelé le gouvernement à mettre ses politiques en conformité avec la réglementation japonaise en matière de radiations, la Constitution et les obligations internationales découlant des conventions sur les droits de l'homme et d'autres instruments normatifs.

Le rapport de mission du Rapporteur spécial des Nations unies sur le droit à la santé, est même allé plus loin en suggérant que les principes de protection contre le nucléaire et les

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<sup>63</sup> AIEA, 'Final Report: The Follow-up IAEA International Mission on Remediation of Large Contaminated Areas Off-Site the Fukushima Daiichi Nuclear Power Plant, 14-21 October 2013' (2014) 11, 17, 18 <[https://www.iaea.org/sites/default/files/final\\_report230114\\_0.pdf](https://www.iaea.org/sites/default/files/final_report230114_0.pdf)> consulté le 15 avril 2019. En effet, cette phrase est répétée trois fois dans le rapport.

<sup>64</sup> UNSCEAR, 'Sources, Effects and Risks of Ionizing Radiation: United Nations Scientific Committee on the Effects of Atomic Radiation: UNSCEAR 2013 Report to the General Assembly with Scientific Annexes' (2013) Vol I Scientific Annex A 10-11.

<sup>65</sup> Study2007, *見捨てられた初期被ばく (Abandoned Initial Exposure Dose)* (Iwanami Shoten 2015). L'enquête sur la santé des résidents de Fukushima, sur laquelle le gouvernement s'est basé pour estimer la dose d'exposition initiale du public, n'a été suivie que par 27 % des résidents de Fukushima, selon la préfecture de Fukushima en mars 2016. Cela signifie que les doses d'exposition initiales de 70 % des résidents concernés restent inconnues. Voir le site de préfecture de Fukushima <<https://www.pref.fukushima.lg.jp/uploaded/attachment/158522.pdf>> consulté le 20 mai 2019

<sup>66</sup> Créée en 2006 par un groupe d'avocats, d'universitaires et de journalistes spécialisés dans les droits de l'homme, Human Rights Now (HRN) est la première ONG internationale de défense des droits de l'homme basée au Japon et dotée du statut consultatif spécial auprès des Nations unies. Source : site web de HRN (<https://hrn.or.jp/eng/>)

radiations n'étaient pas conformes au cadre des droits de l'homme et que, par conséquent, la réponse à la catastrophe nucléaire devrait être basée sur l'approche fondée sur les droits plutôt que sur le cadre nucléaire.<sup>67</sup> D'autres rapports ont exprimé de sérieuses inquiétudes quant au niveau de référence choisi de 20 mSv/an, qualifiant la décision du gouvernement japonais de « profondément troublante »,<sup>68</sup> et ont vivement recommandé que les personnes évacuées de Fukushima « ne reviennent que lorsque la dose de radiation a été réduite [...] à des niveaux inférieurs à 1 mSv/an ». <sup>69</sup> En outre, les rapporteurs ont exhorté le gouvernement à reconnaître les personnes évacuées de Fukushima, qu'elles soient forcées ou volontaires, comme des personnes déplacées à l'intérieur de leur propre pays (PDI, ci-après), à l'égard desquelles il a des obligations spécifiques en vertu des dispositions des Principes directeurs relatifs au déplacement de personnes à l'intérieur de leur propre pays (PDDI ou les Principes directeurs, ci-après). <sup>70</sup>

Deux points de vue s'opposent au sujet de la gestion de catastrophe nucléaire de Fukushima aujourd'hui. Cela suggère notamment qu'il existe actuellement un conflit de légitimité<sup>71</sup>, « collision de régimes »<sup>72</sup> ou « conflit normatif »<sup>73</sup> entre deux régimes normatifs internationaux en ce qui concerne la protection des personnes en cas de catastrophe nucléaire. En effet, le droit nucléaire et le droit humanitaire/des droits de l'homme peuvent être décrits comme des *lex specialis*, ou « régimes autonomes (*self-contained regimes*) », des sous-systèmes du droit international général dotés de règles primaires spécifiques (par exemple, des

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<sup>67</sup> UNHRC, 'Rapport du Rapporteur spécial sur le droit qu'a toute personne de jouir du meilleur état de santé physique et mentale possible, M. Anand Grover' (Conseil des droits de l'homme, 2 mai 2013) UN Doc A/HRC/23/41/Add.3.

<sup>68</sup> OHCHR, " Japan Must Halt Returns to Fukushima, Radiation Remains a Concern, Says UN Rights Expert " *Communiqué de presse du OHCHR* (25 octobre 2018) <<https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=23772&LangID=E>> consulté le 3 janvier 2023.

<sup>69</sup> UNHRC, " Rapport du Rapporteur spécial sur le droit qu'à toute personne de jouir du meilleur état de santé physique et mentale possible, M. Anand Grover " (n 67) 49, 78(a).

<sup>70</sup> UNHRC, Communications, JPN 6/2018 du 5 septembre 2018 et JPN 2/2017 du 20 mars 2017.

<sup>71</sup> Fassert et Hasegawa, (n 21) 176.

<sup>72</sup> Andreas Fischer-Lescano and Gunther Teubner, 'Regime-Collisions: The Vain Search for Legal Unity in the Fragmentation of Global Law' (2003) 25 Michigan Journal of International Law 999.

<sup>73</sup> Martti Koskenniemi, 'Study on the Function and Scope of the Lex Specialis Rule and the Question of "Self-Contained Regimes" : Rapport préliminaire de Martti Koskenniemi, Président du Groupe d'étude' (Commission du droit international de l'ONU, 7 mai 2004) A/CN.4/ILC(LVI)/SG/FIL/CRD.1 4 ; Anja Lindroos, 'Addressing Norm Conflicts in a Fragmented Legal System : The Doctrine of Lex Specialis' (2005) 74 Nordic Journal of International Law 27.

droits et des obligations) avec des règles secondaires spécifiques (par exemple, des mécanismes d'application, des mécanismes d'indemnisation, etc.<sup>74</sup> Chaque régime peut donc « créer des solutions totalement opposées aux solutions d'un autre système » et peut interpréter et appliquer le droit international général de différentes manières<sup>75</sup>.

Une question reste cependant entière : pourquoi le régime de réglementation nucléaire est-il toujours appliqué après les catastrophes nucléaires et non pas le régime des droits de l'homme/des migrations forcées, malgré les conseils des rapporteurs de l'ONU ? Quelle est la différence entre ces deux régimes de protection ? Ces normes sont-elles adéquates ou appropriées pour protéger les individus des effets d'un accident nucléaire ? Quelles sont les lacunes potentielles de ces régimes normatifs pour répondre aux besoins des VCN ? Cette thèse de doctorat étudie ces questions en examinant en détail le régime international de réglementation nucléaire et radioprotection actuellement appliqué en cas de catastrophe nucléaire et d'autres régimes normatifs internationaux qui pourraient ou devraient s'appliquer également en cas de catastrophe nucléaire et remettraient en question le monopole normatif du régime nucléaire<sup>76</sup>.

### **A : Ambiguïté juridique sur l'utilisation de l'énergie atomique et l'exceptionnalisme nucléaire**

Le droit international est ambivalent en ce qui concerne l'utilisation de l'énergie atomique. Interrogée sur la licéité de l'utilisation des armes nucléaires, la CIJ n'a pas pu fournir

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<sup>74</sup> Bruno Simma, "Self-Contained Regimes" (1985) 16 *Netherlands Yearbook of International Law* 111 ; Bruno Simma et Dirk Pulkowski, "Of Planets and the Universe : Self-Contained Regimes in International Law" (2006) 17(3) *European Journal of International Law* 483 ; Koskeniemi (n 73). Comme l'expliquent Simma et Pulkowski, l'expression "régime autonome" a été inventée par la Cour permanente de justice internationale dans l'affaire *Wimbledon (S.S. Wimbledon [1923] PCIJ Rep Series A, No. 1)*, dont le concept a été étendu aux normes secondaires par l'arrêt de la CIJ dans l'affaire des *Otages de Téhéran (Affaire du personnel diplomatique et consulaire des États-Unis à Téhéran (États-Unis d'Amérique c. Iran) (arrêt) [1980] ICJ Rep 1980)*. Selon l'arrêt de la CIJ, un "régime autonome" doit contenir des mesures d'exécution qui sont "entièrement efficaces". Sur la base de cet arrêt, Simma et Pulkowski ont défini les régimes comme "ceux qui englobent un ensemble complet, exhaustif et définitif de règles secondaires" (p. 493). Le droit commercial international, le droit diplomatique, le droit communautaire, le droit de l'environnement et le droit des droits de l'homme sont des exemples typiques de ces régimes.

<sup>75</sup> Lindroos (n 73) 31.

<sup>76</sup> Dans cette thèse, le terme « régime » est utilisé dans le sens défini par Stephen D. Krasner en 1982. Il désigne « un ensemble de principes, de normes, de règles et de procédures de décision implicites ou explicites autour desquels convergent les attentes des acteurs dans un domaine donné des relations internationales ». Voir Stephen D. Krasner, 'Structural Causes and Regime Consequences: Regimes as Intervening Variables' (1982) 36 *International Organization* 185, 186.

de réponse définitive<sup>77</sup>. La Cour n'a pas trouvé de droit coutumier ou international qui interdise ou autorise clairement l'utilisation d'armes nucléaires. Les juges étaient divisés sur certaines questions et n'ont pas pu trouver de consensus juridique<sup>78</sup>. Néanmoins, la reconnaissance de la capacité de l'arme à « porter atteinte à l'environnement, à la chaîne alimentaire et à l'écosystème marin dans l'avenir », « des souffrances indicibles à l'homme » et « des dommages aux générations à venir » suggère une violation potentielle du droit international public. D'autre part, le Comité des droits de l'homme (CCPR) a clairement déclaré que les armes nucléaires étaient « parmi les plus grandes menaces pour le droit à la vie auxquelles l'humanité est confrontée » et « devraient être interdites et reconnues comme des crimes contre l'humanité » (Observation générale n° 14),<sup>79</sup> même si cela a été modifié en une expression moins définitive et plus ambiguë dans la dernière révision (Observation générale n° 36) statuant que de telles armes étaient « incompatibles avec le respect du droit à la vie et *peuvent constituer* un crime en vertu du droit international »<sup>80</sup>.

En ce qui concerne l'utilisation « pacifique », le traité de 1968 sur la non-prolifération des armes nucléaires (TNP) garantit « le droit *inaliénable* » des parties, en particulier des États non dotés d'armes nucléaires, de développer et d'utiliser l'énergie nucléaire à des fins pacifiques en échange de la renonciation au développement et à la possession d'armes nucléaires<sup>81</sup>. Le traité a été ratifié par 191 États au total, ce qui en fait l'accord de désarmement le plus important au monde à ce jour<sup>82</sup>. Pourtant, comme l'a souligné Gabrielle Hecht<sup>83</sup>, aucune autre activité scientifique ou technologique n'a jamais été prescrite comme un « droit inaliénable » des États

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<sup>77</sup> *Licéité de la menace ou de l'emploi d'armes nucléaires*, précité

<sup>78</sup> Les juges étaient divisés en deux (sept contre sept) sur la question suivante : "Il ressort des exigences susmentionnées que la menace ou l'emploi d'armes nucléaires serait généralement contraire aux règles du droit international applicable dans les conflits armés, et spécialement aux principes et règles du droit humanitaire; Au vu de l'état actuel du droit international, ainsi que des éléments de fait dont elle dispose, la Cour ne peut cependant conclure de façon définitive que la menace ou l'emploi d'armes nucléaires serait licite ou illicite dans une circonstance extrême de légitime défense dans laquelle la survie même d'un Etat serait en cause" (par. 105(2)E).

<sup>79</sup> CCPR, "Observation générale n° 14 : Article 6 (droit à la vie) ; les armes nucléaires et le droit à la vie" (Comité des droits de l'homme, 9 novembre 1984), paragraphe 6.

<sup>80</sup> Comité des droits de l'homme des Nations unies, " Observation générale n° 36 (2018) sur l'article 6 du Pacte international relatif aux droits civils et politiques, sur le droit à la vie " (Comité des droits de l'homme, 30 octobre 2018) UN Doc CCPR/ C/GC/36 para 66. C'est nous qui soulignons.

<sup>81</sup> Traité sur la non-prolifération des armes nucléaires (adopté le 1er juillet 1968, entré en vigueur le 5 mars 1970) 729 UNTS 161 (TNP), art IV.1. C'est nous qui soulignons.

<sup>82</sup> Site web de l'ONU <<https://www.un.org/disarmament/wmd/nuclear/npt/>> consulté le 26 octobre 2022

<sup>83</sup> Gabrielle Hecht, *Being Nuclear : Africans and the Global Uranium Trade* (MIT Press 2012).

dans les traités internationaux, ce qui confère à l'énergie atomique un statut spécial en vertu du droit international. Après tout, l'énergie nucléaire est la seule source d'énergie sur terre qui bénéficie d'une agence des Nations unies dédiée à sa promotion.

Les accidents nucléaires, en revanche, mobilisent les principes d'autres lois internationales, notamment celles relatives aux droits de l'homme, à l'environnement et au droit pénal. En effet, le premier projet d'articles de la Commission du droit international des Nations unies (CDI) sur la responsabilité de l'État a déjà qualifié de crime international le fait pour un État de ne pas sauvegarder et préserver l'environnement humain, par exemple en n'empêchant pas une « pollution massive de l'atmosphère ou des mers »<sup>84</sup>. L'activité nucléaire civile n'est pas en soi une « acte illicite », mais elle peut devenir un « acte illicite international » si l'exploitation de la centrale cause des dommages aux personnes, aux biens ou à l'environnement d'un État voisin et au-delà sous certaines conditions<sup>85</sup>.

Dans cette ambivalence juridique, la communauté nucléaire internationale a établi une autorité exclusive sur toutes les questions liées à l'énergie atomique dans les contextes nationaux et internationaux, avec sa propre doctrine, ses instruments juridiques, ses règles, son lexique, ses experts et sa culture opérationnelle, comme si elle opérait dans une enclave autonome au sein de la structure de l'État ou de la communauté internationale, séparée du code civil national (ou common law) ou du droit international général, dissuadant l'intervention de tous les autres acteurs. Cet « exceptionnalisme nucléaire »<sup>86</sup> est rarement examiné ou remis en question par la communauté internationale et les juristes et ne fait guère l'objet de débats publics ou n'est pas mis en lumière par les médias, sauf en cas de catastrophe nucléaire de grande ampleur.

En effet, cet exceptionnalisme du régime nucléaire renvoie à la notion de « souverain » de Carl Schmitt, analysée par Giorgio Agamben, selon laquelle il est « à la fois en dehors et à l'intérieur de l'ordre juridique », puisque le souverain se voit conférer le pouvoir par l'ordre

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<sup>84</sup> Commission du droit international des Nations unies (CDI), "Projet d'articles sur la responsabilité des États", *Annuaire de la Commission du droit international*, vol II, UN Doc A/CN.4/SER.A/1976/Add.1 (Partie 2) (ONU 1976) 95-96 (article 19). Les autres crimes internationaux sont définis comme l'agression, la domination coloniale, l'esclavage, le génocide et l'apartheid. Toutefois, cet article disparaît dans la révision de 2001 du projet d'articles.

<sup>85</sup> Jon M Van Dyke, "Liability and Compensation for Harm Caused by Nuclear Activities" (2006) 35 *Denver Journal of International Law and Policy* 13.

<sup>86</sup> Hecht (n 83). Hecht décrit l'*exceptionnalisme nucléaire* comme des situations où le caractère unique des choses nucléaires est souligné et revendiqué dans les sphères politiques, technologiques, culturelles, institutionnelles et scientifiques, afin d'être différencié des autres choses.



juridique de décider d'un état d'exception, en d'autres termes, de suspendre la validité de l'ordre<sup>87</sup>. Il est intéressant de noter que la technologie nucléaire est parfois décrite comme une « technologie *souveraine* » contrôlée par des « industries *souveraines* » qui reposent sur une structure de pouvoir construite au sein du gouvernement, devenant au fil du temps si importante pour l'économie et la sécurité de la nation qu'elle échapperait finalement à toute surveillance politique et exercerait même un effet de levier sur les différentes décisions du gouvernement, y compris sur sa politique étrangère<sup>88</sup>. Cette souveraineté nucléaire pourrait en fin de compte défier les institutions démocratiques. Comme l'a affirmé un jour le politologue Robert A. Dahl, l'énergie atomique fonctionne dans un régime de « tutelle », échappant largement au contrôle du processus démocratique<sup>89</sup>. C'est notamment le cas dans des États qui accordent une grande importance à leur programme nucléaire national ou qui dépendent fortement de l'énergie nucléaire pour leur production d'électricité (e.g. la France).

La gestion des catastrophes nucléaires, en particulier la protection de la population contre les effets de la catastrophe, est également monopolisée par ce pouvoir souverain du régime nucléaire ou, plus précisément, par une forme particulière de ce pouvoir, la « biopolitique » conceptualisée par Michel Foucault<sup>90</sup>. Dans son analyse généalogique du pouvoir d'État et de la gouvernementalité, Foucault affirme que le pouvoir souverain s'est transformé au fil des siècles, passant du contrôle exercé sur le territoire à celui exercé sur la population, plaçant la vie biologique des individus au cœur de cet exercice<sup>91</sup>. Ce « biopouvoir », la politisation de la santé et de la vie biologique des citoyens, exercé par l'autorité de régulation nucléaire, a été particulièrement visible dans la gestion de l'accident de Fukushima, notamment dans sa décision unilatérale d'augmenter la dose de référence, la « dose admissible » en effet,

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<sup>87</sup> Giorgio Agamben, *Homo Sacer : Sovereign Power and Bare Life* (Stanford University Press 1998) 15.

<sup>88</sup> Alain-Marc Rieu, "Penser après Fukushima. Epistemic Shift in Social Sciences" (2013) 11 *Asia Europe Journal* 65. C'est nous qui soulignons.

<sup>89</sup> Robert A. Dahl, *Controlling Nuclear Weapons : Democracy Versus Guardianship* (Syracuse University Press 1985). Selon Dahl, la "tutelle" signifie qu'une petite minorité de personnes qualifiées (souvent des élites politiques) gouverne le reste, en raison de leurs connaissances et de leur vertu supérieure, en exerçant l'autorité déléguée (par exemple, la technocratie). Mais souvent, cette "vertu supérieure" fait défaut aux tuteurs et l'"autorité déléguée" devient un "pouvoir aliéné" des citoyens.

<sup>90</sup> Michel Foucault, *The History of Sexuality, Vol. 1 : An Introduction* (Reissue edition, Vintage 1990) ; La publication originale en français, Michel Foucault, *La Volonté de Savoir* (Gallimard 1976) ; Une analyse similaire a été faite par Majja Holmer Nadesan, 'Nuclear Governmentality : Governing Nuclear Security and Radiation Risk in Post-Fukushima Japan' (2019) 50 *Security Dialogue* 512.

<sup>91</sup> Michel Foucault, *Security, Territory, Population : Lectures at the College De France, 1977-1978* (Michel Senellart ed, Graham Burchell tr, Picador USA 2009).

pour la population à 20 fois la limite de dose pour le public, sans aucune intervention du *Diet* et en non-conformité avec certaines règles en vigueur relatives à la régulation des rayonnements ionisants. Il s'agissait en fait d'un état d'exception au système juridique existant, mis en place par l'autorité nucléaire sur la base des « urgences nucléaires », où l'autorité pouvait justifier toute décision sur la base de la doctrine normative nucléaire internationale, suspendant en effet l'application des lois nationales. En cas de catastrophe nucléaire, les autorités nucléaires se comportent comme le pouvoir souverain au sein d'un État souverain, exerçant la biopolitique de la population et déterminant l'avenir de la « société » après la catastrophe, ce qui inclut l'avenir de l'industrie nucléaire et de la stratégie énergétique du pays.

### **B : Régime de réglementation nucléaire**

Aujourd'hui, seules les institutions internationales de sûreté nucléaire et de radioprotection fournissent des lignes directrices spécifiques concernant la protection des personnes en cas d'accident nucléaire. L'AIEA est en effet autorisée par son statut (article III. A.6) à « établir ou adopter... des normes de sécurité pour la protection de la santé et la réduction au minimum des dangers pour la vie et les biens » en cas d'urgence nucléaire.<sup>92</sup> Depuis sa création, l'AIEA a joué un rôle d'autorité en établissant des normes internationales pour les activités liées au nucléaire, en particulier dans le domaine du *nuclear safeguards* (la non-prolifération des armes nucléaires).

Toutefois, il a fallu beaucoup de temps à l'Agence pour élaborer la norme relative à la sûreté nucléaire (c'est-à-dire le contrôle sur l'utilisation civile). Son mandat principal étant axé sur la promotion de l'utilisation « pacifique », certains spécialistes estiment que l'AIEA a longtemps minimisé les risques liés au programme nucléaire civil.<sup>93</sup> En outre, ses États membres, les grandes puissances nucléaires en particulier, ont longtemps considéré tout contrôle international de la sûreté de leurs installations comme une ingérence dans leur souveraineté, repoussant ainsi toute internationalisation des normes de sûreté, y compris la gestion des accidents. En conséquence, les premières conventions internationales sur les accidents nucléaires, la Convention sur la notification rapide d'un accident nucléaire ou de

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<sup>92</sup> Statut de l'Agence internationale de l'énergie atomique (adopté le 26 octobre 1956, entré en vigueur le 29 juillet 1957) 276 UNTS 3

<sup>93</sup> Menno T Kamminga, 'The IAEA Convention on Nuclear Safety' (1995) 44 *International & Comparative Law Quarterly* 872; Kohki Abe, '原子力災害と人権 (Nuclear Disasters and Human Rights)' (2013) 32 *世界法年報 (Yearbook of World Law)* 23.

situation d'urgence radiologique<sup>94</sup> et la Convention sur l'assistance en cas d'accident nucléaire ou de situation d'urgence radiologique<sup>95</sup> n'ont été établies qu'après l'accident de Tchernobyl en 1986, et la première convention sur la sûreté nucléaire, la Convention sur la Sûreté Nucléaire (CSN)<sup>96</sup>, n'a été signée qu'en 1994, huit ans après l'accident de Tchernobyl et 37 ans après la création de l'AIEA. L'AIEA n'a publié sa première ligne directrice sur la gestion des accidents nucléaires qu'en 2002 et la ligne directrice sur la protection de la population en cas d'accident grave qu'après l'accident de Fukushima en 2013.<sup>97</sup>

Dans ces lignes directrices, l'AIEA adopte les principes de justification et d'optimisation comme code de conduite. Ils sont en effet les principes fondamentaux de radioprotection établis par la CIPR. Les recommandations de la CIPR sont devenues au fil des ans les normes de radioprotection les plus influentes et ont été incorporées dans de nombreuses législations nationales et dans les lignes directrices d'organisations internationales telles que l'Organisation internationale du travail (OIT), l'Agence pour l'énergie nucléaire de l'Organisation de coopération et de développement économiques (AEN/OCDE), la Communauté européenne de l'énergie atomique (EURATOM) et l'AIEA.

Selon la CIPR, le principe de justification signifie que toute action visant à appliquer ou à réduire la dose de rayonnement doit *faire plus de bien que de mal*, c'est-à-dire « produire un bénéfice net suffisant pour les individus exposés ou pour la société afin de compenser le préjudice causé par le rayonnement », ce qui serait obtenu par une analyse bénéfice-risque.<sup>98</sup> L'optimisation, quant à elle, est définie comme une action visant à maintenir les doses d'exposition individuelles au niveau *le plus bas qu'il soit raisonnablement possible d'atteindre* (principe ALARA) en tenant compte des facteurs économiques et sociétaux. Il s'agit d'un processus visant à atteindre « le meilleur niveau de protection dans les circonstances actuelles »

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<sup>94</sup> Convention sur la notification rapide d'un accident nucléaire (adoptée le 26 septembre 1986, entrée en vigueur le 27 octobre 1986) 1439 UNTS 275

<sup>95</sup> Convention sur l'assistance en cas d'accident nucléaire ou de situation d'urgence radiologique (adoptée le 26 septembre 1986, entrée en vigueur le 27 octobre 1986) 1457 UNTS 133.

<sup>96</sup> La convention sur la sûreté nucléaire (adoptée le 20 septembre 1994, entrée en vigueur le 24 octobre 1996) 1963 UNTS 293 (CNS)

<sup>97</sup> AIEA, 'IAEA Safety Requirement: Preparedness and Response for a Nuclear or Radiological Emergency' (Jointly Sponsored by FAO, IAEA, ILO, OECD/NEA, PAHO, OCHA, WHO 2002) IAEA Safety Standards Series, No. GS-R-2 ; IAEA, 'Actions to Protect the Public in an Emergency Due to Severe Conditions at a Light Water Reactor' (IAEA 2013) EPR-NPP-PPA (2013).

<sup>98</sup> Publication 103 de la CIPR (n 35) 89.

en utilisant une méthode d'analyse coût-bénéfice<sup>99</sup>. La CIPR explique que la meilleure mesure de protection n'est donc pas nécessairement celle qui permet d'obtenir la dose la plus faible, mais celle qui permet d'équilibrer les inconvénients de l'exposition aux rayonnements (c'est-à-dire les effets sur la santé) et les coûts économiques et sociaux des mesures de protection (par exemple, l'évacuation, la décontamination, etc.), ce qui « assure un avantage global au sens le plus large pour la société et donc *pas nécessairement pour chaque individu* »<sup>100</sup>. La notion de droits individuels est donc largement absente du cadre de radioprotection. Ainsi, le régime nucléaire constitue l'un des rares cadres normatifs internationaux qui n'adopte pas ou ne se réfère pas aux principes des droits de l'homme pour protéger les individus dans les situations de catastrophe.

En ce qui concerne les normes de dose, la CIPR adopte le système de restriction des doses qui applique différentes limites de dose (ou doses de référence) aux personnes en fonction des catégories d'« individus » et de « situations d'exposition ». Les « individus » sont divisés en trois catégories : les travailleurs (en situation d'exposition professionnelle), le public (en situation d'exposition publique) et les patients (en situation d'exposition médicale). Il convient ici de prêter attention à ce qui est exclu de l'« exposition du public » dans le lexique de la CIPR. L'« exposition du public » exclut notamment, outre les expositions professionnelles et médicales, le « rayonnement naturel local normal (*the normal local natural background radiation*) » (par exemple, les rayons cosmiques), ne comptabilisant ainsi que le rayonnement artificiel ou naturel « anormal » (par exemple, les nouveaux accidents, les nouvelles retombées radioactives, les nouveaux sites d'enfouissement, le radon, etc.)<sup>101</sup>.

Les « situations d'exposition » sont ensuite différenciées entre les « situations d'exposition planifiées », les « situations d'exposition d'urgence » et les « situations d'exposition existantes ». Les premières situations, dites « planifiées », peuvent être qualifiées de situations « normales » où l'exposition aux rayonnements est anticipée et maîtrisée. Ces situations comprennent le travail dans des centrales nucléaires en fonctionnement régulier, dans des établissements médicaux qui utilisent des équipements radiologiques et dans la radiographie industrielle, ainsi que le fait de vivre à proximité de sites des déchets ou de mines d'uranium

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<sup>99</sup> *ibid* 91.

<sup>100</sup> *ibid* 90. C'est nous qui soulignons

<sup>101</sup> CIPR, "Recommandations 2007 de la Commission internationale de protection radiologique. Publication 103 de la CIPR. (n 35) 29.

actives (ou anciennes). Les troisièmes situations, dites « existantes », sont celles où l'exposition aux rayonnements existe déjà et depuis longtemps, et où une décision de contrôle doit être prise. Il s'agit notamment des personnes vivant dans un territoire contaminé depuis longtemps à la suite d'accidents majeurs et des personnes vivant dans un environnement affecté par le radon.

Selon ce système, la limite de dose annuelle pour le public est fixée à 1 mSv/an et celle pour les travailleurs à 20 mSv/an. Cependant, comme le montre le cas de Fukushima, la particularité du système de radioprotection est que ces limites ne s'appliquent qu'aux « situations d'exposition planifiées », c'est-à-dire aux situations radiologiques « normales ». Dès qu'une nouvelle dose de rayonnement est introduite dans l'environnement, typiquement dans le cas d'un accident nucléaire, ces limites de dose sont ignorées et remplacées par un autre concept de restriction de la dose, la dose de référence. La dose de référence est plus souple que la limite de dose, les autorités nationales pouvant choisir et fixer le niveau dans une fourchette de doses de rayonnement supérieures à la limite de dose (voir le tableau 1 ci-dessous). La dose de référence pour les travailleurs en cas d'urgence nucléaire est encore plus souple, puisqu'elle peut devenir illimitée dans des circonstances extrêmes.

Tableau 1 : Système de restriction des doses de la CIPR<sup>102</sup>

Type de situation/exposition	Professionnel	Public
<b>Planifié</b>	<i>Limite de dose</i> 20 mSv/an (moyenne sur 5 ans), et ne doit pas dépasser 50 mSv en un an.	<i>Limite de dose</i> 1 mSv/an
<b>Urgence</b>	<i>Dose de référence</i> Moins de 100 mSv, 500 mSv, 1 000 mSv ou aucune restriction (en fonction de la situation)	<i>Dose de référence</i> Bande de 20 à 100 mSv/an (le plus récemment, moins de 20 mSv/an)
<b>Existant</b>	N.A. (Il est traité comme dans les situations d'exposition planifiée)	<i>Niveau de référence</i> Bande de 1-20 mSv/an (le plus récemment, moins de 10 mSv/an)

En tant que tel, le système fonctionne non seulement pour restreindre les doses d'exposition, mais aussi pour *autoriser ou justifier* ces expositions pour les autorités réglementaires. Selon les données scientifiques actuelles, il n'existe pas de dose de rayonnement « sûre » en dessous de laquelle il n'y aurait pas d'effet sur la santé. Dans ce contexte d'incertitude scientifique, le système de radioprotection semble constituer une sorte

<sup>102</sup> *ibid*

de « boîte à outils de gestion » pour les autorités nucléaires nationales, qui peuvent choisir le niveau de protection de la population en fonction de leur volonté et de leurs ressources, en tenant compte de leurs priorités politiques, économiques et stratégiques.

Cette philosophie de base se reflète dans l'objectif de radioprotection fixé par la CIPR et l'AIEA. Les recommandations 2007 de la CIPR (publication 103) décrivent son objectif comme étant de « *contribuer à un niveau approprié de protection des personnes et de l'environnement contre les effets néfastes de l'exposition aux rayonnements sans limiter indûment les actions humaines souhaitables* qui peuvent être associées à une telle exposition »<sup>103</sup>. L'AIEA est encore plus explicite, précisant que la protection des personnes et de l'environnement contre les rayonnements ionisants « *doit être assurée sans limiter indûment le fonctionnement des installations* ou la conduite des activités qui donnent lieu à des risques d'irradiation »<sup>104</sup>. Il ressort clairement de ces objectifs que la protection des individus est conditionnelle dans le cadre nucléaire. Les personnes ne sont protégées qu'en fonction de certains critères. Il en résulte que le système qui protège les personnes d'une certaine exposition aux rayonnements est également celui qui impose une certaine exposition aux personnes dans le but de protéger les activités nucléaires<sup>105</sup>. Par conséquent, il devient un système qui permet et impose inévitablement le sacrifice des droits individuels, le plus souvent ceux des minorités et des groupes vulnérables, au profit de la majorité et du « bien commun »<sup>106</sup>. Dans ce « système sacrificiel », le bénéfice de certains est produit et maintenu au détriment de la vie, de la santé, des biens, de la dignité et des espoirs des autres, et ces sacrifices sont « souvent soit rendus invisibles, soit loués comme de “nobles sacrifices” au nom d'intérêts communs tels que ceux de l'État, de la population, de la société ou de l'économie ».<sup>107</sup> Ces sacrifices nucléaires sont encodés non seulement dans le principe de justification et d'optimisation, mais aussi dans le

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<sup>103</sup> *ibid* 41. C'est nous qui soulignons.

<sup>104</sup> AIEA et autres, "Radiation Protection and Safety of Radiation Sources : International Basic Safety Standards" (AIEA 2014) GSR Part 3 ix. C'est nous qui soulignons.

<sup>105</sup> Yasuo Nakagawa, *放射線被曝の歴史：アメリカ原爆開発から福島原発事故まで (L'histoire de l'exposition aux radiations : From the American Atomic Bomb Development to the Fukushima Nuclear Accident)* (Version augmentée de l'édition originale de 1991, Akashi Shoten 2012).

<sup>106</sup> KS Shrader-Frechette, *Nuclear Power and Public Policy : The Social and Ethical Problems of Fission Technology* (D Reidel Publishing Company 1980) ; Tetsuya Takahashi, *犠牲のシステム 福島 沖縄 (Sacrificial System : Fukushima and Okinawa)* (Shueisha Shinsho 2012).

<sup>107</sup> Takahashi (n 106) 42. Takahashi a inventé le terme de "système sacrificiel" pour décrire le système de production d'énergie nucléaire dans son ensemble. Il est professeur de philosophie à l'université de Tokyo.

système des différentes situations d'exposition et dans le concept de dose de référence, ce qui signifie essentiellement l'acceptation, par les autorités, d'une surmortalité dans certains segments de la population, sans que cette population ait la possibilité de donner explicitement son consentement, ou de le refuser.

Le système de radioprotection, ou plus généralement, le droit nucléaire, a toujours accompagné le développement de l'énergie atomique, que ce soit à des fins militaires ou industrielles, et a joué un rôle majeur dans l'acceptation sociale du programme nucléaire par le public<sup>108</sup>. Comme l'affirme Norbert Pelzer, expert en droit nucléaire, la mission du droit nucléaire est de rendre possible le développement de l'énergie nucléaire en supprimant les « restrictions juridiques inadéquates » et, dans le même temps, de « garantir la sécurité afin de réduire le risque à un niveau *tolérable* »<sup>109</sup>. Cet objectif a également été atteint en partie en minimisant les risques afin d'éviter les critiques et de calmer les inquiétudes du public<sup>110</sup>. Le régime de sûreté nucléaire et radioprotection est donc intrinsèquement sensible aux paramètres politiques, économiques et de défense de l'État, où la protection des personnes et de l'environnement est reléguée à un concept plutôt relatif ou secondaire.

### **C : Régimes humanitaire et des droits de l'homme**

Pour protéger les populations en cas de catastrophe, la communauté internationale a développé au fil des ans un cadre juridique et normatif faisant autorité, sous l'égide des Nations unies ou d'autres organisations internationales, fondé sur le droit international humanitaire (DIH) et les droits de l'homme (DDH). L'origine du droit humanitaire remonte à la première Convention de Genève de 1864<sup>111</sup>, qui a évolué vers les actuelles Conventions de Genève de

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<sup>108</sup> Soraya Boudia, 'Sur Les Dynamiques de Constitution Des Systèmes d'expertise Scientifique. La Naissance Du Système d'évaluation et de Régulation Des Risques Des Rayonnements Ionisants' (2008) 70 *Genèses* 26, 12.

<sup>109</sup> Norbert Pelzer, "The Present State of Research Carried Out by the English-Speaking Section of the Centre for Studies and Research", *Les risques résultant de l'utilisation pacifique de l'énergie nucléaire* (Académie de Droit International de la Haye, Martinus Nijhoff Publishers 1993) 207, 214. C'est nous qui soulignons.

<sup>110</sup> Soraya Boudia, "Global Regulation : Controlling and Accepting Radioactivity Risks' (2007) 23 *History and Technology* 389.

<sup>111</sup> Convention pour l'amélioration du sort des blessés dans les armées en campagne (22 août 1864) 18 *Martens Nouveau Recueil* (ser. 1) 607, 129 *Consol. T.S.* 361 (Convention de la Croix-Rouge)

1949 et leurs Protocoles additionnels<sup>112</sup> visant à protéger les civils, les victimes et les non-combattants pendant les guerres. Après la Seconde Guerre mondiale, et surtout après l'expérience de la persécution, par les Nazis, de leurs propres ressortissants, deux autres ensembles de régimes de protection internationale ont été établis dans le cadre du système des Nations unies afin de protéger les personnes d'un nouveau type de guerre - la guerre interne ou civile - où leur vie est menacée par l'action ou l'inaction de leur propre gouvernement : le droit international relatif aux droits de l'homme et le droit relatif aux réfugiés. Le premier est ancré dans la Déclaration universelle des droits de l'homme<sup>113</sup> et dans deux pactes internationaux relatifs aux droits de l'homme<sup>114</sup>, et le second est fondé sur la Convention sur les réfugiés de 1951 et son protocole<sup>115</sup>.

Initialement développé pour protéger les personnes dans les conflits armés, le modèle de cette protection internationale a évolué au fil des ans pour couvrir, ou est en voie d'être étendu à, d'autres types de catastrophes telles que les catastrophes naturelles, les accidents industriels, les projets de développement et, plus récemment, le changement climatique. Généralement appelé « régime humanitaire international » ou « régime de migration forcée », il s'agit aujourd'hui du cadre normatif, opérationnel et institutionnel dirigé par les Nations unies et les agences humanitaires internationales telles que le Comité international de la Croix-Rouge (CICR) et la Fédération internationale des sociétés de la Croix-Rouge et du Croissant-Rouge

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<sup>112</sup> Les Conventions de Genève de 1949 sont composées de quatre conventions : Convention de Genève sur les blessés et les malades dans les forces armées en campagne (adoptée le 12 août 1949, entrée en vigueur le 21 octobre 1950) 75 UNTS 31 ; Convention pour l'amélioration du sort des blessés, des malades et des naufragés des forces armées sur mer (adoptée le 12 août 1949, entrée en vigueur le 21 octobre 1950) 75 UNTS 85 ; Convention de Genève relative au traitement des prisonniers de guerre (adoptée le 12 août 1949, entrée en vigueur le 21 octobre 1950) 75 UNTS 135 ; Convention de Genève relative à la protection des personnes civiles en temps de guerre (adoptée le 12 août 1949, entrée en vigueur le 21 octobre 1950) 75 UNTS 287. Leurs protocoles additionnels sont au nombre de deux : Protocole additionnel aux Conventions de Genève du 12 août 1949 relatif à la protection des victimes des conflits armés internationaux (Protocole I) (adopté le 8 juin 1977, entré en vigueur le 7 décembre 1978) 1125 UNTS 3 ; Protocole additionnel aux Conventions de Genève du 12 août 1949 relatif à la protection des victimes des conflits armés non internationaux (Protocole II) (adopté le 8 juin 1977, entré en vigueur le 7 décembre 1978) 1125 UNTS 609.

<sup>113</sup> AGNU, "Déclaration universelle des droits de l'homme" (Assemblée générale des Nations unies, 10 décembre 1948), UN Res 217A(III), UN Doc A/810.

<sup>114</sup> Pacte international relatif aux droits civils et politiques (adopté le 16 décembre 1966, entré en vigueur le 23 mars 1976) 999 UNTS 171 (ICCPR) ; Pacte international relatif aux droits économiques, sociaux et culturels (adopté le 16 décembre 1966, entré en vigueur le 3 janvier 1976) 993 UNTS 3 (ICESCR).

<sup>115</sup> Convention relative au statut des réfugiés (adoptée le 28 juillet 1951, entrée en vigueur le 22 avril 1954) 189 UNTS 137 (Convention relative au statut des réfugiés) ; Protocole relatif au statut des réfugiés (adopté le 31 janvier 1967, entré en vigueur le 4 octobre 1967) 606 UNTS 267 (Protocole).



(FICR), qui est régulièrement appliqué en cas de conflits, de catastrophes naturelles et d'autres catastrophes causées par l'homme<sup>116</sup>.

Le document normatif clé du régime est les Principes directeurs relatifs au déplacement de personnes à l'intérieur de leur propre pays (PDDI).<sup>117</sup> Fondés sur les principes du droit humanitaire et des droits de l'homme, les principes directeurs prescrivent, bien qu'ils ne soient pas juridiquement contraignants, les obligations des États et fixent les normes minimales pour la protection des personnes déplacées par des catastrophes à l'intérieur d'une frontière nationale<sup>118</sup>. Ils disposent notamment que les autorités nationales ont le devoir et la responsabilité de « créer les conditions propices » et de « fournir les moyens nécessaires » au « retour librement consenti, dans la sécurité et la dignité, des PDI dans leur foyer ou leur lieu de résidence habituel, ou à leur réinstallation volontaire dans une autre partie du pays » (principe 28). En outre, ils précisent que le rapatriement ou la réinstallation des personnes déplacées ne doit jamais être forcé ou encouragé « dans tout lieu où leur vie, leur sûreté, leur liberté et/ou leur santé seraient en danger » (principe 15 (d)). Selon le régime de protection des personnes déplacées, « les droits, les besoins et les intérêts légitimes des personnes déplacées doivent être les considérations premières guidant toutes les politiques et décisions relatives aux déplacements internes et aux solutions durables »<sup>119</sup>.

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<sup>116</sup> Un spécialiste du droit international, B.S. Chimni, souligne le fait que les régimes de réfugiés et de migration forcée ont également été conçus pour servir les intérêts et les stratégies des États occidentaux à différentes époques géopolitiques. Par exemple, pendant la guerre froide, ils ont été utilisés pour discréditer le régime communiste en acceptant des réfugiés du bloc de l'Est et, dans l'après-guerre froide, ils ont également servi à contenir les mouvements de population du sud vers le nord en mettant l'accent sur la responsabilité de l'État de protéger les personnes déplacées à l'intérieur de leurs frontières. Pour plus de détails, voir BS Chimni, 'The Geopolitics of Refugee Studies : A View from the South' (1998) 11 *Journal of Refugee Studies* 350 ; BS Chimni, 'The Birth of a Discipline : From Refugee to Forced Migration Studies' (2009) 22 *Journal of Refugee Studies* 11.

<sup>117</sup> UNCHR, 'Rapport du représentant du secrétaire général, M. Francis M. Deng, présenté conformément à la résolution 1997/39 de la Commission, Addendum : Principes directeurs relatifs au déplacement de personnes à l'intérieur de leur propre pays' (Commission des droits de l'homme des Nations unies, 11 février 1998) UN Doc E/CN.4/1998/53/Add.2.

<sup>118</sup> Walter Kälin, "The Future of the Guiding Principles on Internal Displacement" [2006] *Forced Migration Review* (Special Issue) 5.

<sup>119</sup> IASC, "IASC Framework on Durable Solutions for Internally Displaced Persons" (The Brookings-Bern Project on Internal Displacement 2010) 11.

En fait, dès le début, l'un des rédacteurs des PDDI avait considéré que les accidents nucléaires faisaient partie des catastrophes auxquelles les principes directeurs s'appliquaient.<sup>120</sup> En outre, à la suite de l'accident de Fukushima, les institutions des droits de l'homme des Nations unies ont, pour la première fois, clairement reconnu les victimes de l'accident nucléaire comme des PDI et ont vivement conseillé aux autorités japonaises d'appliquer les PDDI dans le cadre de leur réponse à la catastrophe.

En fait, les institutions des Nations unies chargées des droits de l'homme ont été les seules entités au sein des Nations unies à réagir et à critiquer le traitement des victimes de l'accident par le gouvernement japonais après l'accident nucléaire de Fukushima. Alors que les institutions nucléaires de l'ONU ont validé et loué les mesures prises par le gouvernement après l'accident, le Conseil des droits de l'homme et les organes de traités de l'ONU ont émis une évaluation très critique de ces mesures. En particulier, le rapporteur spécial des Nations unies sur le droit à la santé, Anand Grover, a conclu que les politiques post-accidentelles du gouvernement, en particulier la dose de référence de 20 mSv/an, étaient incompatibles avec les résultats récents des études épidémiologiques, le précédent établi lors de l'accident de Tchernobyl, la position de la CIPR sur le risque lié aux faibles doses (c'est-à-dire le modèle LSS), et même la législation japonaise en matière de rayonnements ionisants<sup>121</sup>. Ainsi, elle a vivement recommandé que le retour des personnes évacuées ne soit facilité que lorsque la dose de rayonnement est réduite « à des niveaux inférieurs à 1 mSv/an »<sup>122</sup>. Le Rapporteur spécial sur les substances toxiques et les droits de l'homme, Baskut Tuncak, a même suggéré que la politique de retour basé sur une dose de référence de 20 mSv/an constituerait une violation de certaines dispositions de la Convention relative aux droits de l'enfant (CDE)<sup>123</sup> à laquelle le Japon est partie, et a vivement recommandé au gouvernement de « mettre un terme au retour »

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<sup>120</sup> Voir l'article post-scriptum sur les Principes directeurs relatifs au déplacement de personnes à l'intérieur de leur propre pays écrit par Roberta Cohen, "The Guiding Principles on Internal Displacement : An Innovation in International Standard Setting" (2004) 10 *Global Governance* 459.

<sup>121</sup> UNHRC, "Rapport du rapporteur spécial sur le droit qu'a toute personne de jouir du meilleur état de santé physique et mentale possible, Anand Grover" (n 67).

<sup>122</sup> *ibid.* para 49.

<sup>123</sup> Convention relative aux droits de l'enfant (adoptée le 20 novembre 1989, entrée en vigueur le 2 septembre 1990) 1577 UNTS 3 (CDE)

des enfants et des femmes en âge de procréation dans les zones où les niveaux de radiation restent supérieurs à 1 mSv/an.<sup>124</sup>

En outre, le rapport du Rapporteur fait pour la première fois une référence directe aux principes de protection de la CIPR, déclarant que les concepts tels que « la maximisation du bien par rapport au mal » et « l'analyse bénéfices-risques » ne sont pas compatibles avec le cadre de protection des droits de l'homme parce qu'ils donnent « la priorité aux intérêts collectifs par rapport aux droits individuels »<sup>125</sup>. Dans le cadre des droits de l'homme, a rappelé le Rapporteur, « chaque individu a le droit d'être protégé » et il a vivement encouragé le gouvernement à formuler des politiques « fondées sur les droits de l'homme plutôt que sur une analyse bénéfices-risques »<sup>126</sup>.

L'Examen périodique universel (EPU)<sup>127</sup> du Japon en 2017 par le Conseil des droits de l'homme a été tout aussi critique. Le rapport final a notamment conseillé au gouvernement japonais de rétablir la dose permmissible de radiation à 1 mSv/an, de reconnaître toutes les personnes évacuées (obligatoirement ou volontairement) comme des déplacés internes et d'appliquer les Principes directeurs relatifs au déplacement de personnes à l'intérieur de leur propre pays pour assurer leur protection<sup>128</sup>. Les rapports de suivi publiés en 2021 par les Rapporteurs spéciaux et les comités de traités internationaux ont tous exprimé leurs regrets, déclarant que « le Japon semble pratiquement ignorer la recommandation de 2017 du mécanisme de monitoring des droits de l'homme des Nations unies (EPU) »<sup>129</sup> et que les besoins

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<sup>124</sup> OHCHR (n 68) ; voir également UNIIRC, "Rapport du rapporteur spécial sur les conséquences pour les droits de l'homme de la gestion et de l'élimination écologiquement rationnelles des substances et déchets dangereux" (Assemblée générale des Nations unies, 15 novembre 2018) UN Doc A/73/567.

<sup>125</sup> UNHRC, "Rapport du rapporteur spécial sur le droit qu'a toute personne de jouir du meilleur état de santé physique et mentale possible, Anand Grover" (n 67), paragraphe 47.

<sup>126</sup> *ibid.*

<sup>127</sup> L'EPU est le mécanisme d'examen par les pairs du Conseil des droits de l'homme, mis en place par la Commission des droits de l'homme (l'ancien organe du Conseil des droits de l'homme) en 2008. Tous les quatre ans et demi, le Conseil évalue le bilan de chaque État membre des Nations unies en matière de droits de l'homme et rédige un rapport.

<sup>128</sup> UNHRC, "Rapport du groupe de travail sur l'examen périodique universel : Japon" (Assemblée générale des Nations unies, 4 janvier 2018) UN Doc A/HRC/37/15 para 161.215, 161.216.

<sup>129</sup> OHCHR (n 68).

des personnes déplacées et d'autres groupes vulnérables n'ont pas été suffisamment pris en compte<sup>130</sup>.

Malgré ces appels répétés, la dose de référence de 20 mSv/an n'a jamais été révisée par le gouvernement japonais et les cadres normatifs relatifs à la protection des PDI et aux droits de l'homme n'ont jamais été appliqués ou reflétés dans les politiques post-accidentelles mises en place à la suite de l'accident de Fukushima. Comme nous l'avons mentionné précédemment, la réponse aux catastrophes nucléaires est en effet réalisée en quasi-autonomie par les régulateurs nucléaires, et séparée du reste du cadre normatif qui s'applique habituellement aux catastrophes.

Toutefois, les Principes directeurs ou le régime de protection des PDI ne suffisent pas à répondre à tous les besoins des victimes de catastrophes nucléaires. Comme on l'a observé dans le cas de Fukushima, un accident nucléaire ne déplace pas seulement des personnes, mais les piège également dans un environnement contaminé. En outre, la protection en cas de catastrophe nucléaire implique toujours la question du seuil de risque, ou « point de basculement (*tipping point*) », formulé dans le jargon des migrations environnementales par la question : « quel niveau de risque est suffisamment "risqué" ? ». À partir de quel degré de dégradation ou de quel seuil de contamination un mouvement d'individus est-il considéré comme un déplacement, qui n'est plus volontaire, et qui nécessite donc une protection ? Ces questions deviennent encore plus complexes lorsqu'il existe des controverses scientifiques sur l'évaluation des risques, comme dans le cas de l'effet des radiations à faible dose. Les problèmes de l'immobilité forcée et de l'évaluation des risques sont des questions typiques des déplacements liés aux catastrophes environnementales, qui sont notablement absentes dans le cadre de protection des PDI.

Depuis que la définition de « réfugié environnemental »<sup>131</sup> a été officiellement proposée par Essam El-Hinnawi dans le rapport de 1985 du Programme des Nations unies pour l'environnement (PNUE), les débats scientifiques et l'élaboration de politiques internationales sur les déplacements humains dus au changement climatique et à la dégradation de

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<sup>130</sup> HCR, Communication JPN 1/2021 du 13 janvier 2021 ; *ibid* ; OHCHR, 'Japan Must Step up Efforts to Solve Human Rights Fallout from Fukushima Disaster : UN Experts' *OHCHR Press Release* (11 March 2021) <<https://www.ohchr.org/en/press-releases/2021/03/japan-must-step-efforts-solve-human-rights-fallout-fukushima-disaster-un>> consulté le 3 janvier 2023.

<sup>131</sup> Le terme a été initialement inventé par Lester Brown, le fondateur du Worldwatch Institute, un groupe de réflexion sur l'environnement basé à Washington, D.C., dans les années 1920. Richard Black, 'Environmental Refugees: Myth or Reality?' (UNHCR 2001) Working Paper 34.

l'environnement se sont intensifiés. Ils ont pris de l'ampleur au cours des dix dernières années, lorsque les effets du changement climatique ont été de plus en plus ressentis dans le monde et que les négociations internationales sur le climat se sont développées. Le processus d'élaboration des politiques internationales sur les déplacements environnementaux, bien qu'il soit actuellement axé sur le changement climatique et les catastrophes naturelles, suggère une nouvelle façon d'envisager les catastrophes nucléaires et offre une voie inspirante pour construire un cadre de protection plus approprié pour les victimes de l'énergie nucléaire.

Comme indiqué plus haut, une des questions récurrentes et non résolues sur les déplacements environnementaux concerne le « point de basculement » : à partir de quel moment le mouvement des personnes devient-il une migration environnementale *forcée* au lieu d'une migration *volontaire* ?<sup>132</sup> En fait, l'accent mis sur le motif initial et le caractère contraignant de la décision de déplacement d'un individu présente un parallèle avec la notion de « crainte fondée » dans le cadre de la détermination du statut de réfugié. Pour obtenir le statut de réfugié, les demandeurs d'asile doivent établir que la cause première de leur fuite est basée sur une crainte fondée de persécution. Dans le cas des déplacements environnementaux, ce test de « crainte fondée » est souvent effectué par des scientifiques (souvent des experts publics). Comme l'a fait valoir Ulrich Beck, les risques environnementaux tels que la radioactivité, qui échappe totalement aux capacités de perception de l'homme, n'existent que dans la mesure où ils sont compris par la science ou les connaissances disponibles à l'époque donnée.<sup>133</sup> À cet égard, l'interprétation des risques peut changer au fil du temps et peut également être minimisée ou amplifiée dans le cadre des connaissances, et donc « ouverte à la définition et à la construction sociales »<sup>134</sup>. Précisément, à la suite de l'accident de Fukushima, la dose de référence a été portée de 1 mSv/an à 20 mSv/an par le gouvernement japonais sur la base d'une interprétation particulière du risque de faible dose - la théorie du seuil - en contradiction avec

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<sup>132</sup> Walter Kälin, 'Displacement Caused by the Effects of Climate Change: Who Will Be Affected and What Are the Gaps in the Normative Framework for Their Protection?' (Brookings 2008) Background Paper submitted to IASC informal working group on 15 September 2008 <<https://www.brookings.edu/research/displacement-caused-by-the-effects-of-climate-change-who-will-be-affected-and-what-are-the-gaps-in-the-normative-framework-for-their-protection/>> consulté le 22 October 2018; Roberta Cohen and Megan Bradley, 'Disasters and Displacement: Gaps in Protection' (2010) 1 *Journal of International Humanitarian Legal Studies* 95; Megan Bradley and Roberta Cohen, 'Disasters, Displacement and Protection: Challenges, Shortcomings and Ways Forward' in Thomas Faist and Jeanette Schade (eds), *Disentangling Migration and Climate Change: Methodologies, Political Discourses and Human Rights* (Springer Netherlands 2013).

<sup>133</sup> Ulrich Beck, *Risk Society: Towards a New Modernity* (1992 English translation, SAGE Publications 1986).

<sup>134</sup> *ibid* 23.

la théorie linéaire sans seuil (LSS) adoptée par la CIPR et d'autres organismes de réglementation nucléaire.

Certains juristes ont fait deux propositions intéressantes en contrepoint pour surmonter le problème de définition susmentionné, en particulier le test de la « crainte fondée ». La première proposition émane de Jane McAdam, professeur de droit des réfugiés à l'université de Nouvelle-Galles du Sud, qui préconise l'application du principe de précaution dans la définition du déplacement environnemental.<sup>135</sup> Ce principe est l'un des principes fondamentaux du droit de l'environnement inscrit dans l'article 15 de la déclaration de Rio sur l'environnement et le développement, qui stipule :

En cas de risque de dommages graves ou irréversibles, l'absence de certitude scientifique absolue ne doit pas servir de prétexte pour remettre à plus tard l'adoption de mesures effectives visant à prévenir la dégradation de l'environnement.<sup>136</sup>

En vertu de ce principe, les personnes déplacées ne doivent pas apporter la preuve définitive d'un préjudice ; l'existence d'un « dommage grave ou irréversible » potentiel suffit à justifier leur fuite et leur besoin de protection.

La deuxième proposition en contrepoint a été présentée par Walter Kälin, l'ancien Représentant du Secrétaire général (RSG) pour les droits de l'homme des personnes déplacées dans leur propre pays. Il a lancé l'Initiative Nansen en 2012, la première plateforme internationale de réflexion et d'élaboration de politiques pour la protection des migrants forcés transfrontaliers dans le contexte des catastrophes et du changement climatique. Bien que l'initiative concerne essentiellement les mouvements transfrontaliers lors de catastrophes naturelles et climatiques, sa réflexion sur l'identification et la définition des personnes déplacées pour des raisons environnementales a une implication importante sur la protection des personnes lors de catastrophes écologiques en général, y compris les accidents nucléaires.

Dans ses travaux préparatoires à l'initiative, Kälin a proposé une approche tout à fait novatrice pour définir les victimes. Alors que la plupart des chercheurs s'intéressent au motif de départ et au caractère impérieux de la fuite de l'individu (le test de la « crainte fondée »), il

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<sup>135</sup> Jane McAdam, 'Displacement in the Context of Climate Change and Disasters' in Cathryn Costello, Michelle Foster and Jane McAdam (eds), *The Oxford Handbook of International Refugee Law* (Oxford University Press 2021).

<sup>136</sup> AGNU, "Rapport de la Conférence des Nations unies sur l'environnement et le développement : Annexe I Déclaration de Rio sur l'environnement et le développement" (Assemblée générale des Nations unies 1992) Article 15.

a insisté pour que l'on se concentre sur la question du retour, une sorte de test de « retournabilité » basé sur trois critères : l'admissibilité, la possibilité et le caractère raisonnable (permissibility, possibility, and reasonableness). Kälén a en effet soutenu que si la réponse à l'une de ces questions : « *Le retour est-il "permissible" ? Le retour est-il possible ? Le retour peut-il être raisonnablement exigé ?* » est « Non », les personnes concernées doivent être considérées comme des victimes de déplacements forcés ayant besoin d'une protection et d'une assistance spécifiques, soit dans leur propre pays, soit dans un autre État<sup>137</sup>.

En introduisant cette nouvelle approche, Kälén a effectivement débloqué le débat fixé sur le motif subjectif, ou sur la notion de risque des individus en invitant à se concentrer d'abord sur les circonstances particulières et les vulnérabilités des individus en mouvement. Cette conception pourrait être extrêmement utile pour la protection des personnes déplacées à la suite d'une catastrophe nucléaire ou déplacées du fait d'une catastrophe écologique.

## **D : Régime environnemental**

Une autre *lex specialis*, le droit international de l'environnement, présente également un conflit normatif avec le régime nucléaire. Malgré la « complémentarité » déclaré entre le droit nucléaire et le droit de l'environnement,<sup>138</sup> plusieurs principes du droit international de l'environnement s'opposent en vérité au cadre nucléaire : notamment le principe de précaution, le principe du pollueur-payeur, les droits procéduraux et le principe d'équité.<sup>139</sup> Par conséquent, l'utilisation « pacifique » de l'énergie atomique et les accidents nucléaires sont considérés comme relevant d'une lacune du droit international de l'environnement.<sup>140</sup> Cette lacune concerne précisément « la protection de la vie et de la dignité humaines contre les menaces

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<sup>137</sup> Kälén, "Displacement Caused by the Effects of Climate Change" (n 132)

<sup>138</sup> Sam Emmerechts, "Environmental Law and Nuclear Law : A Growing Symbiosis" (2008) 82 Nuclear Law Bulletin 91 ; Patrick Reyners, "Le droit nucléaire confronté au droit de l'environnement - Autonomie ou complémentarité ?" (2007) 1 Revue québécoise de droit international 149.

<sup>139</sup> Ved P Nanda, "International Environmental Norms Applicable to Nuclear Activities, with Particular Focus on Decisions of International Tribunals and International Settlements" (2006) 35(1) Denver Journal of International Law and Policy 47 ; Anguel Anastassov, "The Sovereign Right to Peaceful Use of Nuclear Energy and International Environmental Law" in Jonathan L Black-Branch and Dieter Fleck (eds), *Nuclear Non-Proliferation in International Law - Volume 1* (TMC Asser Press 2014).

<sup>140</sup> Luis E Rodriguez-Rivera, "Is the Human Right to Environment Recognized under International Law - It Depends on the Source" (2001) 12 Colorado Journal of International Environmental Law and Policy 1 ; Luis E Rodriguez-Rivera, "The Human Right to Environment and the Peaceful Use of Nuclear Energy" (2006) 35 Denver Journal of International Law and Policy 173. Rodriguez-Rivera est professeur de droit international de l'environnement à l'Université de Porto Rico.

associées à la dégradation de l'environnement, en particulier lorsque ces menaces résultent d'actions ou d'inactions du gouvernement national d'un individu »<sup>141</sup>. De nombreuses victimes de l'accident nucléaire de Fukushima ont fait face à une telle situation, notamment lorsque le gouvernement a décidé de ne pas les évacuer des zones touchées par les radiations en augmentant le critère de dose de 20 fois la limite de dose prescrite. Selon Luis E. Rodriguez-Rivera, juriste du droit international de l'environnement, c'est précisément là que le droit des droits de l'homme vient croiser le droit de l'environnement, impliquant en particulier la notion de droit à un environnement sûr et sain.<sup>142</sup> Michel Prieur s'est joint à sa suggestion : la protection des personnes en cas de catastrophe concerne à la fois les droits de l'homme classiques et les *nouveaux droits de l'homme en matière d'environnement*.<sup>143</sup> Selon lui, « une nouvelle reconnaissance mondiale du droit de l'homme à un environnement sûr devrait sans aucun doute accompagner une nouvelle reconnaissance universelle des droits de l'homme des victimes de l'environnement »<sup>144</sup>.

### **1. Principes du droit de l'environnement applicables aux catastrophes nucléaires**

Les principes fondamentaux du droit international de l'environnement sont énoncés dans la déclaration de Rio de 1992 sur l'environnement et le développement.<sup>145</sup> Ils comprennent le principe du développement durable, le principe de prévention, le principe du pollueur-payeur, le principe de précaution, les droits procéduraux en matière d'environnement et le principe de l'équité intergénérationnelle. Dans le droit de l'environnement, ces principes servent d'orientation politique pour la réglementation environnementale et de concepts juridiques pour guider les décisions judiciaires. Certains d'entre eux ont été incorporés dans des conventions

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<sup>141</sup> Rodriguez-Rivera, "Is the Human Right to Environment Recognized under International Law - It Depends on the Source" (n 140) 9.

<sup>142</sup> Rodriguez-Rivera, "The Human Right to Environment and the Peaceful Use of Nuclear Energy" (n 140).

<sup>143</sup> Michel Prieur, "Projet de convention sur le statut international des personnes déplacées pour des raisons environnementales" (Centre international de droit comparé de l'environnement 2016) Rapport soumis au Comité exécutif du Mécanisme international de Varsovie pour les pertes et dommages, CCNUCC <[https://unfccc.int/files/adaptation/groups\\_committees/loss\\_and\\_damage\\_executive\\_committee/application/pdf/prieur-convention\\_on\\_the\\_international\\_status\\_of\\_environmentally.pdf](https://unfccc.int/files/adaptation/groups_committees/loss_and_damage_executive_committee/application/pdf/prieur-convention_on_the_international_status_of_environmentally.pdf)> consulté le 20 mai 2019. C'est nous qui soulignons

<sup>144</sup> *ibid* 10.

<sup>145</sup> AGNU, "Rapport de la Conférence des Nations unies sur l'environnement et le développement : Annexe I Déclaration de Rio sur l'environnement et le développement (Assemblée générale des Nations unies, 12 août 1992) UN Doc A/CONF.151/26 (Vol. I).



internationales sur l'environnement, reflétant ainsi des règles de droit coutumier (par exemple, le principe de prévention)<sup>146</sup>. Certains experts du droit nucléaire affirment que certains principes ont déjà été incorporés dans le cadre de la sûreté nucléaire et que le droit nucléaire et le droit de l'environnement sont en « symbiose croissante »<sup>147</sup>.

L'une de ces « symbioses » est en effet observée dans le principe du développement durable. Conçu à l'origine pour intégrer la question de la protection de l'environnement dans les projets de développement économique et social, le principe a évolué au fil des ans pour devenir un concept plutôt ambivalent. La notion est de plus en plus accompagnée des principes d'intégration et de conciliation dans lesquels les considérations sociales et économiques (souvent les coûts) doivent être mises en balance avec la protection de l'environnement. Selon certains juristes, cela a conduit à une « *economicisation* » du droit de l'environnement,<sup>148</sup> où les intérêts économiques sont souvent prioritaires dans cet exercice d'équilibre et où les exigences environnementales finissent par être mises de côté.<sup>149</sup> De même, le principe de proportionnalité inscrit dans la politique de l'UE (article 5 (1) (4), TUE), qui est souvent appliqué pour modérer les mesures de protection de l'environnement, par exemple, présente un parallèle intéressant avec le principe d'optimisation de la CIPR. En vertu de ce principe, le niveau des mesures préventives « ne doit pas nécessairement être le plus élevé qui soit techniquement possible » si le coût économique de ces mesures dépasse le gain environnemental qui en découle.<sup>150</sup> Il n'est pas surprenant que l'environnement, la protection des consommateurs et la protection de la santé soient trois sujets dont la protection, en vertu de la Charte des droits fondamentaux de l'Union

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<sup>146</sup> Nicolas de Sadeleer, *Principes environnementaux : From Political Slogans to Legal Rules*, vol Second edition (OUP Oxford 2020) ; Philippe Sands et Jacqueline Peel, *Principles of International Environmental Law* (4e édition, Cambridge University Press 2018).

<sup>147</sup> Reyners (n 138) ; Emmerechts (n 138).

<sup>148</sup> Raphaël Romi, "La "Transversalité", Caractéristique, Moteur et Frein Du Droit de l'environnement", *Confluences. Mélanges en l'honneur de J. Morand-Deville* (Montchrestien 2007).

<sup>149</sup> Patrick Thieffry, *Handbook of European Environmental and Climate Law* (2e édition, Bruylant 2021).

<sup>150</sup> *ibid* 79. La citation est tirée de deux jurisprudences de la Cour européenne : Affaire C-284/95 *Safety hi-Tech Srl c. S.&T. Srl* (1998) ECR I-04301, paras. 49 et 59 ; affaire C-341/95 *Gianni Bettati contre Safety hi-Tech Srl* (1998) ECR I-04355.

européenne, est constamment tempérée par le principe d'intégration, dont les dispositions sont « rédigées comme des déclarations politiques plutôt que comme des droits individuels »<sup>151</sup>.

Cependant, plusieurs spécialistes du droit de l'environnement soutiennent que le régime nucléaire présente en fait de nombreuses lacunes par rapport aux principes du droit de l'environnement, notamment le principe de « no harm » (i.e. prévention), le principe du pollueur-payeur et le principe de précaution, et qu'il est donc inadéquat pour assurer une protection contre les risques nucléaires<sup>152</sup>. Il est également dépourvu de toute considération concernant les générations futures et l'environnement durable, alors que la principale caractéristique du risque nucléaire - la radioactivité - est sa longévité, puisqu'elle peut rester toxique pendant des décennies, voire des siècles.

L'intégration incomplète du principe du pollueur-payeur – l'inadéquation des règles secondaires – remettrait également en question le caractère « autonome » du droit nucléaire par rapport au droit international général,<sup>153</sup> impliquant l'applicabilité de la responsabilité de l'État pour les dommages transfrontaliers. Bien que le régime nucléaire soit reconnu comme une *lex specialis* comme le régime des droits de l'homme, l'application du principe général de la responsabilité de l'État ne peut être exclue en l'absence d'un « ensemble complet, exhaustif et définitif de règles secondaires »<sup>154</sup>. En vertu du droit international coutumier de « no harm », les États ont le devoir de veiller à ce que les activités relevant de leur juridiction ou de leur contrôle ne causent pas de dommages à l'environnement d'autres États<sup>155</sup>. Comme les exemples de Tchernobyl et de Fukushima l'ont amplement démontré, les accidents graves peuvent causer des dommages importants et durables non seulement dans les limites de la juridiction nationale,

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<sup>151</sup> Nicolas de Sadeleer, "Enforcing EUCHR Principles and Fundamental Rights in Environmental Cases" (2012) 81 *Nordic Journal of International Law* 39, 43 ; Alexandre Kiss, "Environmental and Consumer Protection", In S. Peers and A. Ward (eds), *The European Union Charter of Fundamental Rights* (Oxford, Hart 2004), cité par de Sadeleer (ibid). Dans cet article, Kiss qualifie les dispositions de la CEDF relatives à la protection de l'environnement (article 37) et à la protection des consommateurs (article 38) de "*parents pauvres*" de la Charte, dotés d'un poids bien moindre par rapport à d'autres dispositions (p. 247).

<sup>152</sup> Nanda (n 139) ; Dyke (n 85) ; Duncan EJ Currie, "The Problems and Gaps in the Nuclear Liability Conventions and an Analysis of How an Actual Claim Would Be Brought Under the Current Existing Treaty Regime in the Event of a Nuclear Accident" (2006) 35 *Denver Journal of International Law and Policy* 85 ; Alexandre Kiss, "State Responsibility and Liability for Nuclear Damage" (2006) 35 *Denver Journal of International Law & Policy* 67.

<sup>153</sup> Simma et Pulkowski (n 74). Selon les auteurs, les "régimes autonomes" doivent être dotés d'un "ensemble complet, exhaustif et définitif de règles secondaires" (p. 493).

<sup>154</sup> *ibid* 493.

<sup>155</sup> Par exemple, voir article 2 de la Déclaration de Rio sur l'environnement et le développement

mais aussi dans des zones situées au-delà des frontières nationales<sup>156</sup>. Comme le défend également Norbert Pelzer, le risque de dommages nucléaires transfrontaliers « justifie non seulement l'implication internationale dans la détermination du concept de sûreté nucléaire mais, de plus, les principes du droit international public obligent l'État d'installation à accepter le concept international à condition qu'il prévienne ou atténue de manière significative les dommages transfrontaliers mieux que sa propre approche nationale de la sûreté nucléaire ». <sup>157</sup>

## 2. Le droit à un environnement sûr et sain

Le droit de l'homme à l'environnement - plus largement, les droits environnementaux - est un concept qui a émergé dans les années 1960 et 1970, lorsque le mouvement écologiste était à son apogée aux États-Unis et dans d'autres pays occidentaux. Mais c'est la déclaration de Stockholm de 1972, le document final de la conférence des Nations unies sur l'environnement humain, qui a pour la première fois intégré le concept dans le texte, bien que de nature non contraignante, galvanisant ainsi l'attention de la communauté internationale. Depuis lors, le droit à un environnement sûr, sain, propre, durable et écologiquement équilibré a été incorporé dans 110 constitutions nationales dans le monde<sup>158</sup> et reconnu dans plusieurs instruments régionaux relatifs aux droits de l'homme et à l'environnement tels que la Charte africaine des droits de l'homme et des peuples<sup>159</sup> et la Convention sur l'accès à l'information, la participation du public au processus décisionnel et l'accès à la justice en matière d'environnement (Convention d'Aarhus).<sup>160</sup> Près de 50 ans après la déclaration de Stockholm, l'Assemblée

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<sup>156</sup> Dans le cas de l'accident de Tchernobyl, 40 % de la surface de l'Europe a été affectée par le césium 137 libéré par l'accident. 70 % des radiations émises lors de l'accident de Fukushima sont tombées dans l'océan. Cette pollution a atteint la haute mer et les eaux territoriales d'autres pays tels que les États-Unis et la Russie. Voir Takuya Kobayashi, '福島第一原発事故に伴う海洋汚染に関する研究 (The Study on Marine Pollution Related to the Fukushima Daiichi Nuclear Accident)' (Japan Atomic Energy Agency 2017) Presentation at the 8th Fukushima Radiation Measure Forum, held on 19 July 2017.

<sup>157</sup> Norbert Pelzer, "Safer Nuclear Energy Through a Higher Degree of Internationalisation? International Involvement Versus National Sovereignty" (2013) 91 Nuclear Law Bulletin 43, 49.

<sup>158</sup> UNHRC, 'Droit à un environnement sain : bonnes pratiques ; Rapport du Rapporteur spécial sur la question des obligations relatives aux droits de l'homme se rapportant aux moyens de bénéficier d'un environnement sûr, propre, sain et durable' (Conseil des droits de l'homme, 30 décembre 2019) UN Doc A/HRC/43/53.

<sup>159</sup> Charte africaine des droits de l'homme et des peuples (adoptée le 27 juin 1981, entrée en vigueur le 21 octobre 1986) 1529 UNTS 217

<sup>160</sup> Convention sur l'accès à l'information, la participation du public au processus décisionnel et l'accès à la justice en matière d'environnement (Convention d'Aarhus) (adoptée le 25 juin 1998, entrée en vigueur le 30 octobre 2001) 2161 UNTS 447/UNTS 447

générale des Nations unies a également adopté une résolution (76/300) en août 2022, reconnaissant clairement ce droit et exhortant les États, la communauté internationale, les entreprises et les autres parties prenantes à redoubler d'efforts pour garantir un environnement propre, sain et durable pour tous.<sup>161</sup> Le Conseil des droits de l'homme des Nations unies avait adopté une résolution similaire un an plus tôt.<sup>162</sup>

Comme le suggère Rodriguez-Rivera, le droit à un environnement sûr joue un rôle majeur en comblant la brèche laissée par le droit de l'environnement et le droit nucléaire en matière de protection des VCN. Garantir ce droit dans le contexte des catastrophes nucléaires signifierait deux choses : garantir *le droit des individus au déplacement*<sup>163</sup> (alternativement appelé le droit « à l'évacuation »<sup>164</sup>, « au mouvement »<sup>165</sup>, ou au voyage<sup>166</sup>) d'une part, et le *droit d'être protégé de l'exposition in situ* d'autre part. Ces deux notions de droits ont été proposées à l'origine par des ONG japonaises et la JFBA à la suite de l'accident nucléaire de Fukushima.<sup>167</sup> L'établissement de ces droits pourrait être déterminant pour répondre à la situation spécifique des VCN nucléaires en cas d'évacuation « volontaire » et de déplacement sur place. Le « droit au déplacement » traite efficacement la question de l'immobilité forcée, en garantissant que les personnes qui souhaitent évacuer les zones touchées par les radiations pourront le faire avec l'aide du gouvernement. L'établissement de ce droit garantirait également que les personnes évacuées « volontairement » recevraient une assistance adéquate. Le droit d'être protégé contre l'exposition aux radiations, quant à lui, est conçu pour protéger les

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<sup>161</sup> AGNU, " Res 76/300 ; Le droit de l'homme à un environnement propre, sain et durable" (Assemblée générale des Nations unies 2022) A/RES/76/300 (1 août 2022)

<sup>162</sup> UNHRC, "Résolution adoptée par le Conseil des droits de l'homme le 8 octobre 2021" (Conseil des droits de l'homme, 18 octobre 2021), UN Doc A/HRC/RES/48/13. Les quatre pays qui se sont abstenus sont la Chine, l'Inde, le Japon et la Fédération de Russie.

<sup>163</sup> Le terme "droit au déplacement" a également été utilisé par le CRIDEAU-OMIJ (Université de Limoges) dans la troisième version (2013) du projet de convention sur le statut des personnes déplacées pour des raisons environnementales. Dans la quatrième version (2018), il a été remplacé par "le droit de voyager". Voir CRIDEAU-OMIJ (Université de Limoges), 'Projet de Convention sur le statut des personnes déplacées dans leur environnement' (CIDCE 2013) Troisième version.

<sup>164</sup> Fukuda et Kawasaki (n 58).

<sup>165</sup> Richard Black et autres, "Migration, Immobility and Displacement Outcomes Following Extreme Events" (2013) 27 Environmental Science & Policy S32, S39.

<sup>166</sup> CRIDEAU-OMIJ (University of Limoges), 'Draft Convention on the Status of Environmentally Displaced Persons' (CIDCE 2018) Fourth Version.

<sup>167</sup> Fukuda et Kawasaki (n 58); Kenji Fukuda, 'おわりに 改めて避難する権利を考える' (Epilogue: Reflecting on the Right to Evacuation)' in Kenichiro Kawasaki and others (eds), *避難の権利、それぞれの選択 (The Right to Evacuation, Respective Choices)* (Iwanami Booklet No 839, Iwanami-Shoten 2012).

personnes qui choisissent de rester dans les zones contaminées ainsi que celles qui choisissent de retourner dans les zones contaminées selon leur propre volonté.

Ainsi, la mise en œuvre du droit à un environnement sûr et sain est identifiée comme l'un des principes de protection clés pour la protection contre les catastrophes nucléaires dans la proposition de cette thèse ci-dessous exposée.

### **III : Proposition de nouvelles normes de protection pour les catastrophes nucléaires**

L'étude de cas de Fukushima a montré que le cadre actuel d'intervention en cas de catastrophe nucléaire était inadéquat pour protéger les personnes touchées par une catastrophe nucléaire. Le programme d'énergie nucléaire, en raison de l'ampleur des enjeux politiques et financiers, de son lien historique ou continu avec le programme d'armement et de sa sensibilité matérielle pour la sécurité nationale, a toujours fait partie du domaine de l'État. En tant que telle, l'intervention en cas de catastrophe nucléaire est très différente des autres catastrophes, dans la mesure où l'État intervient à tous les niveaux. Dans ce contexte, le régime international actuel de contrôle géré par l'AIEA est inefficace, voire complice, car l'Agence souligne à plusieurs reprises la primauté de la « responsabilité nationale » dans toutes les questions liées à la sûreté nucléaire<sup>168</sup>. Dans ce contexte, il est nécessaire d'établir un régime normatif international solide, efficace et faisant autorité, qui garantirait la protection des individus contre les actes ou les omissions imputables aux États qui sont souvent sous l'emprise d'intérêts politiques, économiques, de sécurité nationale et industriels dans leur gestion des catastrophes nucléaires.

En outre, la critique juridique menée à partir d'autres branches du droit international et de régimes normatifs, à savoir les droits de l'homme, les migrations forcées et le droit de l'environnement, a révélé que le régime nucléaire est en grande partie en discordance ou en contradiction avec eux, et que leurs principes de protection peuvent largement combler le vide de protection créé par le cadre nucléaire. En fait, les pays nucléaires ont également des obligations légales en vertu de ces régimes normatifs. Par exemple, toutes les puissances

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<sup>168</sup> IAEA and others, 'Fundamental Safety Principles' (IAEA 2006) Safety Fundamentals No. SF-1 para 1.2. Directive 2009/71/Euratom du Conseil du 25 juin 2009 établissant un cadre communautaire pour la sûreté nucléaire des installations nucléaires (8), modifiée par la directive 2014/87/Euratom.

nucléaires<sup>169</sup> sont les États parties au Pacte international relatif aux droits civils et politiques et au Pacte international relatif aux droits économiques, sociaux et culturels (à l'exception des Émirats arabes unis et de la Chine<sup>170</sup>) et signataires d'au moins cinq conventions relatives aux droits de l'homme. En outre, la moitié de ces nations sont également les États parties à la Convention européenne des droits de l'homme. Et leurs obligations s'appliquent dans les situations de catastrophe, y compris les accidents nucléaires,<sup>171</sup> ce qui a été clairement confirmé par la jurisprudence de la Cour européenne des droits de l'homme<sup>172</sup> et par les rapports du rapporteur spécial des Nations unies sur l'accident de Fukushima.

Les accidents nucléaires entraînent des déplacements, des immobilisations involontaires, une exposition aux radiations, une pollution de l'environnement et diverses violations des droits de l'homme. Le cadre actuel d'intervention est loin de répondre suffisamment à ces conséquences majeures. Les normes de protection contre les catastrophes nucléaires ont donc grand besoin d'une révision complète ou d'une refondation.

### **A : La définition et les catégories de « victimes de catastrophes nucléaires (VCN) »**

Afin d'élaborer des normes de protection appropriées, il convient tout d'abord de définir ce que sont les « victimes de catastrophes nucléaires (VCN) ». De fait, la façon de

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<sup>169</sup> Les pays dotés d'un pouvoir nucléaire militaire ou civil, ou les deux. Il s'agit de l'Afrique du Sud, de l'Allemagne, de l'Argentine, de l'Arménie, de la Biélorussie, de la Belgique, du Brésil, de la Bulgarie, du Canada, de la Chine, de la Corée du Nord (RPDC), de la Finlande, de la France, de la Hongrie, de l'Inde, de l'Iran, d'Israël, du Japon, du Mexique, des Pays-Bas, du Pakistan, de la Roumanie, de la Russie, de la Slovaquie, de la Slovénie, de la Corée du Sud, de l'Espagne, de la Suède, de la Suisse, de Taïwan, des Émirats arabes unis, du Royaume-Uni, de l'Ukraine et des États-Unis.

<sup>170</sup> La Chine n'est partie qu'au Pacte international relatif aux droits économiques, sociaux et culturels (PIDESC) et non au Pacte international relatif aux droits civils et politiques (PIDCP).

<sup>171</sup> Michel Prieur, "人権の観点から見た破局的な原子力事故の管理" (Destructive Nuclear Accident Management From the Perspective of Human Rights) (2015) 49 (2) 比較法学 (Comparative Law Review) 244; Walter Kälin, 'The Human Rights Dimension of Natural or Human-Made Disasters Focus: Disaster Preparedness and Response' (2012) 55 German Yearbook of International Law 119. L'article 4 du Pacte international relatif aux droits civils et politiques et l'article 15 de la Convention européenne des droits de l'homme permettent aux États de suspendre temporairement l'application des droits de l'homme en cas de danger public menaçant "la vie de la nation". Kälin estime que les catastrophes ne créent généralement pas de telles conditions nécessitant des dérogations.

<sup>172</sup> Les affaires les plus notables sont *Öneriyildiz c. Turquie*, App no 48939/99 (CEDH, 30 novembre 2004) et *Budayeva et autres c. Russie*, App nos 15339/02, 21166/02, 20058/02, 11673/02 et 15343/02 (CEDH, 20 mars 2008).

désigner et de décrire une victime déterminera le risque/le dommage qu'elle encourt et, par conséquent, le type de protection/d'assistance dont elle aura besoin.

Avant de proposer une nouvelle définition des « VCN », la thèse passe en revue les définitions et catégories existantes établies lors de catastrophes antérieures et explore d'autres définitions potentielles du point de vue des cadres et régimes normatifs internationaux.

### **1. Définitions existantes à partir des catastrophes passées**

Tout d'abord, la thèse présente une vue d'ensemble des définitions établies après la catastrophe de la bombe A d'Hiroshima/Nagasaki (a), l'accident nucléaire de Fukushima (b) et l'accident nucléaire de Tchernobyl (c).

#### **a. La définition des « victimes » de la bombe atomique d'Hiroshima/Nagasaki**

La première catastrophe nucléaire au monde, le largage des bombes atomiques d'Hiroshima et de Nagasaki, a été provoquée par les États-Unis dans le contexte de leur guerre avec le Japon et, par conséquent, ses victimes n'ont jamais été indemnisées par aucun des deux gouvernements après la guerre. A la place d'un système d'indemnisation, le gouvernement japonais a mis en place un programme d'assistance aux survivants de la bombe A - le statut d'*hibakusha* - pour ceux qui ont été exposés aux bombes, plus précisément aux radiations émises par les bombes, et qui souffraient de leurs effets. Les *hibakusha* sont donc par essence des victimes de l'exposition aux radiations et leur statut de protection pourrait être utile pour la protection des victimes d'accidents nucléaires civils.

Le statut d'*hibakusha* comporte essentiellement deux catégories : le statut d'*hibakusha* général et le statut d'*hibakusha* certifié. Pour les deux statuts, la reconnaissance du statut de victime est basée sur une dose d'exposition estimée à 100 mSv, calculée uniquement à partir de l'exposition externe.<sup>173</sup> Cette estimation a été effectuée concrètement sur la base de la distance de la victime par rapport à l'hypocentre (quelques kilomètres de rayon) et du délai d'exposition (quelques jours à quelques semaines après l'explosion). Pour obtenir le statut d'*hibakusha* certifié, un *hibakusha* doit, outre une exposition à 100 mSv minimum, souffrir d'une des sept « maladies de la bombe A » spécifiques établies par le Ministère de la santé, du travail et de la

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<sup>173</sup> Masayoshi Naito, 'The Trials for Recognition of A-Bomb Injuries and the Feelings of Hibakusha' (Japan Association of Lawyers Against Nuclear Arms (JALANA) 2013) <[http://www.hankaku-j.org/data/07/oslo\\_201305\\_004.pdf](http://www.hankaku-j.org/data/07/oslo_201305_004.pdf)>.

protection sociale. Toutes les autres maladies sont donc ignorées car elles ne sont pas considérées comme liées à l'exposition à la bombe A et la demande de statut est généralement rejetée par le ministère<sup>174</sup>.

L'*hibakusha* général bénéficie d'un examen médical annuel gratuit, d'une assistance médicale (pour la partie non couverte par le système de santé public) et d'une petite allocation mensuelle à vie sous certaines conditions, tandis que l'*hibakusha* certifié bénéficie d'une assistance médicale complète et d'une allocation mensuelle<sup>175</sup>. Le régime d'assistance aux *hibakusha* est centré sur l'assistance médicale et comporte peu d'aspects sociaux et d'aide sociale. Dans les deux cas, les critères établis par le gouvernement japonais sont si restrictifs et stricts que de nombreuses victimes ont été exclues du système et ont déposé une plainte devant les tribunaux. La jurisprudence *Hibakusha* a réfuté certains des critères gouvernementaux et a suggéré l'importance de prendre en compte les doses d'exposition interne et le contexte global dans lequel se trouvait l'individu après le bombardement, et de ne pas se fier uniquement aux critères dosimétriques pour déterminer le statut.

Néanmoins, le régime du statut d'*hibakusha* offre également un exemple intéressant pour la protection des victimes de l'exposition aux rayonnements. En effet, un programme d'assistance spécial créé en 1979 pour les *hibakusha* de la deuxième génération est particulièrement instructif. Bien qu'il s'agisse d'une mesure administrative distincte du statut d'*hibakusha*, les enfants d'*hibakusha* ont droit à un contrôle médical annuel gratuit à vie et, dans certaines préfectures, bénéficient d'un soutien médical lorsqu'ils sont diagnostiqués comme souffrant de l'une des 11 maladies reconnues par le Ministère de la santé et du travail (MHLW) comme des « conditions spécifiques (*special impediments*) » pour les *hibakusha*. Cette mesure a très probablement été instituée sur la base d'une attitude précautionneuse, le doute profitant à la victime, contre les effets héréditaires des radiations, bien que les autorités japonaises n'aient pas officiellement reconnu ces effets.

Ce système de protection intergénérationnelle a également été mis en place après l'accident de Tchernobyl par les autorités soviétiques et constitue l'un des principaux

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<sup>174</sup> Outre les sept "maladies de la bombe A", onze affections ont été reconnues comme des "conditions spécifiques" et ont donné lieu à l'octroi d'un quart de l'allocation accordée aux *hibakusha* certifiés "maladie de la bombe A".

<sup>175</sup> Les *hibakusha* certifiés reçoivent environ 1,000 euros par mois tandis que les *hibakusha* non certifiés reçoivent 0 à 250 euro par mois.



enseignements tirés des catastrophes passées pour les normes de protection contre les catastrophes nucléaires.

### **b. La définition des victimes de l'accident de Fukushima**

Le système de protection mis en place par le gouvernement japonais à la suite du deuxième accident nucléaire le plus important au monde ressemble à celui des *hibakusha* : restrictif, strict, et « atomisé » avec de multiples catégories. Le statut d'identification et de protection des victimes de Fukushima a été aussi déterminé en grande partie sur la base des zones, en particulier par la dose de radiation ambiante de 20 mSv/an, en d'autres termes, le niveau de contamination environnementale de la zone au lieu des doses d'exposition estimées des individus.

Le système de protection de Fukushima a finalement produit les quatre groupes de victimes d'accidents suivants :

- Personnes déplacées faisant l'objet d'un ordre d'évacuation (évacués obligatoires)
- Personnes déplacées n'ayant pas reçu d'ordre d'évacuation (évacuées « volontaires »)
- Les personnes restées « piégées » dans les zones contaminées sans ordre d'évacuation
- Les personnes qui restent volontairement dans les zones contaminées, qu'elles aient ou non reçu un ordre d'évacuation.

Parmi eux, seul le premier groupe de victimes - les évacués obligatoires - a été reconnu comme victime « légitime » de la catastrophe, les autres étant considérées comme des victimes moins légitimes et ne bénéficiant donc que d'une assistance limitée. En fixant la dose de référence 20 fois plus élevée que la limite de dose publique, le cadre de protection de Fukushima établi par le gouvernement japonais s'est avéré très partiel, ne protégeant pas une grande partie des victimes de l'accident exposées aux radiations. À la lumière de cet exemple, les normes modèles doivent être conçues pour aider et protéger tous les groupes de victimes susmentionnés.

Cependant, le cas de Fukushima a également fourni un modèle inspirant de protection contre les catastrophes nucléaires : la promulgation de la loi sur le soutien aux victimes d'accidents nucléaires et aux enfants (la loi sur le soutien aux enfants).<sup>176</sup> Cette loi garantit

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<sup>176</sup> Loi n° 48 du 27 juin 2012 sur la promotion des mesures de soutien à la vie des victimes de catastrophes pour protéger et soutenir les enfants et autres résidents souffrant de dommages dus à l'accident nucléaire de la Tokyo Electric Power Company ; une traduction non officielle par le Japanese Law Translation (le projet du ministère japonais de la Justice), se trouve à <<https://www.japaneselawtranslation.go.jp/en/laws/view/2435>>, consultée le 4 avril 2022.

notamment le droit des individus à choisir volontairement entre trois options de mobilité - rester, déménager (évacuer) ou retourner - dans/depuis/vers les territoires contaminés et exige du gouvernement qu'il alloue équitablement les ressources pour faciliter leurs choix respectifs. Elle prévoit également un examen médical gratuit à vie pour les enfants et les femmes enceintes au moment de l'accident. Dans les faits, la loi n'a pas été correctement appliquée par le gouvernement, mais elle a créé un précédent important en matière de législation post-accidentelle.

### **c. La définition des victimes de l'accident de Tchernobyl**

Le statut de protection créé après la plus grande catastrophe nucléaire civile au monde à ce jour, l'accident de Tchernobyl, était basé sur l'estimation des doses d'exposition aux rayonnements des individus. Toutefois, la manière d'estimer ces doses et le niveau des critères de dose établis ont été sensiblement différents de ceux mis en place par le gouvernement japonais pour les survivants de la bombe atomique et les victimes de l'accident nucléaire de Fukushima. L'ancien gouvernement soviétique a adopté en 1991 une politique et des lois spécifiques pour l'accident de Tchernobyl – ce qu'on appelle « les lois Tchernobyl »<sup>177</sup> – qui établissaient trois catégories de « population affectée » ou de « victimes » pouvant bénéficier d'une assistance et d'une indemnisation de la part de l'État : 1) les « liquidateurs » de l'accident, 2) les personnes qui vivaient dans les zones contaminées et se sont réinstallées ailleurs, et 3) les personnes qui sont restées dans les zones contaminées. Plus important encore, les « zones contaminées » ont été définies par le niveau de contamination du sol, et non par la distance au site de l'accident ou la dose ambiante dans l'environnement ; enfin, la dose de référence activant toutes ces actions de protection a été fixée à 1 mSv/an, ce qui correspond à la limite de dose publique, une différence frappante par rapport aux 100 mSv fixés pour les survivants d'Hiroshima/Nagasaki, aux 20 mSv/an choisis pour les victimes de l'accident de Fukushima, ou aux critères de dose établies par les instances internationales comme la CIPR et l'IAEA.

Dans le cadre de la législation sur Tchernobyl, les personnes qui vivaient dans la zone où les doses estimées d'exposition aux rayonnements dépassaient 1 mSv/an avaient droit à une

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<sup>177</sup> Le "Concept de vie dans les districts affectés par l'accident de la centrale nucléaire de Tchernobyl" adopté par le gouvernement de l'URSS le 8 avril 1991, la loi fédérale soviétique "sur la protection sociale des citoyens exposés aux radiations à la suite de la catastrophe de la centrale nucléaire de Tchernobyl" adoptée le 12 mai 1991 et le décret gouvernemental (Russie) intitulé "sur le régime des territoires exposés à la contamination radioactive à la suite de l'accident de la centrale nucléaire de Tchernobyl" adopté le 25 décembre 1992. L'Ukraine et le Belarus ont adopté les lois similaires, bien que leur nom et leur contenu soient légèrement différents. Dans cette thèse, l'ensemble de ces lois et décrets est désigné par « les lois Tchernobyl ».

aide de l'État et à une indemnisation, quel que soit leur choix de mobilité, qu'il s'agisse de déménager ou de rester sur place. En effet, le régime a été conçu pour compenser l'exposition des personnes au risque de radiation plutôt qu'aux effets sur la santé dus à l'exposition.<sup>178</sup> Les lois Tchernobyl ont également fixé une autre dose de référence, 5 mSv/an, pour la relocalisation ou la réinstallation à long terme de la population touchée. Ce niveau est 10 fois inférieur à la dose de référence de Fukushima pour la réinstallation à long terme (50 mSv/an). Par conséquent, le phénomène d'évacuation « volontaire » comme on l'a vu lors de la catastrophe de Fukushima, a été très limité, voire inexistant à Tchernobyl.

En termes de stratégie de protection, les autorités soviétiques ont choisi la relocalisation des résidents plutôt que la décontamination et la radioprotection, reconnaissant l'inefficacité relative de ces dernières contre-mesures pour réduire les doses d'exposition de la population dans les territoires contaminés<sup>179</sup>. Cela contraste avec la stratégie de redressement post-Fukushima mise en place par le gouvernement japonais, qui a donné la priorité au retour et au maintien des populations affectées dans les territoires contaminés par la décontamination et de mesures de radioprotection. Finalement, les lois Tchernobyl ont établi un principe de protection qui garantit le droit des personnes vivant dans les territoires contaminés à décider volontairement de continuer à vivre sur ces territoires, ou à se réinstaller ailleurs, sur la base d'informations objectives concernant la situation radiologique et ses effets possibles sur la santé, ainsi qu'un droit à être aidées indépendamment de ce choix<sup>180</sup>. Toutefois, en cas de doses d'exposition estimées dépassant 5 mSv/an, la réinstallation en dehors des zones contaminées devient obligatoire sous les lois Tchernobyl.

Une autre particularité du statut de victime de Tchernobyl réside dans les catégories spéciales créées pour les populations vulnérables., En premier lieu, les personnes malades ou

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<sup>178</sup> PNUD et UNICEF (n 9).

<sup>179</sup> Oleg Nasvit, 'Legislation in Ukraine about the Radiological Consequences of the Chernobyl Accident' in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998) 51.

<sup>180</sup> Igor A Ryabzev and Tetsuji Imanaka, 'Legislation and Research Activity in Russia about the Radiological Consequences of the Chernobyl Accident' in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998); R Omatsu, 3.11 とチェルノブイリ法：再建への知恵を受け継ぐ (3.11 and Chernobyl Law: To Succeed the Wisdom for Reconstruction) (Toyo Shoten 2013) 87. Principe 11 du concept.

handicapées en raison de l'exposition aux radiations ont bénéficié de prestations et d'indemnités spéciales. Il faut noter toutefois, que dans les faits, ce programme a été mal mis en œuvre lors de la transition vers l'économie de marché des trois pays nouvellement indépendants. En Ukraine, par exemple, ce système a créé une situation de « citoyenneté biologique »<sup>181</sup> dans laquelle les personnes ne pouvaient accéder à la « citoyenneté » (droits à la protection sociale et à l'indemnisation) qu'en prouvant le lien entre leur maladie et l'accident. Mais au niveau politique et législatif au moins, il a montré que les autorités soviétiques avaient adopté une approche beaucoup plus précautionneuse et protectrice envers la population affectée que les autorités japonaises dans le cas de l'accident de Fukushima. Deuxièmement, les enfants et la deuxième génération de victimes ont également été reconnus comme un groupe vulnérable ayant besoin d'un soutien supplémentaire.<sup>182</sup> Reconnaisant que les enfants sont plus sensibles aux effets des radiations, les autorités soviétiques ont créé un programme d'assistance spécial pour les mineurs au moment de l'accident, ainsi que pour la deuxième génération, les enfants nés de parents exposés (« victimes »). La reconnaissance par les autorités soviétiques des effets héréditaires possibles des rayonnements est tout à fait remarquable si l'on considère que les institutions nucléaires internationales telles que l'UNSCEAR, la CIPR et l'AIEA ont continué jusqu'à ce jour à nier ou à remettre en question ces effets. Cette mesure suit l'exemple établi par le gouvernement japonais pour le programme des *hibakusha* de la bombe A, dans le cadre duquel la deuxième génération bénéficie d'un bilan de santé annuel gratuit et, dans certains cas, d'une assistance médicale.

Bien qu'en réalité les victimes de Tchernobyl aient eu du mal à accéder aux ressources médicales, à l'aide sociale et aux indemnités prévues par les lois dans un contexte de troubles économiques et politiques après l'éclatement de l'Union soviétique et en raison de la corruption endémique dans le pays,<sup>183</sup> le statut de protection, les critères de dose et le système de soutien établis par les anciennes autorités soviétiques étaient fondés sur la précaution, la

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<sup>181</sup> Adriana Petryna, *Life Exposed: Biological Citizens after Chernobyl* (The 2013 Edition, Princeton University Press 2013).

<sup>182</sup> Volodymyr Tykhyi, 'Chernobyl Sufferers in Ukraine and Their Social Problems: Short Outline' in Tetsuji Imanaka (ed), *Research Activities about the Radiological Consequences of the Chernobyl NPS Accident and Social Activities to Assist the Sufferers by the Accident* (Research Reactor Institute, Kyoto University 1998); Omatu (n 180).

<sup>183</sup> Petryna (n 181); Kate Brown, *Manual for Survival: A Chernobyl Guide to the Future* (Allen Lane 2019).

protection et le pragmatisme, ce qui en fait un exemple inspirant pour la protection contre les catastrophes nucléaires.

## **2. Définitions possibles à partir des cadres normatifs internationaux**

Après avoir passé en revue les définitions des VCN établies lors de catastrophes antérieures, la thèse dresse ensuite un inventaire des définitions potentielles des VCN tirées des cadres juridiques et normatifs internationaux examinés dans cette thèse. Il existe en effet six descriptions possibles des VCN à partir de ces régimes, comme suit : (a) PDI, (b) déplacés environnementaux et personnes piégées dans leur environnement, (c) victimes d'exposition aux radiations, (d) victimes de violations des droits de l'homme, (e) victimes de catastrophes, et (f) personnes affectées par un accident nucléaire.

### **a. Les VCN en tant que « PDIs »**

Les victimes de catastrophes nucléaires se trouvent souvent dans une situation de déplacement à l'intérieur de leurs frontières nationales. En cas d'urgence nucléaire, de nombreuses personnes fuient leur domicile, soit sur ordre du gouvernement, soit à leur propre initiative, afin de se protéger et de protéger les membres de leur famille des effets des radiations. Dans de nombreux cas, elles restent déplacées et se réinstallent dans d'autres parties du pays en raison du risque permanent que représente la contamination radiologique de leur environnement de vie. Selon le régime de protection des réfugiés et de migration forcée, ces personnes sont appelées « personnes déplacées à l'intérieur de leur propre pays » (PDI). La communauté internationale a adopté de nombreux documents normatifs, notamment les Principes directeurs relatifs au déplacement de personnes à l'intérieur de leur propre pays<sup>184</sup>, qui sont aujourd'hui considérés comme la référence internationale en matière de protection de ces personnes.

Dans les Principes directeurs, les personnes déplacées sont définies comme celles « qui ont été forcés ou contraints à fuir ou à quitter leur foyer ou leur lieu de résidence habituel, notamment en raison d'un conflit armé, de situations de violence généralisée, de violations des droits de l'homme ou de catastrophes naturelles ou provoquées par l'homme ou pour en éviter les effets, et qui n'ont pas franchi les frontières internationalement reconnues d'un État ».<sup>185</sup>

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<sup>184</sup> UNCHR (n 117).

<sup>185</sup> PDDI, Introduction.

Les catastrophes nucléaires sont en effet considérées comme l'une de ces « catastrophes d'origine humaine » auxquelles s'appliquent ces Principes directeurs.<sup>186</sup> Dans le cadre de la protection des personnes déplacées, toutes les activités « visent à obtenir le plein respect des droits de l'individu [...] conformément au droit des droits de l'homme, au droit humanitaire international et au droit des réfugiés »<sup>187</sup>. Et « les autorités nationales ont le devoir et la responsabilité première » d'assurer cette protection<sup>188</sup>.

Parmi les principaux droits des personnes déplacées garantis par ces Principes directeurs figurent le droit de chercher la sécurité dans une autre partie du pays, le droit d'être protégé contre un retour forcé, le droit au respect de sa vie familiale et le droit à un niveau de vie adéquat. En outre, une attention particulière doit être accordée aux besoins spécifiques des populations vulnérables telles que les femmes, les enfants, les personnes âgées et les personnes malades ou handicapées.

La règle de base la plus importante de ce cadre normatif est que « les droits, les besoins et les intérêts légitimes des personnes déplacées doivent être les considérations premières guidant toutes les politiques et décisions »<sup>189</sup>. Cela est particulièrement important pour trouver « des solutions durables » pour les personnes déplacées. Ces solutions consistent soit en un « retour librement consenti, dans la sécurité et la dignité, [...] dans leurs foyers ou leurs lieux de résidence habituels » soit en la « réinstallation volontaire dans une autre partie du pays » et doivent être basées sur des décisions libres et informées de chaque individu. Plus important encore, les autorités compétentes doivent établir les conditions propices et fournir les moyens nécessaires à cet effet<sup>190</sup>. Cela correspond également à la notion d'obligation positive des États, établie par le cadre international des droits de l'homme et la jurisprudence de la Cour européenne des droits de l'homme (CEDH), selon laquelle les États sont tenus non seulement de respecter, mais aussi d'assurer la protection des droits de leurs ressortissants.

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<sup>186</sup> Cohen (n 120); Aninia Nadig, 'Forced Migration and Global Processes - Report of the Eighth Conference of the International Association for the Study of Forced Migration, Chiang Mai, Thailand, 5-9 January 2003 Report' (2003) 16 *Journal of Refugee Studies* 361.

<sup>187</sup> IASC, 'Policy Paper: Protection of Internally Displaced Persons' (Inter-Agency Standing Committee 1999) 4.

<sup>188</sup> PDDI, principe 3.

<sup>189</sup> IASC (n 119) 11.

<sup>190</sup> PDDI, principe 28 (1).

De même, le droit d'être protégé contre le retour ou la réinstallation forcés dans tout lieu où leur vie, leur sécurité, leur liberté et/ou leur santé seraient en danger (principe 15 (d)) revêt une importance particulière dans le cas de la protection des PDI à la suite d'une catastrophe nucléaire. Après l'accident nucléaire de Fukushima, les autorités japonaises ont encouragé le retour des personnes évacuées en instituant des incitations financières, en menant des campagnes d'information et en supprimant progressivement l'aide aux personnes évacuées. Les Principes directeurs déconseillent spécifiquement ces pratiques en déclarant que « les conditions sur le site du déplacement qui peuvent pousser les PDI à accepter un retour ou une réinstallation dangereux doivent également être surveillées »<sup>191</sup> et « *en aucun cas* les PDI ne doivent être encouragées ou contraintes à retourner ou à se réinstaller dans des zones où leur vie, leur sécurité, leur liberté ou leur santé seraient en danger »<sup>192</sup>.

Bien que le cadre de protection des personnes déplacées soit extrêmement pertinent et utile pour protéger les VCN, il existe certaines lacunes en matière de protection compte tenu des besoins spécifiques de ces victimes. L'une de ces lacunes concerne la situation d'immobilité forcée. Le cadre normatif pour la protection des personnes déplacées s'est traditionnellement développé autour de la protection contre les déplacements arbitraires, un principe du droit humanitaire. Mais dans le cas de catastrophes environnementales telles que les accidents nucléaires, il faudrait précisément l'inverse, à savoir le droit à l'évacuation et à la réinstallation afin de se protéger de l'exposition aux substances toxiques, ce que cette thèse appelle « le droit au déplacement ». Cela rejoint la notion de « droit de se déplacer » avancée par certains spécialistes des migrations pour la protection des personnes « piégées » dans des catastrophes environnementales.<sup>193</sup>. En outre, d'autres aspects tels que l'évaluation des risques et les incertitudes scientifiques dans la définition des normes de radioprotection pour les catastrophes nucléaires ne sont pas couverts par les normes de protection pour les PDIs. Pour combler ces lacunes, la thèse explore d'autres cadres normatifs comme suit.

#### **b. Les VCN en tant que « déplacées environnementaux » et « personnes piégées dans l'environnement »**

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<sup>191</sup> IASC (n 119) 13.

<sup>192</sup> *ibid* 12. C'est nous qui soulignons.

<sup>193</sup> Black et autres (n 165) S39.

Les VCN sont également des personnes déplacées par un type spécifique de catastrophes qui impliquent une pollution de l'environnement. À cet égard, les personnes déplacées à la suite d'une catastrophe nucléaire relève de la catégorie de « déplacés environnementaux ». La protection des personnes contre les catastrophes environnementales doit aborder certaines questions spécifiques qui n'existent pas pour d'autres catastrophes : notamment la notion de « seuil » et le rôle de la science dans l'élaboration des normes de protection. En outre, comme nous l'avons déjà mentionné, les catastrophes environnementales produisent généralement un phénomène d'immobilité involontaire, ou de « déplacement sur place »<sup>194</sup> où les personnes sont piégées dans un environnement risqué et toxique contre leur volonté, faute de moyens ou d'assistance.

Les normes de protection internationale pour les déplacés environnementaux sont encore en phase de développement, mais certaines initiatives concrètes et influentes ont accéléré de manière significative le processus d'élaboration de normes au niveau mondial. L'une d'entre elles est l'Initiative Nansen (2012-2015), dirigée par l'ancien Représentant du Secrétaire général (RSG) pour les droits de l'homme des personnes déplacées dans leur propre pays, Walter Kälin. Une autre concerne le projet de Convention sur le statut des déplacés environnementaux (2008)<sup>195</sup>, proposé par le professeur Michel Prieur et son équipe de juristes spécialisés dans le droit de l'environnement à l'Université de Limoges (France). Bien que ces initiatives n'aient pas encore abouti à un texte normatif international, le concept de déplacés environnementaux développé par Walter Kälin pour l'initiative Nansen et leur statut de protection proposé par le projet de Convention sont extrêmement instructifs pour les normes de protection des VCN.

Comme mentionné précédemment, Kälin a proposé une approche innovante pour identifier les déplacés environnementaux, et notamment les différencier des autres personnes déplacées, ce qui a permis de clarifier leurs besoins spécifiques en vue d'une meilleure protection. Notamment, il a suggéré d'effectuer le test de « retournabilité » d'un individu selon les critères de la permissibilité (*permissibility*), la possibilité et la « raisonabilité » (*reasonableness*). Une fois identifiées comme des « déplacés environnementaux » par ce test, les personnes ne devraient pas être censées retourner et encore moins contraintes à retourner

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<sup>194</sup> Le terme a été introduit par Lubkemann (n 53).

<sup>195</sup> Michel Prieur and others, 'Draft Convention on the International Status of Environmentally- Displaced Persons' (2008) 12 Revue Européenne de Droit de l'Environnement 395, 397.



dans un endroit où leur vie ou leur intégrité physique serait en danger, ni rester sans une assistance adéquate des autorités compétentes leur permettant de reconstruire leur vie et de reprendre une vie normale.

Le projet de Convention sur le statut des déplacés environnementaux, quant à lui, est une proposition de texte normatif complet contenant des définitions, des principes de protection, des droits garantis et des dispositions institutionnelles pour ces déplacés. Dans la proposition, les déplacés environnementaux sont définis comme « des individus, des familles, des groupes et des populations confrontés à un bouleversement soudain ou insidieux de leur environnement qui met inévitablement en péril leurs conditions de vie, les obligeant à quitter, d'urgence ou à long terme, leur lieu de vie habituel » (article 2, paragraphe 2). Dans la note explicative du projet, Michel Prieur fait spécifiquement référence aux personnes évacuées à la suite d'une catastrophe nucléaire comme faisant partie des déplacés environnementaux couvertes par ce projet de Convention<sup>196</sup>.

L'un des aspects novateurs de la Convention est la garantie des droits des déplacés environnementaux, qui sont divisés en deux catégories : les droits avant le déplacement et les droits après le déplacement. En ce qui concerne les droits avant le déplacement, le projet de convention prévoit le droit à l'information et à la participation (article 9), le droit de voyager (c'est-à-dire le droit à l'évacuation/la réinstallation) (article 10) et le droit de refuser à voyager (c'est-à-dire le droit de rester à leurs propres risques) (article 11).<sup>197</sup> Les deux derniers droits sont en fait de nouveaux concepts de droits qui n'ont été abordés par aucun cadre normatif auparavant et qui sont particulièrement pertinents pour la protection des VCN. En effet, ces deux droits opposés abordent directement la question de l'évacuation volontaire et de l'immobilité involontaire qui ont tendance à se produire en cas de catastrophe nucléaire.

Le « droit de voyager »<sup>198</sup> fait d'ailleurs écho au « droit à l'évacuation », le concept défendu par les associations de victimes de Fukushima et la fédération japonaise des avocats agréés (JFBA) à la suite de l'accident nucléaire de Fukushima. La thèse utilisera ces nouveaux

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<sup>196</sup> Michel Prieur, "Projet de convention sur le statut international des personnes déplacées pour des raisons environnementales" (n 143)

<sup>197</sup> CRIDEAU-OMIJ (University of Limoges), 'Draft Convention on the Status of Environmentally Displaced Persons' (CIDCE 2018) Fourth Version.

<sup>198</sup> En fait, la troisième version (2013) du projet de convention utilisait le terme "droit au déplacement" au lieu de "droit de voyager". Voir CRIDEAU-OMIJ (University of Limoges) (n 163).

concepts de droits proposés par le projet de convention comme référence pour élaborer quelques idées sur un modèle de protection contre les catastrophes nucléaires.

### **c. Les VCN en tant que « victimes d'exposition aux radiations »**

Les VCN sont également victimes d'une exposition aux radiations ou de menaces d'exposition aux radiations. L'exposition à des substances toxiques met en jeu un large éventail de droits garantis par les instruments internationaux relatifs aux droits de l'homme, notamment le droit à la vie, au meilleur état de santé possible, à l'intégrité physique, à l'eau potable et à l'alimentation, à un logement et à un niveau de vie adéquats, à un environnement sûr et sain, aux droits culturels et aux droits de l'enfant. Selon le Rapporteur spécial sur les substances toxiques et les droits de l'homme, l'exposition aux substances dangereuses affecte les groupes les plus vulnérables de la population, tels que les personnes vivant dans la pauvreté, les minorités, les personnes handicapées, les femmes et les enfants<sup>199</sup>. Comme l'ont montré les catastrophes passées, c'est exactement le cas des victimes de catastrophes nucléaires.

Les victimes de l'exposition aux radiations sont également les victimes du non-respect par les États des principes du droit de l'environnement tels que le principe de prévention, le principe de précaution, les droits substantiels de l'environnement et l'équité intergénérationnelle. Selon le Rapporteur spécial, « la prévention, la précaution et la non-discrimination doivent être les principes primordiaux dans l'élaboration des politiques environnementales » et les États ont le devoir de « rechercher la pollution zéro et l'élimination des substances toxiques, plutôt que d'essayer simplement de minimiser, de réduire et d'atténuer l'exposition » aux substances dangereuses<sup>200</sup>.

Plus précisément, l'exposition aux rayonnements implique un nouveau concept de droit de l'homme, le droit à un environnement sûr et sain. Ce droit n'a pas encore été inscrit dans des instruments globaux contraignants, mais il est de plus en plus reconnu par les constitutions et les lois nationales, les instruments régionaux, la jurisprudence de la Cour européenne des droits de l'homme et la communauté internationale. Plus récemment, l'Assemblée générale des

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<sup>199</sup> Source : Site web du OHCHR <<https://www.ohchr.org/en/special-procedures/sr-toxics-and-human-rights/about-toxics-and-human-rights>> consulté le 28 juin 2022

<sup>200</sup> UNHRC, 'The Right to a Clean, Healthy and Sustainable Environment: Non-Toxic Environment - Report of the Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment' (Human Rights Council 2022) A/HRC/49/53 (12 January 2022) para 2.

Nations unies a adopté une résolution (76/300) en août juillet 2022, reconnaissant spécifiquement ce droit.<sup>201</sup>

Le droit à un environnement sûr et sain est constitué ou associé au « droit à un environnement non toxique »<sup>202</sup> ou au « droit de ne pas être soumis à la pollution, à la dégradation de l'environnement et aux activités qui portent atteinte à l'environnement, menacent la vie, la santé, les moyens de subsistance, le bien-être ou le développement durable à l'intérieur, à travers ou à l'extérieur des frontières nationales »<sup>203</sup>. C'est précisément ce que les victimes de Fukushima et les associations d'avocats ont demandé : « le droit de ne pas être exposé aux radiations ». Le droit d'éviter l'exposition aux rayonnements est constitué de deux droits : le droit à l'évacuation et le droit d'éviter l'exposition dans la vie quotidienne (par exemple, grâce aux mesures de radioprotection).<sup>204</sup> L'application pratique du droit à un environnement sûr et sain dans le contexte des catastrophes nucléaires impliquerait donc que les autorités compétentes garantissent ces droits aux personnes touchées.

Néanmoins, la mise en œuvre du droit à un environnement sûr, et plus précisément du droit de ne pas être soumis à un environnement pollué, est toujours confrontée à la question du « seuil ». Cette question est presque toujours ambiguë et politique, en particulier lorsque les substances concernées ont des enjeux industriels et économiques importants, comme le tabac, les pesticides et, typiquement, les radiations. La question du risque pour ces substances s'accompagne le plus souvent de controverses scientifiques où « l'information nécessaire peut être en grande partie entre les mains de la partie qui cause ou menace le dommage »<sup>205</sup>.

Dans ce contexte, comment peut-on élaborer des normes de protection qui seraient adéquates ou suffisamment protectrices ? L'un des moyens d'y parvenir est de se référer à des études environnementales indépendantes menées par des scientifiques non institutionnels, des universitaires et des organisations civiles, en plus de celles publiées par des institutions

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<sup>201</sup> AGNU, " Res 76/300 ; Le droit de l'homme à un environnement propre, sain et durable" (n 161)

<sup>202</sup> UNHRC (n 200).

<sup>203</sup> UNCHR, 'Human Rights and the Environment: Final Report Prepared by Mrs. Fatma Zohra Ksentini, Sepcial Rapporteur' (UN Commission on Human Rights, 6 July 1994) UN Doc E/CN.4/Sub.2/1994/9 Annex I (Principle 2, 5).

<sup>204</sup> Fukuda et Kawasaki (n 58); Fukuda (n 167).

<sup>205</sup> Citation de l'opinion dissidente du juge Weeramantry lors du réexamen de l'affaire des *essais nucléaires en 1995*. Voir *Demande d'examen de la situation conformément au paragraphe 63 de l'arrêt de la Cour du 20 décembre 1974 dans l'affaire des Essais nucléaires* (Nouvelle-Zélande c. France) (ordonnance) [1995] ICJ Rep 288 (opinion dissidente du juge Weeramantry 317), 342.

d'experts affiliées à l'État. Ensuite, le processus d'élaboration des normes doit impliquer des parties prenantes telles que des associations civiles et des tiers tels que des experts juridiques (e.g. le médiateur), en plus des experts institutionnels et des scientifiques<sup>206</sup>. De cette manière, le risque serait davantage défini en termes de menaces qu'en termes de pourcentages et de probabilités, ce qui permettrait de prendre en compte d'autres éléments tels que la justice et les principes de précaution, en plus des données scientifiques<sup>207</sup>. En effet, ces deux éléments - les avis scientifiques indépendants et la participation du public - seront la clé pour rendre opérationnel le droit à l'environnement en protégeant les individus contre les menaces environnementales graves telles que l'exposition aux rayonnements.

En outre, le principe de précaution, l'un des principes fondamentaux du droit de l'environnement, joue un rôle essentiel pour garantir le droit de l'individu à un environnement non toxique dans le contexte des controverses scientifiques. Selon ce principe, les actions préventives telles que l'évacuation de la population pour éviter l'exposition ne doivent pas être reportées en raison de « l'absence de certitude scientifique absolue » lorsqu'il existe des « menaces de dommages graves ou irréversibles »<sup>208</sup>. L'application de ce principe devient donc cruciale pour la protection des personnes en cas de catastrophe radiologique.

Enfin, les victimes d'exposition aux rayonnements souffrent souvent d'une détresse psychologique liée au fait d'avoir été exposées ou « contaminées ». À cet égard, la jurisprudence établie par les tribunaux français constitue une référence intéressante. Le concept de préjudice d'anxiété a été développé en France pour soulager les victimes d'une exposition à « une substance nocive ou toxique générant un risque élevé de développer une pathologie grave » qui souffrent de détresse psychologique associée à la crainte de développer des maladies à la suite d'une telle exposition<sup>209</sup>. Les victimes des accidents nucléaires de Fukushima et de Tchernobyl ainsi que les survivants de la bombe atomique souffrent généralement de ce préjudice particulier. L'aspect des dommages psychologiques associés à l'exposition constitue donc une partie

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<sup>206</sup> Masashi Shirabe, Reiko Hasegawa and Christine Fassert, 'From Risk Communication to Participatory Radiation Risk Assessment' [2015] Fukushima Global Communication Programme Working Paper Series. No.21, December 2015. United Nations University, Tokyo. <<https://i.unu.edu/media/ias.unu.edu-en/news/12850/FGC-WP-21-FINAL.pdf>> accessed 20 May 2019.

<sup>207</sup> Francis Chateauraynaud and Didier Torny, *Les sombres précurseurs. Une sociologie pragmatique de l'alerte et du risque* (Editions de l'École des hautes études en sciences sociales 2000); Soraya Boudia and Nathalie Jas, *Powerless Science?: Science and Politics in a Toxic World*, vol 2 (Berghahn Books 2014).

<sup>208</sup> Déclaration de Rio (n 136) Principe 15.

<sup>209</sup> Voir notamment Cass. Soc., 11 sept. 2019, n°17-24.879 à 17-25.623.

importante de la protection des victimes de radiations, que la thèse tente d'aborder dans la proposition de normes de protection ci-dessous.

#### **d. Les VCN en tant que « victimes de violations des droits de l'homme »**

Les VCN sont également victimes d'un large éventail de violations des droits de l'homme. Dans le cadre du régime des droits de l'homme, l'État est le principal détenteur d'obligations positives et négatives en matière de la protection des droits de toutes les personnes relevant de sa juridiction<sup>210</sup>. L'État peut également être tenu responsable des violations des droits de l'homme et des abus commis par des acteurs non étatiques, tels que les entreprises et les groupes paramilitaires, s'il ne fait pas tout ce qui est en son pouvoir pour les empêcher de se produire ou pour en protéger la population. Dans les situations de catastrophe telles que les accidents nucléaires, la jurisprudence de la CEDH a clairement établi que l'État avait l'obligation positive de prendre les mesures législatives et administratives nécessaires et suffisantes pour pallier les menaces pesant sur la vie des personnes de ces activités « potentiellement dangereuses »<sup>211</sup>. Dans le contexte des catastrophes nucléaires, cette obligation positive pourrait impliquer la prise de mesures de protection préventives telles que l'évacuation et la réinstallation permanente de la population touchée afin d'éliminer les menaces que l'exposition aux radiations fait peser sur la vie.

En tant que victimes de violations des droits de l'homme, les VCN peuvent déposer des plaintes non seulement devant les tribunaux nationaux, mais aussi dans le cadre du mécanisme de recours des instances internationales et les tribunaux régionaux des droits de l'homme. Dans le cadre du mécanisme de recours des Nations unies, les individus peuvent envoyer des plaintes, appelées « communications », aux procédures spéciales du Conseil des droits de l'homme ou aux procédures de plainte de neuf organes de traités pour qu'elles fassent l'objet d'une enquête. Les limites du système de recours des instances internationales sont sa faible applicabilité et son accessibilité limitée. Les procédures de plaintes individuelles des Nations unies ne produisent en effet que des recommandations non contraignantes pour les États.

Les particuliers peuvent également déposer une plainte auprès des cours régionales des droits de l'homme, notamment la Cour européenne des droits de l'homme, qui est la plus

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<sup>210</sup> OHCHR Europe, 'Making A Difference: An Introduction to Human Rights' (2018) 6.

<sup>211</sup> *Öneryıldız v. Turkey* App no 48939/99 (ECtHR, 30 November 2004), para 60.

accessible d'entre elles pour les plaintes individuelles,<sup>212</sup> si la violation implique l'un des États membres du Conseil de l'Europe, qui sont donc parties à la Convention européenne des droits de l'homme.<sup>213</sup> Contrairement au mécanisme de recours des Nations unies, les décisions de la Cour sont juridiquement contraignantes pour les États, et leur mise en œuvre est également contrôlée par le Comité des ministres du Conseil de l'Europe. Toutefois, la Cour européenne n'est pas accessible aux victimes en dehors de la région européenne. Les victimes de l'accident de Fukushima n'ont donc pas eu accès à la Cour européenne des droits de l'homme, mais seulement au mécanisme des Nations unies. Ainsi, comme nous l'avons vu, le gouvernement japonais n'a pas remédié aux problèmes soulevés par les différents rapports et « communications » publiés par les mécanismes de monitoring et de recours de ces instances des droits de l'homme et n'a pas eu à en subir les conséquences.

#### **e. Les VCN en tant que « victimes de catastrophes »**

Les VCN appartiennent également à un groupe plus large de « victimes de catastrophes ». Selon le cadre international de la Réduction des Risques de Catastrophe (RRC), le terme « catastrophe » est défini comme suit :<sup>214</sup>

une grave perturbation du fonctionnement d'une communauté ou d'une société, à quelque échelle que ce soit, due à des phénomènes dangereux interagissant avec des conditions d'exposition, de vulnérabilité et de capacité, entraînant un ou plusieurs des éléments suivants : pertes et impacts humains, matériels, économiques et environnementaux.

D'après la définition ci-dessus, les accidents nucléaires peuvent être en effet considérés comme une de ces « catastrophes ».

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<sup>212</sup> Il existe actuellement trois cours régionales des droits de l'homme dans le monde : la Cour européenne des droits de l'homme, la Cour interaméricaine des droits de l'homme et la Cour africaine des droits de l'homme et des peuples. Toutefois, la Cour interaméricaine n'accepte pas directement les plaintes individuelles et ne peut être saisie que par l'intermédiaire de la Commission interaméricaine des droits de l'homme. Quand à la Cour africaine, les plaintes des particuliers et des ONG sont également acheminées par la Commission africaine des droits de l'homme et des peuples, mais certains États membres acceptent la compétence de la Cour pour les plaintes individuelles (actuellement, 9 des 54 États membres de la Convention)

<sup>213</sup> Il y avait 46 États membres jusqu'à la décision du Comité des Ministres du 16 mars 2022 qui en a exclu la Fédération de Russie. Voir le site du Conseil de l'Europe <<https://www.coe.int/en/web/portal/-/the-russian-federation-is-excluded-from-the-council-of-europe>> consulté le 29 juin 2022.

<sup>214</sup> UNDRR, 'Words Into Action - Disaster Displacement : How to Reduce Risk, Address Impacts and Strengthen Resilience : Annexe III : Terminologie' (Bureau des Nations Unies pour la réduction des risques de catastrophes 2019)

Dans le système des Nations unies, le terme « catastrophe » désigne généralement les désastres naturels ou ceux causés par l'homme, tels que les accidents industriels, et se distingue des conflits et de la violence généralisée. En tant que telle, la gestion des « catastrophes » a longtemps été considérée comme une question de juridiction nationale et a été coordonnée par le Bureau des Nations Unies pour la réduction des risques de catastrophes (UNDRR) au lieu du cadre humanitaire et de migration forcée opéré par le Bureau de Coordination des Affaires Humanitaires (OCHA), l'HCR, l'IOM, etc. Alors que l'objectif premier de ces dernières est de garantir les droits des personnes en cas de catastrophe, celui du cadre de la RRC est davantage axé sur le renforcement de la capacité des États à se préparer aux catastrophes et à en atténuer les effets. Traditionnellement, le cadre de la RRC a concentré ses efforts sur la protection non seulement des « personnes se trouvant sur son territoire », mais aussi des « infrastructures et autres biens nationaux » contre les effets des catastrophes<sup>215</sup>. Par la suite, ses textes normatifs ont régulièrement utilisé des termes collectifs tels que « populations » et « public », comme le cadre normatif relatif à la régulation nucléaire, au lieu des termes « individus » et « personnes » régulièrement utilisés dans les textes normatifs fondés sur les droits, et n'ont guère fait référence aux droits de l'homme.

Cette tendance a connu un changement radical au milieu des années 2010 lorsque le Cadre de Sendai pour la réduction des risques de catastrophe 2015-2030<sup>216</sup>, le principal document d'orientation du cadre de RRC, a fixé son objectif comme étant de « protéger les personnes et leurs biens, leur santé, leurs moyens de subsistance et leurs actifs productifs, ainsi que les actifs culturels et environnementaux, tout *en promouvant et en protégeant l'ensemble des droits de l'homme* »<sup>217</sup>. De plus, pour la première fois, le document a clairement identifié les catastrophes nucléaires comme les risques couvertes par ce Cadre.<sup>218</sup> La même année, le Conseil des droits de l'homme a corroboré ce point en déclarant que les obligations de l'État en matière de sauvetage, de secours et de réhabilitation en cas de catastrophe devraient être conformes aux droits de l'homme dans les situations post-catastrophe, tout comme dans les

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<sup>215</sup> UNISDR, 'Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters' (2005) 4.

<sup>216</sup> UNDRR, 'Sendai Framework for Disaster Risk Reduction 2015-2030' (2015).

<sup>217</sup> *ibid* para 19. C'est nous qui soulignons.

<sup>218</sup> *ibid* para 15

situations post-conflit<sup>219</sup>. Enfin, le Projet d'article sur la protection des personnes en cas de catastrophe<sup>220</sup> proposé par la Commission du droit international (CDI) des Nations unies en 2016 a également placé la protection des droits de l'homme au cœur de l'instrument, en établissant fermement que « les personnes touchées par des catastrophes ont droit au respect et à la protection de leurs droits de l'homme conformément au droit international » (article 5).

#### **f. Les VCN en tant que « population affectée par un accident nucléaire »**

Les VCN sont également la « population affectée » par les accidents nucléaires, formule typiquement utilisée dans le cadre de sûreté nucléaire et de radioprotection.<sup>221</sup> L'AIEA et la CIPR ont élaboré au fil des ans un large éventail de normes de sûreté, toutes non contraignantes par nature ; cependant celles qui concernent spécifiquement la protection de la population en cas de catastrophe nucléaire sont très peu nombreuses, par rapport aux normes techniques élaborées pour la sûreté des réacteurs et des travailleurs.

Dans ce cadre, les victimes de catastrophes sont souvent traitées comme une « masse », elles sont qualifiées de « people » et de « public » comme dans l'ancien cadre de RRC. Le terme « individus » est utilisé presque exclusivement dans le cadre de l'exposition aux rayonnements. La protection du « public » est alors mise en œuvre sur la base des principes utilitaires de justification et d'optimisation, qui visent à maximiser la marge de bénéfice par rapport au mal en appliquant l'analyse coût-bénéfice et le principe ALARA. Le cadre nucléaire donne la priorité aux intérêts collectifs (souvent ceux de l'État) sur les droits individuels, en garantissant « un bénéfice global au sens le plus large pour la société et donc pas nécessairement pour chaque

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<sup>219</sup> UNHRC, 'Final research-based report of the Human Rights Council Advisory Committee on best practices and main challenges in the promotion and protection of human rights in post-disaster and post-conflict situations' (UN Human Rights Council 2015) UN Doc A/HRC/28/76 21.

<sup>220</sup> CDI, 'Projet d'articles sur la protection des personnes en cas de catastrophe' (Commission du droit international des Nations unies 2016) (A/71/10) Rapport de la Commission du droit international à sa soixante-huitième session (para 48)

<sup>221</sup> Les recommandations de la CIPR originales en anglais utilisent le mot « people ». Mais en version française, « people » est traduit comme « personnes » qui n'a pas exactement la même portée (i.e. individu versus population en masse).



individu ». <sup>222</sup> Cette politique aboutit souvent à une situation où les droits des plus vulnérables de la société sont bafoués au nom de l'intérêt général et des intérêts collectifs. Il se trouve que ces textes normatifs ne mentionnent ou ne se réfèrent pratiquement jamais aux principes des droits de l'homme.

La protection de la vie et de la santé humaines est également une notion relative, plutôt qu'essentielle, dans le cadre du régime nucléaire <sup>223</sup>. L'objectif premier de la radioprotection est défini comme la contribution à « un niveau approprié de protection des personnes et de l'environnement » <sup>224</sup> sans limiter indûment les opérations et les activités nucléaires <sup>225</sup>. C'est ce que cette thèse appelle un système de protection oscillatoire ou conditionnel, dans lequel la vie et la santé humaines sont constamment mises en balance avec la poursuite des activités nucléaires. En ce qui concerne la protection humaine, le régime de sûreté nucléaire et de radioprotection est le moins protecteur de tous les cadres normatifs internationaux existants qui s'appliqueraient aux catastrophes nucléaires. En tant que tel, la thèse se réfère à ce régime uniquement comme point de départ ou comme contrepoint pour développer des normes de protection modèles pour les catastrophes nucléaires ci-dessous, en le complétant largement avec tous les autres cadres normatifs énumérés ci-dessus.

### 3. Proposition de définition de la « victime d'une catastrophe nucléaire »

Compte tenu des éléments annoncés précédemment, la thèse définit les VCN comme suit :

les personnes déplacées, involontairement immobilisées ou affectées par une catastrophe nucléaire, qui ont été ou risquent d'être exposées à des matières radioactives rejetées par la catastrophe, dont les doses dépassent la limite de dose annuelle pour le public (1 mSv/an), et/ou dont la vie, la santé, le cadre de vie, les biens,

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<sup>222</sup> ICRP, 'The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.' (n 35) 90.

<sup>223</sup> Ce point a été bien démontré par les travaux de Paul Jobin, sociologue (Université Paris Diderot). Voir Paul Jobin, 'Qui est protégé par la radioprotection ?' [2012] Ebisu. Études japonaises 121; Paul Jobin, 'Fukushima ou la radioprotection, retour sur un terrain interrompu' in Annie Thebaud-Mony and others (eds), *Santé au travail* (La Découverte 2012).

<sup>224</sup> ICRP, 'The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103.' (n 35) 41. C'est nous qui soulignons.

<sup>225</sup> IAEA and others, 'Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards' (IAEA 2014) GSR Part 3 ix.

la vie privée et familiale ou la communauté sont mis en danger ou endommagés par les effets de la catastrophe

Il convient de préciser que les « victimes de catastrophes nucléaires » ne sont pas toujours des « victimes d'exposition aux radiations », bien qu'elles le soient la plupart du temps. Certaines personnes peuvent échapper à l'exposition en étant loin de chez elles au moment de l'accident ou en évacuant leur domicile avant que le nuage radioactif ne l'atteigne, mais elles deviennent les victimes du déplacement, perdant leur maison, leurs biens, leur emploi, leur école et leur vie communautaire en raison de la contamination radiologique de leur milieu de vie. Les normes de protection des VCN doivent avant tout s'appliquer aux personnes qui ont été exposées, ou qui risquent d'être exposées, aux radiations émises lors de la catastrophe, mais elles doivent également prévoir des mesures pour les victimes non exposées.

Cette thèse doit également préciser ce que l'on entend par « victimes de l'exposition aux rayonnements ». C'est ici qu'intervient la question des niveaux de dose. Bien que ce point sera exploré en détail dans la section ci-dessous sur les normes de protection, la thèse considère que toutes les personnes exposées ou menacées d'être exposées à des doses effectives de rayonnement qui dépassent la limite d'exposition publique de 1 mSv/an pour les expositions externes et internes, à l'exclusion des expositions naturelles et médicales, peuvent être considérées comme des « victimes de l'exposition aux rayonnements ». Cette limite de dose publique a été déterminée en intégrant les connaissances scientifiques et leur incertitude, ainsi que le compromis politique et la précaution. En conséquence, elle représente la meilleure norme de dose actuelle, viable sur le plan opérationnel et moral et offrant une protection adéquate, qui devrait s'appliquer universellement en toutes circonstances, avec ou sans catastrophe nucléaire, afin de protéger la santé et la vie des personnes. La thèse souligne également l'importance de prendre en compte les doses d'exposition interne dans l'estimation des doses individuelles, car elles deviennent souvent une voie importante d'exposition aux rayonnements, ce qui a été systématiquement ignoré par le gouvernement japonais dans le traitement des victimes de Fukushima ainsi que des survivants de la bombe atomique.

Enfin, la thèse aborde la question de l'identification objective et subjective des « victimes », ce que Yannick Barthe a appelé le processus de « victimisation » par lequel « un individu se définit et est défini par d'autres comme une "victime" ». <sup>226</sup> D'après les expériences

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<sup>226</sup> Yannick Barthe, *Les Retombées du passé: Le paradoxe de la victime* (Seuil 2017) 10.

des catastrophes d'Hiroshima/Nagasaki, de Tchernobyl et de Fukushima, les « victimes de la catastrophe nucléaire » ont toujours été identifiées par les autorités dans des groupes fondés sur l'espace géographique, délimités en appliquant des critères de nature purement technique (par exemple, les doses de radiation dans l'air) et administrative (par exemple, les limites de la municipalité). Ce processus d'identification « stérilisé » a certes facilité la reconnaissance de « victimes » et leur assistance rapide, mais il a également laissé une énorme lacune en matière de protection pour les autres personnes dans le besoin, car cette identification « objective » et collective, transposée dans les lois et les ordonnances gouvernementales, correspond rarement à l'identification subjective et individuelle par les victimes elles-mêmes.

L'auto-identification des victimes présente également une certaine ambivalence. Par exemple, Barthe a montré que les vétérans français ayant participé aux essais de la bombe atomique en Polynésie étaient partagés entre une revendication de reconnaissance de leur statut de victime, associée à l'image négative d'être des « victimes », et une autre revendication de reconnaissance de leur sacrifice et des services rendus à la France en tant que vétérans militaires, associée à la fierté d'en faire partie<sup>227</sup>. Une contradiction similaire a été observée chez les victimes de la catastrophe de Fukushima. Nombre d'entre elles ont adopté une position ambiguë quant à leur reconnaissance en tant que victimes de l'exposition aux radiations. Le terme *hibakusha*, « personne exposée aux radiations », utilisé pour désigner les survivants de la bombe A, a été soigneusement évité dans l'identification des victimes de Fukushima, non seulement par les autorités, mais aussi par les victimes de la catastrophe elles-mêmes. De nombreuses victimes de Fukushima n'ont pas voulu s'identifier comme *hibakusha* en raison de l'image négative associée à ce terme (c'est-à-dire le fait d'être « condamné » à des maladies radio-induites dans le futur) et de la discrimination qu'elles pourraient subir en conséquence<sup>228</sup>, alors qu'elles revendiquent également des dommages, en particulier le préjudice de l'anxiété, liés à l'exposition aux radiations.

Compte tenu de ces éléments, la reconnaissance des victimes de catastrophes nucléaires devrait idéalement être réalisée en deux étapes par les autorités compétentes : l'identification du groupe sur la base des zones affectées, des doses et des limites administratives

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<sup>227</sup> *ibid.*

<sup>228</sup> Au cours des entretiens menés à Fukushima, de nombreuses mères de victimes ont exprimé leur inquiétude quant au fait que leurs filles soient discriminées par la famille du futur fiancé en raison de leur statut de victimes de l'exposition aux radiations.

devrait être complétée par la détermination du statut individuel des victimes à l'aide des critères élaborés en consultation avec les victimes et les experts juridiques. Ce dernier processus doit être mis en œuvre par les autorités compétentes une fois que l'accident ou la situation d'urgence est résolu(e) ou stabilisé(e), afin que les victimes n'aient pas besoin de recourir aux tribunaux, « le processus de victimisation secondaire »<sup>229</sup>, dans le cadre duquel les victimes peuvent également devenir les victimes de la non-reconnaissance.

## **B : Proposition de principes de protection**

Cette thèse de doctorat propose trois grands principes de protection qui doivent guider toutes les actions de protection en cas de catastrophe nucléaire : l'approche fondée sur les droits de l'homme (1), le principe de précaution (2) et le « droit au déplacement » garanti (3). Ils sont respectivement issus des principes des droits de l'homme et du droit de l'environnement et du lien entre ces deux cadres juridiques.

### **1. Approche fondée sur les droits de l'homme (HRBA : Human Rights-Based Approach)**

Hormis le régime nucléaire, tous les régimes normatifs internationaux relatifs aux catastrophes adoptent une approche fondée sur les droits de l'homme (HRBA) et font de la protection des droits de l'homme leur objectif premier. En outre, de nombreux rapports publiés par les institutions des Nations unies chargées des droits de l'homme ont vivement recommandé au gouvernement japonais d'adopter l'approche fondée sur les droits, plutôt que le cadre nucléaire, dans la réaction et la protection contre l'accident nucléaire de Fukushima.<sup>230</sup> Il est temps que la gestion des catastrophes nucléaires se « normalise » et s'aligne sur le reste du cadre international de protection contre les catastrophes.

Comme indiqué précédemment, les catastrophes nucléaires mettent particulièrement en cause les droits de l'homme suivants : les droits à la vie, au meilleur état de santé possible, à l'intégrité physique et mentale, à la vie privée et familiale, à l'eau potable et à l'alimentation, à

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<sup>229</sup> Barthe (n 226) 107.

<sup>230</sup> UN Committee on Economic, Social and Cultural Rights, 'Concluding Observations on the Third Periodic Report of Japan, Adopted by the Committee at Its Fiftieth Session (29 April-17 May 2013)' (10 June 2013) UN Doc E/C.12/JPN/CO/3; "Rapport du rapporteur spécial sur le droit qu'a toute personne de jouir du meilleur état de santé physique et mentale possible, Anand Grover" (n 67).

un logement et à un niveau de vie adéquats, à l'information et à la participation, à un environnement sûr et sain, les droits culturels, les droits collectifs et les droits de l'enfant, de la femme et des personnes handicapées. En plus de ces droits classiques, cette thèse propose un nouveau concept de droit, le droit au « déplacement » (ou à la mobilité), qui joue un rôle crucial dans la protection des victimes de catastrophes nucléaires.

Le principe de l'HRBA proposé dans cette thèse est soutenu et constitué par cinq sous-principes : la protection universelle (a), l'obligation positive des États (b), la protection des groupes vulnérables (c), la non-discrimination (d), et l'information et la participation (e).

### **a. Protection universelle (non conditionnelle)**

Comme le montre cette recherche doctorale, les normes de protection actuelles appliquées aux catastrophes nucléaires n'offrent qu'une protection conditionnelle et partielle. Les mesures de protection ne sont mises en œuvre qu'après avoir atteint certains critères de dose et certaines situations d'exposition, ainsi qu'après avoir pris en compte l'analyse coût-bénéfice et les considérations socio-économiques.

En adoptant l'approche fondée sur les droits de l'homme, la réponse aux catastrophes nucléaires offre une protection universelle, au lieu d'une protection conditionnelle, à toutes les personnes touchées par une catastrophe nucléaire. En particulier, elle garantit « une protection qui ne dépend pas des intérêts ou des politiques de l'État »<sup>231</sup>.

On dit que les droits de l'homme ont des effets dits « *trumping* » dans notre société, préemptant d'autres intérêts et préférences sur lesquels l'État agit au nom du bien commun.<sup>232</sup> Selon Dworkin, certains droits constitutionnels établis en tant que droits fondamentaux ou politiques constituent des droits moraux à l'encontre du gouvernement et « un atout pour le type d'argument de compromis qui justifie normalement l'action politique »<sup>233</sup>. Ces droits fondamentaux ne peuvent être sacrifiés dans le seul but de garantir un avantage global à la communauté ou à la société, et « la société devrait supporter les coûts collectifs qui en

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<sup>231</sup> Noëlle NR Quénivet and Catia Lopes, 'Individuals as Subjects of International Humanitarian Law and Human Rights Law' in Roberta Arnold and Noëlle NR Quénivet (eds), *International humanitarian law and human rights law: towards a new merger in international law* (Martinus Nijhoff Publishers 2008) 204.

<sup>232</sup> Ronald Dworkin, *Taking Rights Seriously* (Harvard University Press 1977); cited by Dinah Shelton, 'What Happened in Rio to Human Rights?' (1992) 3 *Yearbook of International Environmental Law* 75.

<sup>233</sup> Ronald Dworkin, *Is Democracy Possible Here?: Principles for a New Political Debate* (Princeton University Press 2008) 31.

découlent »<sup>234</sup>. Or, le régime nucléaire prône une approche opposée, mettant essentiellement les droits des individus en balance avec d'autres intérêts, souvent des intérêts économiques ou industriels d'entreprises privées ou publiques.<sup>235</sup> C'est pourquoi la proposition normative de l'équipe de juristes environnementaux dirigée par Michel Prieur comprend une disposition spécifique qui précise que « la recherche de la rentabilité ne doit en aucun cas l'emporter sur la sécurité », ce qui signifie que « la protection de la santé doit être privilégiée par rapport aux intérêts économiques en évitant l'analyse des coûts-bénéfices »<sup>236</sup>.

Toutefois, les droits de l'homme ne sont pas exempts d'une recherche d'équilibre, notamment par le biais du principe de proportionnalité qui a été bien établi dans la jurisprudence de la Cour de justice de l'Union européenne (CJUE), de la Cour européenne des droits de l'homme (CEDH) et d'autres juridictions. Dans la jurisprudence de la CEDH, la proportionnalité est souvent exprimée comme la recherche d'un « juste équilibre » entre l'intérêt général de la communauté et la protection des droits individuels, dans lequel les États sont autorisés à exercer une certaine « marge d'appréciation ».<sup>237</sup> En fait, cet exercice d'équilibre fait allusion au principe de justification et d'optimisation dans le cadre nucléaire. La différence est que le principe de justification donne systématiquement la priorité aux « intérêts collectifs » sur les « droits individuels », tandis que le principe de proportionnalité ne favorise pas l'un par rapport à l'autre et s'adapte aux circonstances. Pour la CEDH, par exemple, il intervient le plus

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<sup>234</sup> Ronald Dworkin, *Taking Rights Seriously* (n 232) 198.

<sup>235</sup> Le récent rapport du rapporteur spécial sur le droit à un environnement sûr et sain indique clairement que "la santé, la qualité de vie et un large éventail de droits de l'homme sont compromis apparemment pour la "croissance", le "progrès" ou le "développement", mais en réalité pour servir des intérêts privés". Voir UNHRC, 'The Right to a Clean, Healthy and Sustainable Environment: Non-Toxic Environment - Report of the Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment' (n 200) para 28.

<sup>236</sup> La proposition normative a été faite par un groupe de juristes environnementaux français et japonais et soumise à la 3<sup>rd</sup> Conférence mondiale de l'UNDRR qui s'est tenue à Sendai en 2015. Voir CIDCE (Limoges) and Waseda University Institute of Comparative Law, 'Recommendations on Human Rights and Medical Management in Nuclear Disasters' (2015) (Considering that: 7) <[https://cidce.org/wp-content/uploads/2016/08/Recommendations-on-human-rights-and-medical-management-in-nuclear-disasters\\_14.III\\_2017\\_EN.pdf](https://cidce.org/wp-content/uploads/2016/08/Recommendations-on-human-rights-and-medical-management-in-nuclear-disasters_14.III_2017_EN.pdf)> accessed 9 April 2021.

<sup>237</sup> *Lopez Ostra c. Espagne*, App no. 16798/90 (CEDH, 9 décembre 1994) para 51 ; *Ilascu et autres c. Moldavie et Russie*, App no. 48787/99 (CEDH, 8 juillet 2004) ; both cited by Jean-François Akandji-Kombe, 'Positive Obligations under the European Convention on Human Rights: A Guide to the Implementation of the European Convention on Human Rights' (Council of Europe 2007) Human Rights Handbooks, No.7.

souvent dans le respect de certains droits assortis de clauses limitatives, tels que le droit à la vie privée et familiale (article 8) et la liberté d'expression (article 10).<sup>238</sup>

Plus important encore, certains droits sont considérés comme « fondamentaux »<sup>239</sup> ou « non dérogoires »<sup>240</sup>, ce qui permet d'échapper à l'analyse coût-bénéfice ou au test d'équilibre. Le droit à la vie est l'un des exemples qui pourraient être appliqués en cas de catastrophe nucléaire. Par exemple, dans le Pacte international relatif aux droits civils et politiques, ces droits doivent être protégés même « [d]ans le cas où un danger public exceptionnel menace l'existence de la nation » (article 4). De même, pour d'autres droits, en particulier le droit à la santé et le droit à un environnement sûr, la jurisprudence de la CJUE et de la CEDH a expressément déclaré à plusieurs reprises la primauté de ces droits sur les intérêts économiques.<sup>241</sup>

La réponse aux catastrophes nucléaires fondée sur la protection des droits fondamentaux des individus ne devrait pas être conditionnée par les intérêts politiques et économiques des États et des régions, tels que la survie administrative et économique du territoire et le maintien de l'industrie nucléaire.

#### **b. Obligation positive du titulaire de devoirs (l'État)**

Dans le cadre de l'HRBA, les États sont clairement identifiés comme les principaux détenteurs d'obligations spécifiques en matière de respect, de protection et de mise en œuvre des droits de l'homme de toutes les personnes relevant de leur juridiction, c'est-à-dire les

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<sup>238</sup> Dans le cas de la Convention européenne des droits de l'homme, les autres droits assortis de clauses de limitation comprennent le droit à la liberté de religion (article 9), la liberté de réunion et d'association (article 11).

<sup>239</sup> La notion de droits "fondamentaux" découle des droits constitutionnels établis dans le cadre de la juridiction nationale et, par conséquent, le contenu exact de ces droits diffère d'un pays à l'autre. Pour plus de détails, voir Theodor Meron, 'On a Hierarchy of International Human Rights' (1986) 80 *American Journal of International Law* 1.

<sup>240</sup> Les droits non dérogoires sont définis par les principaux instruments relatifs aux droits de l'homme, mais ils ne sont pas tous identiques. Par exemple, le Pacte international relatif aux droits civils et politiques définit les droits non dérogoires comme suit : le droit à la vie (article 6), l'interdiction de la torture (article 7), l'interdiction de l'esclavage (article 8), etc.

<sup>241</sup> Pour les décisions de la CJUE, par exemple, Cases T-70/99 *Alpharma v Council* [2002] ECR II-3495; Case T-13/99 *Pfizer Animal Health v Council* [2002] ECR II-3305; T-74/00 *Artegodan v Commission* (Joined Cases T-74/00, T-76/00, T-83/00, T-84/00, T-85/00, T-132/00, T-137/00 and T-141/00, etc. Pour les décisions de la Cour européenne des droits de l'homme, voir *Băcilă c. Roumanie* App no. 19234/04 (30 March 2010) et *Di Sarno et autres c. Italie* App no 30765/08 (ECtHR, 10 January 2012)

titulaires de droits.<sup>242</sup> Cette notion qui a été largement développée par les instances internationales des droits de l'homme telles que le Comité des droits de l'homme et la CEDH, est également appelée *obligations positives et négatives de l'État*. Alors que l'obligation négative consiste à s'abstenir d'interférer ou de restreindre la jouissance des droits de l'homme des « titulaires de droits », l'obligation positive signifie que les autorités de l'État sont tenues de prendre des mesures positives et proactives pour prévenir la violation ou l'abus par d'autres acteurs et pour faciliter et garantir la jouissance de leurs droits.

En cas de catastrophe nucléaire, les États ont donc une obligation positive, notamment en vertu du droit à la vie (article 6 du Pacte international relatif aux droits civils et politiques ; article 2 de la Convention européenne des droits de l'homme), de prendre toutes les mesures pratiques et appropriées pour assurer la protection effective des citoyens.<sup>243</sup> Cela implique que l'État « mette en place un cadre législatif et administratif » pour prévenir les menaces, fournir les informations nécessaires et « assurer, par tous les moyens à sa disposition, une réponse adéquate » pour sauvegarder ce droit.<sup>244</sup> De même, les États ont l'obligation positive de prendre des mesures « raisonnables et appropriées »<sup>245</sup> ou « appropriées et suffisantes »<sup>246</sup> pour garantir d'autres droits, notamment le droit à la vie privée et familiale, conformément aux décisions de la CEDH.<sup>247</sup>

En cas d'urgence nucléaire, cela se traduirait, entre autres, par l'ordre d'évacuer la population<sup>248</sup> et de prendre des compléments d'iode sur la base d'un principe de précaution, et dans la phase post-accidentelle, par la délimitation de la zone interdite et le relogement à long terme des résidents avec suffisamment de précautions.

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<sup>242</sup> OHCHR Europe (n 210) 6.

<sup>243</sup> Les commentaires du Comité des droits de l'homme (CCPR) et la jurisprudence de la Cour européenne des droits de l'homme l'ont bien établi. Pour les premiers, voir Manfred Nowak, *UN Covenant on Civil and Political Rights: CCPR Commentary* (2nd revised edition, NP Engel 2005).

<sup>244</sup> *Öneryıldız c. Turquie*, App no 48939/99 (CEDH, 30 novembre 2004) para 89-91

<sup>245</sup> *Lopez Ostra c. Espagne*, requête n° 16798/90 (Cour européenne des droits de l'homme, 9 décembre 1994), para 51.

<sup>246</sup> *Ilascu et autres c. Moldavie et Russie*, requête n° 48787/99 (Cour européenne des droits de l'homme, 8 juillet 2004)

<sup>247</sup> *Akandji-Kombe* (n 237).

<sup>248</sup> On pourrait éventuellement s'abstenir d'évacuer les personnes très âgées qui ne le souhaiteraient pas (consentement éclairé).



### **c. Protection des groupes vulnérables**

Dans le cadre des droits de l'homme, une attention particulière doit être accordée à la protection des personnes vulnérables. Dans les situations de catastrophe, ces segments de la population deviennent encore plus vulnérables en raison de leur statut social, économique, physique, politique, culturel ou ethnique. Ces groupes comprennent les femmes, les enfants, les personnes âgées, les personnes handicapées, les populations autochtones, les minorités ethniques, les résidents étrangers et les personnes LGBTI.<sup>249</sup>

En cas de catastrophe nucléaire ou radiologique, les enfants et les femmes enceintes (plus exactement : les fœtus qu'elles portent) doivent faire l'objet d'une attention et de soins particuliers en raison de leur sensibilité accrue aux effets des rayonnements par rapport à d'autres groupes. Cela a déjà été établi lors de catastrophes antérieures avec notamment la promulgation des lois sur Tchernobyl et celle de la loi sur l'aide aux enfants lors de l'accident de Fukushima. Ces deux lois nationales prévoyaient un statut de protection spécial pour les enfants (et les femmes enceintes dans le cas de Fukushima) en reconnaissant leur vulnérabilité spécifique aux effets des radiations. Bien que les deux dispositifs n'aient pas été correctement mis en œuvre, en raison de difficultés financières dans le premier cas et d'un manque de volonté politique dans le second<sup>250</sup>, ils ont créé un précédent important et un modèle de protection juridique de ces groupes vulnérables en cas de catastrophe nucléaire.

En outre, une attention particulière doit être accordée à d'autres groupes vulnérables en raison de leur situation physique et sociale. Par exemple, les femmes sont en général plus sensibles aux effets des rayonnements que les hommes, en raison de leur taille. Les normes de restriction des doses ont été élaborées sur la base du modèle anatomique de l'« homme standard », un homme caucasien âgé de 20 à 30 ans, pesant 70 kg, mesurant 170 cm, vivant dans un climat dont la température moyenne est de 10-20 et dont le mode de vie est celui de

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<sup>249</sup> UNHRC, 'Final research-based report of the Human Rights Council Advisory Committee on best practices and main challenges in the promotion and protection of human rights in post-disaster and post-conflict situations' (n 219).

<sup>250</sup> Le Japon a été critiqué par le CESCR dans son examen de 2013, qui a déclaré que "les besoins spécifiques des groupes défavorisés et vulnérables, tels que les personnes âgées, les personnes handicapées, les femmes et les enfants, n'ont pas été suffisamment satisfaits pendant l'évacuation et dans le cadre des efforts de réhabilitation et de reconstruction". Voir CESCR, 'Concluding Observations on the Third Periodic Report of Japan, Adopted by the Committee at Its Fiftieth Session (29 April-17 May 2013)' (UN ECOSOC, 10 June 2013) UN Doc E/C.12/JPN/CO/3 para 24.

l'Europe de l'Ouest ou de l'Amérique du Nord.<sup>251</sup> En tant que telles, les normes de rayonnement existantes peuvent ne pas être suffisamment protectrices pour les femmes, ainsi que pour les hommes dont les caractéristiques anatomiques et physiologiques diffèrent du modèle de cet « homme standard ».<sup>252</sup>

Par ailleurs, les autorités compétentes doivent veiller à ce que les autres catégories de populations vulnérables, en particulier les minorités, aient le même accès à l'assistance et à la réparation que le reste de la population, en mettant en place un mécanisme de contrôle indépendant ou en traduisant les informations (par exemple, pour les étrangers et les minorités ethniques) afin qu'elles ne se voient pas refuser arbitrairement l'accès au système d'assistance ou qu'elles n'en soient pas exclues.

#### **d. Non-discrimination**

La non-discrimination fait partie du principe d'égalité, l'un des principes fondamentaux des droits de l'homme. Elle signifie que la jouissance des droits doit être assurée sans distinction de sexe, de genre, d'orientation sexuelle, de race, de nationalité, de langue, de religion, d'opinions politiques ou de toute autre opinion, d'origine nationale ou sociale, d'appartenance à une minorité, de fortune, de naissance, de handicap, d'âge ou de toute autre situation.<sup>253</sup>

Cependant, toute distinction ou différence de traitement ne constitue pas nécessairement une discrimination. Dans certaines circonstances, notamment en ce qui concerne la protection des groupes vulnérables, les États sont tenus de « prendre des mesures positives afin de diminuer ou d'éliminer les conditions qui causent ou contribuent à perpétuer la discrimination ».<sup>254</sup> Certaines différences de traitement sont donc légitimes si elles sont mises en œuvre dans le but de corriger la discrimination et si elles ont des justifications objectives et raisonnables. Selon ces principes, les programmes d'assistance spéciale destinés aux enfants,

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<sup>251</sup> ICRP, 'Report on the Task Group on Reference Man. ICRP Publication 23.' (Pergamon Press 1975).

<sup>252</sup> Par exemple, la masse de graisse corporelle serait inférieure d'environ 50 % chez les adultes masculins asiatiques (chinois) par rapport aux adultes masculins caucasiens, ce qui modifierait considérablement les calculs de risque pour les premiers puisqu'ils sont basés sur le taux d'absorption corporelle des matières radioactives pour le second type de corps. Voir ICRP, 'Basic Anatomical and Physiological Data for Use in Radiological Protection Reference Values. ICRP Publication 89.' (Pergamon Press 2002) ICRP 32 (3-4).

<sup>253</sup> CRIDEAU-OMIJ (University of Limoges) (n 166) Article 7.

<sup>254</sup> CCPR, 'General Comment No.18: Non-Discrimination' (Human Rights Committee, 10 November 1989) para 10.

aux femmes enceintes et à d'autres groupes sociaux minoritaires sont à la fois légitimes et nécessaires en cas de catastrophe nucléaire pour compenser leur vulnérabilité face aux radiations ou au sein de la société, garantissant ainsi la jouissance des droits et des libertés pour tous sur un pied d'égalité.

#### **e. Information et participation**

La diffusion de l'information et la participation au processus décisionnel font partie des principaux droits procéduraux environnementaux garantis par plusieurs conventions internationales (régionales), notamment la convention d'Aarhus de 1998. Ainsi, cette convention exige que l'État veille, en cas de catastrophe environnementale, à ce que « toutes les informations susceptibles de permettre au public de prendre des mesures pour prévenir ou limiter d'éventuels dommages qui sont en la possession d'une autorité publique soient diffusées immédiatement et sans retard aux personnes qui risquent d'être touchées » (art 5, para 1(c)). Le public a également le droit de participer à la prise de décision concernant les plans, programmes et politiques liés aux activités présentant des risques pour l'environnement, y compris les activités liées au nucléaire (articles 6 à 8). Ce principe est particulièrement important en cas de catastrophe nucléaire, car le cadre réglementaire nucléaire a longtemps été extrêmement réticent à s'ouvrir à la société<sup>255</sup>.

L'étude de cas de l'accident de Fukushima a confirmé cette tendance et a montré que le partage d'informations et la consultation étaient toujours trop peu organisés et de manière trop tardive. Les informations sur la fusion du cœur, le passage du panache radioactif ou les premières doses de radiation mesurées au sol n'ont pas été divulguées au public par les autorités pendant plusieurs semaines voire quelques mois afin d'« éviter de semer la panique » parmi la population.<sup>256</sup> En outre, les décisions importantes qui concernaient directement la sécurité, la santé et la vie future des résidents ont été prises sans que les résidents eux-mêmes n'interviennent, notamment en ce qui concerne la sélection de la dose de référence, l'évacuation et le retour des résidents.

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<sup>255</sup> Reyners (n 138).

<sup>256</sup> Cabinet Secretariat, '政府・東京電力統合対策室合同記者会見（平成23年5月2日）(The Government/TEPCO Joint Press Conference Held on 2 May 2011)' (2 May 2011) <[http://www.cas.go.jp/jp/genpatsujiko/pdf/godokaiken\\_110502.pdf](http://www.cas.go.jp/jp/genpatsujiko/pdf/godokaiken_110502.pdf)> accessed 28 February 2023.

Selon le Conseil des droits de l'homme des Nations unies, les informations relatives à l'atténuation des catastrophes doivent être diffusées au public par le gouvernement, même dans les situations d'urgence, et ces informations « ne doivent pas être déformées pour éviter la panique sociale ». <sup>257</sup> Un certain nombre de décisions de la CEDH ont également établi que l'État avait une obligation positive, en vertu du droit à la vie privée et familiale (article 8) et même du droit à la vie (article 2), de garantir l'accès du public à l'information afin de prévenir les menaces que les catastrophes environnementales font peser sur ces droits. <sup>258</sup> En tant que telle, la proposition normative susmentionnée de Michel Prieur prescrit également que la réponse et la communication post-catastrophe doivent être faites pour « répondre à l'obligation des États d'assurer la sécurité publique dans le respect des droits de l'homme », et non pour « rassurer la population sur le risque de radiation ». <sup>259</sup>

À la lumière de l'incertitude scientifique existante en ce qui concerne le risque d'irradiation à faible dose, la participation de la population touchée à la prise de décision en matière de politique de protection contre les catastrophes nucléaires qui concerne leur vie est également cruciale, au moins pour la phase post-accidentelle, si ce n'est pour la phase d'urgence, en particulier en ce qui concerne les niveaux de dose de référence, l'évacuation, le retour, la réinstallation, la décontamination, la reconstruction et les mesures de radioprotection. En outre, les organisations tierces telles que les associations de victimes, le médiateur des droits de l'homme, les ONG d'experts juridiques doivent également être autorisées à participer à ces processus décisionnels afin de contrôler et de garantir que la voix des personnes affectées sera suffisamment prise en compte dans les décisions finales.

## 2. Principe de précaution

Le principe de précaution est l'un des principes fondamentaux du droit de l'environnement et invite à prendre des mesures face à des menaces potentielles, incertaines ou

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<sup>257</sup> UNHRC, 'Final research-based report of the Human Rights Council Advisory Committee on best practices and main challenges in the promotion and protection of human rights in post-disaster and post-conflict situations' (n 219) para 41(f).

<sup>258</sup> *Öneriyildiz c. Turquie* (précité) para 62, 89. Voir également *L.C.B. c. Royaume-Uni* App no 23413/94, 21825/93 and 23414/94 (CEDH, 9 juin 1998), *Guerra et autres c. Italie*, App n° 116/1996/735/932 (CEDH, 19 février 1998) et autres.

<sup>259</sup> CIDCE (Limoges) and Waseda University Institute of Comparative Law (n 236) (Considering that: 8).

non élucidées susceptibles de causer des « dommages graves ou irréversibles ».<sup>260</sup> Ce principe a été intégré dans de nombreux instruments environnementaux internationaux, notamment dans la déclaration de Rio de 1992, et bien développé dans la législation de l'UE. L'application de ce principe joue un rôle essentiel dans la protection des personnes en cas de catastrophe nucléaire, car il s'agit d'un risque d'irradiation à faible dose qui n'a pas encore été entièrement élucidé et qui fait l'objet de controverses scientifiques. En vertu du principe de précaution, les autorités compétentes sont tenues de prendre des mesures de protection préventive contre les risques « sans avoir à attendre que la réalité et la gravité de ces risques deviennent pleinement apparentes ».<sup>261</sup> L'absence de certitude scientifique ne suffit donc pas à justifier leur inaction. Inversement, les personnes affectées n'ont pas à fournir une preuve définitive du préjudice, l'existence d'un « dommage grave ou irréversible » potentiel est suffisante pour justifier leurs actions d'autoprotection telles que l'évacuation et la réinstallation « volontaires » ou la recherche d'une protection et d'une assistance de la part des autorités compétentes.

Face à un risque environnemental aussi incertain sur le plan scientifique que les faibles doses de rayonnement, le principe devient également très utile pour déterminer les niveaux de protection ou les seuils de risque. Ces controverses surviennent précisément lorsqu'il existe un point de vue scientifique dominant soutenu par le gouvernement, qui rejette les opinions scientifiques dissidentes et divergentes. Le principe de précaution exige que le débat sur les risques soit mené « de manière ouverte, transparente et pluraliste » et que la prise de décision ne soit plus « la chasse gardée d'une classe scientifique proche de l'élite politique ».<sup>262</sup> Ce principe est également conforme à la jurisprudence de l'organe d'appel de l'OMC, qui a estimé que l'évaluation des risques pouvait exposer « à la fois le point de vue dominant représentant le courant principal de l'opinion scientifique et les opinions des scientifiques ayant un point de vue divergent ».<sup>263</sup> Dans les situations de catastrophe nucléaire, cela se traduirait par la

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<sup>260</sup> La citation est tirée de l'article 15 de la déclaration de Rio de 1992

<sup>261</sup> Les citations sont tirées de la jurisprudence de la CJUE, notamment de l'affaire C-180/96, *Royaume-Uni/Commission*, Rec. 1998, p. I-2265, point 99, "l'arrêt ESB", et de l'affaire C-157/96, *National Farmers' Union et autres*, Rec. 1998, p. I-2211, point 63 ; Affaire C-180/96, *Royaume-Uni/Commission*, Rec. 1998, p. I-2265, point 99 ; affaire C-236/01, *Monsanto Agricoltura Italia*, Rec. 2003, p. I-08105, point 111 ; affaire T-13/99, *Pfizer Animal Health SA/Conseil*, Rec. 2002, p. II-03305, point 139 ; cited by Nicolas de Sadeleer, 'The Precautionary Principle in EC Health and Environmental Law' (2006) 12 *European Law Journal* 139.

<sup>262</sup> *ibid* 153.

<sup>263</sup> Appellate Body, 'EC Measures Concerning Meat and Meat Products (Hormones)' (WTO, 16 January 1998) WT/DS26/AB/R and WT/DS48/AB/R para 194; cited by de Sadeleer, 'The Precautionary Principle in EC Health and Environmental Law' (n 261).

participation d'universitaires et de scientifiques indépendants appartenant à la société civile, en plus des experts officiels affiliés à des institutions publiques ou d'État, pour déterminer la dose de référence.

En outre, l'adoption du principe de précaution dans la protection contre les catastrophes nucléaires est rendue opérationnelle et garantie par les deux sous-principes suivants : la limite de dose universelle de 1 mSv/an (a) et la protection intergénérationnelle (b).

**a. Limite de dose universelle de 1 mSv/an et limite de dose « secondaire » de 5 mSv/an**

La limite de dose annuelle pour le public est fixée à 1 mSv/an par les autorités internationales de protection nucléaire et de radioprotection, à savoir l'AIEA et la CIPR. Ce niveau a été déterminé en tenant compte de plusieurs facteurs : les connaissances scientifiques disponibles et leur incertitude sur le risque de rayonnement à faibles doses, le sens de la précaution, les pressions sociétales et les compromis politiques. En effet, il n'existe pas de dose de rayonnement « sûre ». Comme l'indique le rapport de l'Académie des sciences des Etats Unis (rapport BEAR) de 1956, « du point de vue de la génétique, elles (les expositions aux rayonnements) sont toutes mauvaises »<sup>264</sup>. Dans ces conditions, la limite de dose de 1 mSv/an a été considérée comme le meilleur niveau de dose réalisable, prudent et moralement acceptable pour protéger le public qui ne bénéficie pas directement de l'exposition aux rayonnements, contrairement aux travailleurs et aux patients.

Toutefois, cette limite de dose n'est actuellement appliquée que dans les situations d'exposition planifiées, c'est-à-dire en l'absence d'accident nucléaire. Dès qu'une situation d'urgence survient, cette limite de dose est immédiatement ignorée et remplacée par une « dose de référence » plus souple, qui peut être fixée entre 20 et 100 mSv/an pendant la phase d'urgence et entre 1 et 20 mSv/an pendant la phase post-accidentelle. Dans un tel système, on peut dire que la « limite de dose » n'assume pas la fonction de limite de dose, mais qu'il s'agit plutôt d'un concept « mirage » qui donne une illusion de protection mais qui, en réalité, n'est pas opérante lorsque le besoin s'en fait sentir.

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<sup>264</sup> National Research Council/National Academy of Sciences, 'The Biological Effects of Atomic Radiation: A Report to the Public' (US National Academy of Sciences 1956) (BEAR Report) 20.

En adoptant le principe de précaution, cette limite de dose publique deviendra la limite de dose universelle, appliquée dans toutes les situations, y compris les situations d'urgence et les catastrophes. Cette limite de dose tient compte des doses d'exposition effectives estimées d'un individu provenant d'expositions externes et internes, à l'exclusion des expositions naturelles et médicales. Il s'agit en effet de la dose de référence post-accidentelle établie par les autorités soviétiques lors de l'accident de Tchernobyl, ainsi que de la norme de dose fortement recommandée par les institutions des Nations unies chargées des droits de l'homme lors de l'accident de Fukushima. À des doses supérieures à 1 mSv/an, des mesures de protection, à savoir l'évacuation et la réinstallation, doivent être mises en œuvre, facilitées et assistées par les autorités compétentes. En outre, des valeurs de dose plus faibles pourraient être fixées pour les groupes vulnérables tels que les enfants, les femmes enceintes ou les personnes souffrant de troubles médicaux spécifiques et sensibles aux effets des rayonnements.

En outre, la thèse propose également la limite de dose secondaire de 5 mSv/an uniquement applicable en cas de catastrophe nucléaire, une sorte de « dose de référence » concernant le retour des personnes évacuées dans les territoires contaminés. Les accidents de Tchernobyl et de Fukushima ont montré que certains résidents, en particulier les personnes âgées, souhaitent rester ou retourner chez eux malgré la contamination. Dans cette perspective, la limite de dose secondaire de 5 mSv/an peut être établie en vue de faciliter le souhait de ces résidents tout en maintenant ce niveau de dose relativement bas afin que les mesures de radioprotection soient efficaces et relativement faciles à mettre en œuvre pour les personnes qui retournent chez elles. À des doses supérieures à 5 mSv/an, la réinstallation doit être fortement conseillée, facilitée et pleinement assistée pour les résidents. Dans les cas où les résidents souhaitent rester ou retourner dans la zone où les doses dépassent 5 mSv/an, ils peuvent être autorisés à le faire à leurs propres risques après avoir été pleinement informés des risques potentiels par les autorités compétentes et avoir signé un document de consentement éclairé. Toutefois, pour les enfants et les femmes enceintes, cette limite secondaire ne doit pas être utilisée et seule la limite de dose universelle doit s'appliquer à tout moment, compte tenu de leur sensibilité aux rayonnements.

La dose de 5 mSv/an s'inspire du précédent, la dose de référence établie à Tchernobyl ainsi que de la recommandation formulée par la Japan Federation of Bar Association (JFBA) lors de l'accident de Fukushima. En outre, elle représente le niveau de dose établi par la jurisprudence japonaise comme « seuil » pour reconnaître un accident industriel (le cas de

leucémie) chez les travailleurs nucléaires<sup>265</sup>. Bien que ces décisions n'aient pas établi le lien de causalité entre cette dose d'exposition et la maladie, le seuil de 5 mSv/an a été adopté comme politique de protection des travailleurs au Japon pour l'indemnisation des victimes<sup>266</sup>.

L'établissement d'une limite de dose universelle à 1 mSv/an et d'une limite de dose secondaire à 5mSv/an en cas de catastrophes nucléaires assureraient une protection adéquate des populations touchées contre l'exposition à la radiation et donnerait une cohérence à la stratégie globale de protection.

### **b. Protection intergénérationnelle**

Sur la base du principe de précaution, la protection des victimes de catastrophes radiologiques doit être étendue aux générations suivantes. Le suivi médical et l'assistance intergénérationnels doivent être la norme absolue pour les actions de protection. Ce principe découle des résultats scientifiques qui ont confirmé l'effet héréditaire des rayonnements, malgré le silence persistant de toutes les autorités internationales compétentes en matière de nucléaire et de rayonnements - AIEA, UNSCEAR et CIPR - qui n'ont pas officiellement reconnu ce fait.

L'une de ces découvertes est l'étude de H.J. Muller de 1928 et d'autres travaux de généticiens qui ont démontré que l'exposition aux rayonnements induisait des mutations même avec de faibles doses (pas de seuil) et que cet effet mutagène était irréversible et cumulatif tout au long de la vie, transmissible à la descendance d'un parent qui n'avait pas subi de lésions apparentes dues aux rayonnements au cours de sa vie. D'où le constat du rapport BEAR de 1956 : « Du point de vue de la génétique, elles (les expositions aux rayonnements) sont toutes mauvaises », <sup>267</sup>

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<sup>265</sup> Ministère de la santé, du travail et des affaires sociales (MHLW), "Houshasenhibaku to hakketsubyo no rousainintei no kangaekata (View on Industrial Accident Recognition for Radiation Exposure and Leukaemia ; translation by R. Hasegawa)", octobre 2015, disponible à (uniquement en japonais) <<https://www.mhlw.go.jp/file/05-Shingikai-11201000-Roudoukijunkyo-Soumuka/kouhyousiryoku.pdf>>, consulté le 28 mars 2020. ; Le critère de dose est de 5 mSv multiplié par le nombre d'années de service. Par exemple, un travailleur qui a été exposé à plus de 5 mSv de rayonnement la première année et qui a développé une leucémie la deuxième année, est reconnu comme étant victime d'un accident du travail et peut donc prétendre à une indemnisation.

<sup>266</sup> Hideyuki Hirakawa, '区域外避難はいかに正当化されるか—リスクの心理並びに社会的観点からの考察' (How Can the Out-of-Zone Evacuation Be Justified?: The Reflection from Risk Psychology and Social Perspective) in Takehisa Awaji and others (eds), 原発事故被害回復の法と政策 (*Laws and Policies for Nuclear Accident Damage Reparation*) (Nihon Hyoron Sha 2018).

<sup>267</sup> National Research Council/National Academy of Sciences (n 264) 20.



Cette caractéristique particulière de l'effet des radiations a également été reconnue par les décisions et les avis des tribunaux internationaux. Typiquement, l'avis de la CIJ de 1996 sur les armes nucléaires stipule que « [l]e rayonnement ionisant est susceptible de porter atteinte à l'environnement, à la chaîne alimentaire et à l'écosystème marin dans l'avenir, et de provoquer des tares et des maladies chez les générations futures »<sup>268</sup>. Par ailleurs, un expert du droit nucléaire a même admis que les effets néfastes des radiations peuvent être latents pendant une longue période et que « l'ionisation des gènes humains ne cause pas seulement des dommages somatiques, mais peut également causer des dommages à la génération suivante ».<sup>269</sup>

Comme nous l'avons analysé précédemment, cette protection intergénérationnelle a déjà été mise en place lors de catastrophes antérieures, notamment pour les victimes de l'accident de Tchernobyl et les survivants de la bombe A d'Hiroshima/Nagasaki. Elle devrait devenir la norme pour toutes les protections futures en cas de catastrophe nucléaire.

### 3. Le « droit au déplacement » garanti

Le troisième pilier des principes de protection consiste à garantir le « droit au déplacement » des personnes touchées par les catastrophes nucléaires. La notion de ce droit est tirée du « nouveau » droit de l'homme qui se situe à l'intersection des droits de l'homme et du droit de l'environnement, à savoir le droit à un environnement sûr et sain. D'après l'analyse menée dans le cadre de cette recherche doctorale, la thèse considère que le « droit au déplacement » constitue un principe indispensable de la protection contre les catastrophes nucléaires. Ce principe garantit et rend opérationnel le droit à un environnement sûr et sain, ou « à un environnement non toxique »,<sup>270</sup> dans les situations de catastrophes environnementales. Il permet de protéger efficacement les personnes contre le risque d'être « piégées » ou obligées de retourner dans des zones contaminées où leur santé ou leur vie serait menacée par des substances dangereuses telles que les rayonnements.

Dans le cadre normatif pour la protection des déplacés ou les PDI, le « droit au déplacement » n'est garanti qu'en forme de « réinstallation » une fois que le déplacement a eu

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<sup>268</sup> *Licéité de la menace ou de l'emploi d'armes nucléaires*, précité, para 35

<sup>269</sup> Pelzer (n 16) 269.

<sup>270</sup> UNHRC, ‘‘The Right to a Clean, Healthy and Sustainable Environment: Non-Toxic Environment - Report of the Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment’’ (n 200).

lieu. Dans le cas de catastrophes environnementales telles que les accidents nucléaires, le « droit au déplacement » doit être garanti dès le début de la situation d'urgence (c'est-à-dire l'évacuation). Ce concept constitue en effet « le droit de survivre en fuyant », suggéré par Michel Prieur, selon lequel l'évacuation en cas de catastrophe écologique représente « une manifestation de leur droit fondamental à la vie ». <sup>271</sup>

L'autre concept qui va de pair avec le « droit au déplacement » est le « droit d'être protégé contre l'exposition *in situ* », conçu pour la protection de ceux qui choisissent de rester dans des zones contaminées ainsi que de ceux qui choisissent de retourner dans des zones contaminées pour quelque raison que ce soit. Ce droit a été proposé à l'origine par des ONG japonaises d'experts juridiques et la JFBA à la suite de l'accident nucléaire de Fukushima.<sup>272</sup> Concrètement, cela signifie que les personnes qui restent doivent bénéficier de mesures de radioprotection et de conseils afin d'éviter ou de réduire autant que possible les doses d'exposition pendant qu'elles vivent dans un environnement contaminé.

Ainsi, le « droit au déplacement » et le « droit à la protection radiologique *in situ* » constituent le principe central de la protection qui doit être garantie par les autorités compétentes en cas de catastrophe nucléaire.

## Conclusion

Les normes de protection contre les catastrophes nucléaires fondées sur les droits de l'homme et le droit de l'environnement, en particulier le droit à un environnement sûr et sain et le principe de précaution, fournissent un cadre de protection complètement différent, en termes de philosophie, de forme et de portée, de celui établi par le régime nucléaire international. Les institutions de réglementation nucléaire ont fixé de nombreuses conditions, notamment des critères de dose (par exemple, la dose de référence), l'analyse coût-bénéfice, le principe ALARA et des critères opérationnels (par exemple, les situations techniques du site de l'accident), pour déclencher des actions de protection en cas de catastrophe nucléaire. La proposition de la thèse est de supprimer ces barrières élevées et de simplifier l'action en adoptant la limite de dose annuelle publique de 1 mSv/an pour toutes les circonstances avec une limite de dose secondaire de 5 mSv/an spécifiquement fixée pour le retour des personnes évacuées.

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<sup>271</sup> Prieur (n 143) 1.

<sup>272</sup> Fukuda et Kawasaki (n 58); Fukuda (n 167).

En outre, la proposition fait peser une responsabilité plus lourde sur les autorités de l'État, en les invitant à prendre des mesures plus proactives, plus efficaces et plus prudentes pour contrer la menace radiologique qui pèse sur la population en cas de catastrophe nucléaire de grande ampleur. Comme le confirment de nombreuses jurisprudences d'instances internationales des droits de l'homme, les États ont l'obligation positive, en vertu du droit international, de sauvegarder le droit à la vie, un droit inaliénable des individus, en cas de catastrophe nucléaire, qui doit primer sur tout le reste, comme dans toute autre catastrophe, telle que les guerres et les catastrophes naturelles.

En fait, il s'agit déjà d'une pratique courante lors de nombreuses catastrophes, en particulier en cas de risques naturels. Par exemple, avant l'arrivée du méga-typhon Nanmadol en septembre 2022, le gouvernement japonais a émis un ordre d'évacuation pour neuf millions de personnes des régions de Kyushu, Shikoku et Chugoku, à titre de mesure de protection préventive.<sup>273</sup> Par conséquent, ce que cette thèse propose n'est en théorie ni nouveau ni irréalisable pour de nombreux gouvernements. Comme dans toutes les opérations de sauvetage, de secours et de réhabilitation en cas de catastrophe, la protection des droits de l'homme devrait être à la base de toutes les actions et politiques liées à la protection hors site en cas de catastrophe nucléaire, avant les intérêts politiques et économiques de l'État, sans parler de ceux de l'industrie nucléaire.

Toutefois, le cadre de gestion des catastrophes nucléaires n'a pas changé avant et après l'accident nucléaire de Fukushima en 2011.<sup>274</sup> Alors que l'accident de Tchernobyl à la fin des années 1980 a servi de catalyseur pour la mise en place d'instruments internationaux nouveaux ou renforcés en matière de sûreté nucléaire et de réponse aux catastrophes, l'accident de Fukushima n'a pas eu le même effet. Au contraire, les choses semblent aller dans le sens d'une réaffirmation du cadre mis en place après Tchernobyl en matière de catastrophes nucléaires, malgré les critiques formulées par les institutions des Nations unies chargées des droits de l'homme et par la société civile japonaise. Pour l'instant, il semble que l'expérience de Fukushima se répétera lors des prochaines grandes catastrophes nucléaires.

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<sup>273</sup> BBC News, "Japan storm : Nine million people told to evacuate as super typhoon Nanmadol hits ", 19 septembre 2022, disponible à l'adresse <<https://www.bbc.com/news/world-asia-62952942>> consulté le 20 septembre 2022.

<sup>274</sup> Christine Fassert and Tatiana Kasperski, 'Risques nucléaires : à quand la fin du monopole des experts internationaux ?' (*Journal de l'énergie*, 7 May 2021) <<https://journaldelenergie.com/nucleaire/risques-nucleaires-monopole-experts-internationaux/>> consulté le 27 octobre 2022.

Combien de catastrophes nucléaires dévastatrices le monde devra-t-il encore tolérer avant de remettre enfin en question l'hégémonie du régime nucléaire qui fait peser des menaces catastrophiques potentielles sur l'ensemble de l'humanité et de l'environnement ? Aujourd'hui, le monde compte 440 réacteurs de production d'électricité en activité dans 33 pays,<sup>275</sup> un nombre inconnu d'installations nucléaires militaires et de recherche, un nombre inconnu d'installations de traitement des déchets nucléaires et un stock d'armes nucléaires estimé à 12 705 dans le monde.<sup>276</sup> Au milieu de tout cela, la communauté internationale et les populations du monde entier sont suspendues au mode « par défaut », largement désarmées face aux catastrophes nucléaires qui peuvent infliger « des souffrances indicibles à l'homme » et « des dommages pour les générations à venir »<sup>277</sup> en l'absence d'un système de protection international solide et efficace.

Depuis la fin de la Seconde Guerre mondiale, la communauté internationale a élaboré un cadre juridique et normatif complet pour faire face aux situations de guerre, qui est ancré dans les différentes conventions de Genève: celles de 1949 sur le temps de guerre et celle de 1951 relative au statut des réfugiés. Ce cadre vise en particulier à protéger les personnes dans les pays dont les gouvernements ne veulent pas ou ne peuvent pas protéger leurs propres ressortissants. Ces régimes internationaux permettent en effet de combler le vide de la protection nationale dans le cas de situations particulières. En cas de catastrophe nucléaire, en raison de son importance stratégique et de la proximité de l'énergie avec le pouvoir de l'État, le même type de vide de protection est susceptible de se produire. En outre, la réponse d'urgence aux accidents nucléaires de grande ampleur ressemble à celle des conflits armés qui impliquent souvent « une opération militaire de grande envergure »<sup>278</sup> afin de limiter les dégâts

et les effets de la catastrophe sont tout à fait comparables à ceux des guerres où les pays peuvent

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<sup>275</sup> Source : le site de la World Nuclear Association, trouvé à l'adresse <<https://world-nuclear.org/information-library/current-and-future-generation/plans-for-new-reactors-worldwide.aspx>> consulté le 28 septembre 2022

<sup>276</sup> Le nombre d'armes est une estimation de neuf États : les États-Unis, la Russie, le Royaume-Uni, la France, la Chine, l'Inde, le Pakistan, Israël et la Corée du Nord (RPDC). Source : Institut international de recherche sur la paix de Stockholm : Stockholm International Peace Research Institute, *SIPRI Yearbook 2022: Armaments, Disarmament and International Security* (Oxford University Press 2022).

<sup>277</sup> CII, *Licéité de la menace ou de l'emploi d'armes nucléaires*, précité, para 36

<sup>278</sup> UNGA, 'Report of the World Commission on Environment and Development: "Our Common Future" (Brundtland Report)' (UN General Assembly, 4 August 1987) UN Doc A/42/427 156.

« perdre une partie de leur territoire ». <sup>279</sup> Cela a certainement été le cas lors des accidents nucléaires de Tchernobyl et de Fukushima.

Dans ce contexte, le monde a besoin d'un mécanisme de contrôle international solide pour régler la conduite des États en cas de catastrophe nucléaire. Dans un premier temps, cette thèse propose de « dénucléariser » la réponse et la protection en cas de catastrophe, en la retirant du paradigme nucléaire et en la réintégrant dans le cadre humanitaire et de migration forcée qui s'applique normalement en cas de catastrophe et qui respecte, protège et garantit les droits de l'homme des personnes touchées. Cette « dénucléarisation » ou réintégration dans le cadre fondé sur les droits, en particulier la protection des groupes vulnérables et des minorités dans la réponse aux catastrophes, reconnaît les différentes vulnérabilités des individus face aux effets des catastrophes, aspect qui est totalement ignoré par le régime normatif nucléaire. Deuxièmement, le processus de « dénucléarisation » implique également l'intégration de nouveaux concepts de protection dans le cadre normatif pour la migration forcée, tels que le principe de précaution et le « droit au déplacement ».

Cependant, force est de constater qu'une proposition normative basée sur les droits de l'homme, telle que proposée dans cette thèse serait très certainement reçue avec consternation, suspicion et désapprobation par certains décideurs politiques, les organisations régulatrices du nucléaire, et les industriels et les experts liés à la production électronucléaire. Ils affirmeront qu'il est financièrement et concrètement impossible d'appliquer de telles normes de protection. Il paraît cependant difficile de justifier qu'une gestion des catastrophes fondée sur les droits de l'homme ne puisse être appliquée aux catastrophes nucléaires alors qu'elle s'applique aux autres catastrophes. Est-il justifié de ne fournir qu'une protection partielle ou "secondaire" à la population en cas d'accident nucléaire en l'absence d'acceptation réciproque du risque ou de "sacrifices" potentiels dès le départ ? Comme l'ont montré les accidents de Tchernobyl et de Fukushima, les effets des catastrophes nucléaires échappent largement aux capacités organisationnelles, technologiques et financières des gouvernements. Cela signifie que les "sacrifices" de la part des nationaux (et potentiellement des citoyens des pays voisins) sont préprogrammés et font partie intégrante du cadre de réponse aux catastrophes nucléaires. <sup>280</sup>

Dans ces circonstances, certaines nations voisines des États dotés d'installations nucléaires ont

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<sup>279</sup> Pelzer (n 16) 270. Voir également ICRP, 'Application of the Commission's Recommendations to the Protection of People Living in Long-Term Contaminated Areas after a Nuclear Accident or a Radiation Emergency. ICRP Publication 111.' Ann. ICRP 39 (3). (Elsevier, 2009) 30.

<sup>280</sup> Takahashi (n 106)

demandé que la légalité de l'utilisation de l'énergie nucléaire civile soit subordonnée à la mise en place d'un système adéquat d'indemnisation des dommages transfrontaliers.<sup>281</sup> Les citoyens des États dotés d'installations nucléaires devraient être en capacité soit d'accepter ces sacrifices potentiels au nom de l'intérêt et des avantages de ces activités nucléaires civiles, soit de subordonner ces activités à la mise en place d'un système de protection solide fondé sur les droits de l'homme en cas d'accident, ou enfin d'avoir la possibilité de refuser de tels risques. Pourtant, ce choix explicite a rarement été proposé dans les grandes démocraties qui se sont dotées de l'industrie nucléaire.

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<sup>281</sup> IAEA, 'The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage — Explanatory Texts' (IAEA 2017) Text IAEA International Law Series No. 3 (Revised) 28.

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