The obligation of prevention and reduction as an essential obligation for State responsibility for environmental damage caused by nuclear activities

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1. Introduction

The obligation to prevent and reduce transboundary environmental damage, at the present time, is one of the fundamental principles in contemporary international law necessary for the protection of the environment. This principle as general principle in international law has been recognised by the international doctrine,¹ the arbitral and international case law² and reflected in international practice.³ It has been embodied in a number of multilateral, regional, international


declarations such as the UNEP Principles\textsuperscript{4} and bilateral agreements dealing with the protection of the environment from hazardous activities in variant areas in international law.\textsuperscript{5} Moreover, the principle has become as customary international law principle and general principle of law.\textsuperscript{6} It has been codified by the ILC in the Draft Articles on the topics of international liability for harm caused by lawful activities.

According to the principle, the State conducting hazardous activity, e.g. nuclear activity, within its territory of under jurisdiction or control is obliged not to cause environmental damage to other States. It must take precautionary and preventive measures as well as due diligence to prevent such damage and to reduce its harmful consequences. These measures are procedural principles and obligations aimed at the control of the activity and enhance the cooperation between States in providing the necessary information which helps to prevent and minimize environmental damage caused by the activity.

The Chernobyl accident has already drawn the attention of the international community as a whole to the need for the establishment of a comprehensive international mechanism aimed at the prevention, mitigation and reparation of environmental damage caused by nuclear activities. The main features of this regime have been developed by the doctrine of international law along


with the past three decades. Such a regime may involve three aspects: the rules and measures of prevention of nuclear damage such as international safety standards and measures for verification of related compliance; the provisions of mitigation of consequences of nuclear accidents such as providing information and assistance in the case of a nuclear accident occurrence; and finally, reparation of environmental damage caused by the accident. The general rules of prevention and international liability have been embodied in the ILC Draft Articles in three topics, i.e., Prevention of Transboundary Harm Caused by Hazardous Activities, State Responsibility for Wrongful Acts and Principles on the Allocation of Loss in the Case of Transboundary Harm Arising out of Hazardous Activities. In these Articles the issues of prevention and international liability have been codified in general and would apply to environmental damage caused by nuclear activities in the absence of inter-state treaty to cover these issues.

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10 The 2006 Draft principles on the allocation in the case of transboundary harm arising out of hazardous activities, with commentaries in 2006, and submitted to the General Assembly (A/61/10), at p. 110, Para. 67.
This article argues for the obligation of prevention as a fundamental principle in contemporary international law and its effectiveness in the protection of the environment from damage caused by nuclear activities. It focuses on examination of the issues of prevention and reduction of damage as a tool for generating State responsibility to prevent and reduce environmental damage caused by nuclear activities according to the general rules of international law.

Examination of these issues gives rise to certain questions which would have to be answered in this research in order to determine the obligation of State for prevention of environmental damage caused by a nuclear accident. These questions are: Does international law impose upon the State certain standards and obligations to conduct nuclear activities within its territory or under jurisdiction or control and to ensure that such activities do not cause environmental damage to other States or the global environment? If so, what sort of obligations? Does it a general obligation in international law capable to incur State responsibility for violation of a State to its environmental obligations or it merely non-binding principle? Does it a customary international law principle or it a general principle of law?

The answer to these questions determines the legal basis of the obligation of prevention and minimizing environmental damage caused by nuclear activities. The violation of this principle constitutes the basis of State responsibility to prevent nuclear accident and environmental damage caused by nuclear activities.

This article examines the legal basis of the obligation of prevention under the general rules and principles of international law for preventing hazards and damage arising out of nuclear activities as lawful activities not prohibited under international law. Yet, distinguishing between the general rules and principles of international law and drawing a dividing line between them in practice remains unclear. Before examining these principles, therefore, a brief discussion to the distinction between the general principles and rules of international law will be given in the
following section. The definition of the terms “rule” or “norm” and “obligation” is important to explore the difference between them. Section 3 examines the legal basis of the obligation of prevention under the general rules of international law. The examination involves certain issues which form the basis of the principle of prevention including the obligation of a State not to cause environmental damage to other States and to take preventive measures to prevent such damage before the occurrence. This also includes examination of two other international principles required for the safe operation of a nuclear installation including due diligence principle and the precautionary principle. Section 4 investigates the principle of cooperation and its importance with regard to implantation of the procedural rules and obligations for prevention and reduction of environmental damage caused by a nuclear accident. Section 5 concludes that the obligation of prevention consists of a number of international procedural obligations which are necessary to be implemented by the State of origin and other States in order to avoid environmental damage likely to be caused by nuclear activities.

2. The general rules, principles and customary international law

In general, there is evidence in the doctrine of international law, international instruments and judicial decisions to support the distinction between the general rules of international law and the principles of international law.\(^{11}\) According to Verschuuren, there are some differences between the rules of international law and the general principles of international law, but it is difficult to

draw a distinct line between them. He argues that ‘There is a sliding scale with a theoretical, abstract and indeterminate principle on one side and a very concrete, highly practical rule on the other. Both principles and rules can range from abstract to more concrete’. However, according to Cheng, ‘the general principles of law form the basis of positive rules of law’. In practice, the principles of law have moral character higher than that of rules of law and form the basis of their functions in national and international law. These functions, according to Verschuuren, include inter alia: help to define open or unclear statutory rules; enhance the normative power of statutory rules; increase legal certainty and enhance legitimacy of decision-making, form the basis of new statutory rules; given guidance to self-regulation and negotiation processes between various actors in society; create flexibility in the law; play an important role in implementation of international obligations in national law; stimulate integration of environmental considerations into other policy fields; create a necessary link between ideals; and concrete legal rules. The functions of the principles also have been addressed by the 1992 United Nations Framework Convention on Climate Change. It referred to the importance of these principles in implementation of the provisions of the Convention. It considers them as guidance for its State Parties to achieve objectives of the Convention and to implement its provisions. Also, to define

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16 Article 3 of the 1992 United Nations Framework Convention on Climate; see also Article 3 the 1992 Convention on Biodiversity Convention. The text of this convention is available at: http://www.cbd.int/convention/convention.shtml (accessed on 31.8.2009); The 2003 Consolidated Versions of
the internationally wrongful act, the ILC made a distinction between the term of rule or norm and obligation. It indicated that the breach of a wrongful act is a breach of international obligation of a State and a breach of a norm. Finally, in the Gentini case in 1903 (Italy v. Venezuela) this distinction is clearly made. The Umpire stated that:

‘A ‘rules… ‘is essentially practical and, moreover, binding …; there are rules of art as there are rules of government’ while principle ‘expresses a general truth, which guides our action, serves as a theoretical basis for the various acts of our life, and the application of which to reality produces a given consequence’.18

Also, in relation to the application of the rules of general customary international law, Judge G. Morelli in his separate opinion in the Case Concerning the Barcelona Traction, Light and Power Company, Limited, Belgium v. Spain, Judgment of 5 February 1970, argued that ‘the international rules concerning the treatment of foreigners, although they are rules of general international law and, as such, are binding on every State with regard to every other State, take concrete form in the shape of bilateral legal relationships, so that a State’s obligation to accord the required treatment to a particular person exists solely towards the national State of that person and not towards other States’.19 Accordingly, the principles of law have moral

character and foundation of the theoretical basis which guides States to implement rules of law. This is true, but in my view that the rule of law is the foundation of any principle of law. The rule of law is a provision which can be embodied in any agreement, judicial decision, principles of law or any other source of law and binds State to respect rights of other States.

Thus, customary and general principles of international law are composed of certain rules and provisions which constitute the basis of these principles. Nevertheless, the application of these principles is not transparent in practice because they are, in some cases, embodied in non-binding international instruments and in other cases it cannot determine their scope and extent of application. The principle of notification, for instance, has recognized in practice, it was not applied by the States. The non-application of this principle by the USSR after the Chernobyl accident therefore necessitated the formulation of the principle in more detail norms in conventional provisions.20 However, the unusual speed for the adoption of the 1986 Notification and Assistance Conventions21 which were adopted within only one month of negotiation indicates that there was evidence for the existence of customary international law on the principle of notification prior to the formulation of the norms in these Conventions. The


circumstances emerged as a result of the Chernobyl aftermath necessitated the recognition and codification of the principles in specific norms.\textsuperscript{22}

Nevertheless, there are some obstacles which are standing in the way of developing customary international law in general for the protection of the environment. For instance, ‘The renaissance of custom requires the articulation of a coherent theory that can accommodate its classic foundations and contemporary developments’.\textsuperscript{23} There is no theory to explain the role of customary international law and its doctrine.\textsuperscript{24} Also, the developing nations are still opposing to accept customary international norms as a source of liability for the protection of the environment. They believed that the acceptance of these principles is an obstacle for their development. They are pointing the finger to the developed nations for damaging the environment by harmful activities carried out in their territory or under jurisdiction or control after they benefited from these activities by developing their countries at the beginning of the twentieth century in the absence of environmental standard. Now they argue that the developed countries should bear the responsibility for the protection of the environment.\textsuperscript{25} The principle of customary international law cannot constitute a principle of international law, unless it has been accepted by developed and developing countries. This, to some extent, explores the difference between the principles of customary international law and the general principles of international law which are those adopted by the developed solely. According to Dupuy:

\begin{itemize}
\item \textsuperscript{22} D’Amato and Engel, 1996, at p. 12.
\item \textsuperscript{24} Andrew T. Guzman, “Saving Customary International Law”, in: Michigan Journal of International Law, vol. 27, 2006, pp. 115-276, at p. 117.
\item \textsuperscript{25} D’Amato and Engel, 1996, at p. 15.
\end{itemize}
customary law status of a rule depends on whether the principle is invoked by a majority of states, comprising both developed and developing countries, by a regional group of states (as in the case of the support expressed by the members of the European Union), or even by the international community, including international civil society. In addition, it depends on whether the principle has been referred to, or put into operation, in a treaty, in a soft law instrument, in judicial or semi-judicial decisions, or in other expressions of state practice. Therefore, the process of formulation of customary international law, and that of its consolidation as a rules of positive international law are two sides of the same coin, which is suggested by the fact that the concept of ‘custom’ refers to both the law making process and to the end result of that process—a legally binding norm at the universal, or, more, rarely, the regional, level’.26

The general principles of international law as adopted in Article 38 (1) (c) of the ICJ Statute are those adopted by the civilized nations. Thus, those adopted by the developing nations are excluded. Moreover, some writers stipulate that the general principles of national law do not considered in themselves as general principles of international law, unless they have been accepted at the international level.27 In addition, in practice it is difficult for one to observe the sources and difference between the customary and general principles of international law,28 as many of principles of general rules have become customary international law

principles. In this relation, in North Sea Continental Shelf Cases, the ICJ stated that, ‘Customary international law is evidenced by the practice of states by reference to published material, statements of the national government and state’s own laws and judicial decisions and its acceptance as law’.

Yet, customary and general principles of international law have significant role in the protection of rights of the States and their subjects including the protection of the environment from damage caused by hazardous activities. These principles have been gradually emerged and still under development. The prime of these principles is the principle of State sovereignty which aims at the protection of the political integrity of the States. This principle is complemented by other principles, i.e., abuse of rights, neighbourliness, due diligence and more recently the polluter pays principle and the precautionary principle. Other procedural principles including the duty of cooperation and providing information are significant. These principles impose certain obligations upon the States to prevent damage from causing to the environment of the States and the global commons where they conduct hazardous activities within their territories or under jurisdiction or control. International law requests the State not to abuse its right which have been given by law to carry out hazardous activities and to take due diligence and precautionary measures to protect the environment and to pay the economic costs of pollution, if nevertheless, such pollution has been materialised. Therefore, in case of conducting nuclear activities violation of these obligations generates State responsibility.

The International Tribunal of the Law of the Sea in MOX Plant Case revived the importance of customary international law in the protection of the environment from damage

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caused by nuclear activities. In this case, Ireland claimed that UK violated the duty of cooperation and the duty to provide the relevant information about the disputed activity and failing to assess the potential risks and effects on the marine environment of the Irish Sea arising out of the operation of the Plant and international movements of radioactive materials. The Tribunal therefore examined the duty of cooperation and other procedural obligations and their application in practice.

Finally, reference should be made is, that these principles are considered by some writers to be theories of liability and relevant to be the basis of liability in national and international law. Some of these principles also are interrelated with the procedural obligations such as the precautionary and prevention principles, while others are customary obligations such as Stockholm and Rio principles. The latter principles, for instance, are embodied in the principles of sovereignty, abuse of rights and principles of neighbourliness. Accordingly, in practice it is difficult to draw a strict line between the functions of these principles, as every principle and theory has its uses and own characteristics which must be applied in different cases, but in each case alone.

3. The obligation of a State to prevent and reduce environmental nuclear damage

As mentioned, the principle of prevention requires the Installation State not to cause environmental damage to other States in case of conducting nuclear activities and to take all precaution and due diligence to ensure that the activity does not cause environmental damage to other States. This includes all preventive and necessary measures consistent with international

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31 Order of 3 December 2001, Para. 27.
law that are necessary to prevent, minimize and control damage might be caused by a nuclear accident. These are the principles which constitute the legal basis of the duty of prevent to damage caused by a nuclear accident.

The obligation of prevention also is relying on providing information and the cooperation between States, as without providing the relevant information environmental damage cannot be prevented. The same holds true, in relation to the cooperation between States, as without the cooperation it is difficult to prevent the damage and put the obligation of prevention in effective. At the same time, the principle of providing information and the principle of cooperation are interrelated. The two principles are aimed at the control of the activity and prevention of the damage.

3.1. The obligation of a State not to cause environmental damage to other States

International law does not permit any State to conduct hazardous activities, nuclear activities, within its territory or under jurisdiction or control without regarding the rights of other States and taking the necessary measures for the protection of the global environment. It only permits the States to use hazardous activities by reasonable way and not to cause damage to other States or the environment.\(^{32}\) The rationale behind this principle is that the absolute freedom of a State to decide conducting hazardous activities within its territory or under jurisdiction or control permits interference with and injury to the interests of other states and affects the environment.\(^{33}\) This obligation constitutes a general principle in international law and has also

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\(^{33}\) Brain D. Smith, State responsibility, 1988, at p. 72.
become a principle of customary international law.\textsuperscript{34} The principle determines the legal rights of States to use such hazardous activities and responsibilities of the States for transboundary environmental damage under customary international law.\textsuperscript{35} Thus, the principle not to cause damage to other State also has been associated with the obligation of the State to prevent and to reduce damage caused to other States.\textsuperscript{36} In this relation, some arguments distinct between the obligation of prevention and the obligation to reduce and control damage, as the obligation of prevention relates to new pollution caused by a hazardous activity, while the obligations of reduction and “control” relates to the existing pollution.\textsuperscript{37}

The principle not to cause environmental damage to other States constitutes a customary principle of international law.\textsuperscript{38} This reflected in Principle 21 of the 1972 Stockholm Declaration and affirmed in Principle 2 of the 1992 Rio Declaration. This principle obliges the State ‘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 material jurisdiction’.\textsuperscript{39} These principles form the basis of the principle of prevention in customary international law and determine the scope and extent of application of the principle prevention. Nevertheless, Sands distinguishes between these two principles and the principle of prevention. According to him:

\textsuperscript{34} Alexandre Kiss and Dinah Shelton, “Guide to International Environmental Law”, 2007, at p. 91.


\textsuperscript{39} Principle 2 of the 1992 Rio Declaration.
‘Closely related to the principle 21 obligation is the obligation requiring the prevention of damage to the environment, and otherwise to reduce, limit or control activities which might cause or risk such damage. This obligation, sometimes referred to as the ‘principle of preventive action’ or the ‘preventive principle’, is distinguishable from Principle 21/Principle 2 in two ways. First, the latter arise from the application of respect for the principle of sovereignty, whereas the preventive principle seeks to minimise environmental damage as an objective in itself. This difference of underlying rational relates to the second distinction: under the preventive principle, a state may be under an obligation to prevent damage to the environment within its own jurisdiction, including by means of appropriate regulatory, administrative and other measures.\textsuperscript{40}

The principle of prevention has been developed and codified by the ILC in its Draft Articles on international liability for damage caused by lawful activities. The principle was formulated by Quentin-Baxter and further developed by Barboza in their reports submitted to the Commission. In this Draft Articles, the Commission adopted a number of articles related to the prevention of accidents and its transboundary harmful effects. These articles include procedural obligations which enable the affected States to protect themselves against the risks might be caused by nuclear catastrophes.\textsuperscript{41} The principle is also embodied in a number of international instruments. According to the 1997 United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses, the continued operation of an activity violates the principle of


\textsuperscript{41} YILC 1988, vol. II, Part Two, at p. 20.
equitable and reasonable utilisation if the activity is found to be unreasonable utilisation.\textsuperscript{42} Thus, a watercourses State is prevented from using an activity by unreasonable way in which it can harm the environment. The obligation of prevention is provided for under Article 21 (2) of this Convention which requires the Watercourses State to prevent significant harm to the environment and to harmonize their policies in this relation.\textsuperscript{43} This provision set forth a general obligation on the Watercourse States to prevent, reduce and control pollution caused by an international watercourse which may cause significant transboundary harm to other watercourse States or to the environment.\textsuperscript{44} Similar obligation also has been provided for in Article 194 (1) of the 1982 UNCLOS. This Article sets forth a number of general obligations which requires States inter-alia: to take all the necessary means at its disposal to prevent, reduce and control environmental damage caused by a hazardous activity; to take all necessary measures to ensure that such activity does not cause environmental damage to other States; and to take all necessary measures to ensure that environmental damage caused by the activity does not spread beyond its territory.\textsuperscript{45} The principle also has been adopted in the 1992 Convention on Biodiversity Convention.\textsuperscript{46} Under this Convention, the principle expands the protection of the environment


\textsuperscript{43} Article 21 (2) of the 1997 UN Convention on Watercourses; YILC, 1994, vol. II, Part Two, at p. 121.

\textsuperscript{44} YILC, 1994, vol. II, Part Two, p. 122.


\textsuperscript{46} Article 3 of the 1992 Convention on Biodiversity Convention.
to areas beyond the sovereignty of the State. It restricts the sovereign right of the State to exploit its natural resources according to its own environmental policies.\textsuperscript{47} Nevertheless,

‘The principle does not impose an absolute duty to prevent all harm, but rather requires each state to prohibit those activities known to cause significant harm to the environment, such as the dumping of toxic waste into an international lake, and to mitigate harm from lawful activities that may harm the environment, by imposing limits, for example, on the discharges of pollutants into the atmosphere or shared watercourses’. \textsuperscript{48}

The principle of prevention has been embodied in a number of non-binding instruments on the protection of the environment. For instance, in 1985, the World Commission on Environment and Development established the Experts Group on Environmental Law to prepare “Legal Principles for Environmental Protection and Sustainable Development” to support States in drafting international instruments on environmental protection and sustainable development.\textsuperscript{49}


In 1986, the Expert Group prepared these principles. Principle 10 of this draft sets out the general principle on prevention which requires States to prevent and reduce significant damage to the environment.

In relation to the application of the principle to damage caused by nuclear activities, this principle of prevention has also been reflected in the nuclear instruments. It finds support in the 1959 Antarctic Treaty which prohibits any nuclear explosions and disposal of nuclear waste on Antarctic.\textsuperscript{50} Similarly, the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies which prohibits placing objects carrying nuclear arms on or around the moon.\textsuperscript{51} Also, the 1963 UN Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space and Under Water was adopted\textsuperscript{52} to express the desire of the parties ‘to put an end to the contamination of man’s environment by radioactive substances’.\textsuperscript{53}


\textsuperscript{53} See the Preamble of the 1963 Treaty Banning Nuclear Weapons Tests.
explosion at any place under jurisdiction or control if such explosion causes radioactive debris outside its territory or under jurisdiction or control where such explosion is conducted. Nevertheless, not all damage caused by a nuclear activity to the environment is prohibited. There is certain level of damage allowed to be caused to the environment. International law has recognized certain level of radioactive material to be discharged into the environment. Therefore, at present, disposal of low radioactive waste at sea is subject to regulation by international organizations. For instance, the IAEA developed scientific standards and guidance to guide the national authorities of the member States in laying down regulations with regard to disposal of radioactive waste at sea. However, there is a broad consensus among States that high level radioactive waste should not be disposed of at sea. In this regard, the 1972 London Convention on the Prevention of Maritime Pollution by Dumping of Waste and Other Matter prohibited disposal of high-level radioactive waste at sea. According to this Convention, ‘High-level radio-active wastes or other high level radioactive matter, defined on public health, biological or other grounds, by the competent international body in this field, at present the International Atomic Energy Agency, is unsuitable for dumping at sea’. In 1996, the Protocol to Amend London Convention was adopted to

54 Article I (1) of the 163 Treaty Banning Nuclear Weapons Tests.


56 Pelzer, Academy, 1994, at p. 297.

57 Article IV (I) (a) of the 1972 London Dumping Convention.

prohibit dumping at sea all radioactive waste above the permissible level of radioactivity as defined by the IAEA and adopted by the Contracting Parties.\(^5\) In addition, the Protocol obliges the Contracting Parties to carry out a scientific study each year for a period of 25 years to review the prohibition of dumping of low level radioactive waste at sea.\(^6\) The Protocol allows the Contracting Parties during conducting such study to take into consideration all factors which may consider appropriate for reviewing the prohibition of dumping of low radioactive waste at sea including political, legal, social and economic considerations.\(^6\) Accordingly, there is no State liability under international law for damage caused by a nuclear activity, unless a significant damage has been caused to the environment.

Finally, the principle not to cause damage to other State has been applied in international law case. It has been reflected in the 1941 Trail Smelter Case between Canada and USA.\(^6\) In this judgment, the Tribunal stated that, ‘Under the principles of international law, as well as of the law of the United States, 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’.\(^6\) It also has been affirmed by the ICJ in several decisions relating to transboundary environmental damage. The principle was adopted in the Corfu Channel


Case between Britain and Albania in 1949.\textsuperscript{64} The ICJ also has affirmed on the principle of prevention and protection of the environment in its judgment in the Case concerning “Gabčíkovo-Nagymaros Project (Hungary/Slovakia) of 25 September 1997. It has recognized the importance of the protection of the environment not only to a particular State, but also to the whole mankind.\textsuperscript{65} The ICJ in its advisory opinion of 8 July 1996 on the ‘Legality of the Threat or Use of Nuclear Weapons’ recognizes the principle of prevention and its importance in the protection of the environment. In the advisory opinion:

’The Court recognizes that the environment is under daily threat and that the use of nuclear weapons could constitute a catastrophe for the environment. The Court also recognizes that the environment is not an abstraction but represents the living space, the quality of life and the very health of human beings, including generations unborn. The 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’.\textsuperscript{66}

Nevertheless, the Court hesitated to give a decisive decision and solution to the matter. It stated that there are no provisions in customary and conventional international law that support neither authorization nor prohibition of the use of nuclear weapons. It also stated that such use might be prohibited by the existing rules of international environmental law.\textsuperscript{67} Accordingly, the Court did not prohibit manufacturing and the use of nuclear weapons. In

\textsuperscript{64} ICJ Reports, 1949, at p. 22.
\textsuperscript{65} ICJ Reports, 1997, p. 7, at p. 41, Para. 53.
\textsuperscript{66} ICJ Reports, 1996, p. 226, at pp. 241-242, Para. 29.
fact, in this sensitive issue, the Court took a narrow view and focused only in examining the legal evidences without given any consideration to other factors such the harmful consequences might be result from the use of nuclear weapons. The Court missed the opportunity to develop a legal principle that emphases on the prohibition of nuclear weapons. The ground for taking that approach is that it seems that the Court scared to being accused by involvement in political matters. Finally, the Court also addressed the principle of prevention in its recent judgment in the Case Concerning Pulp Mills on the River Uruguay (Argentina v. Uruguay), 20 April 2010 Judgment and reaffirmed on it as a general principle of international law required for the protection of the environment.  

3.2. Preventive measures

To implement the principle of prevention, the source State is obliged under international law to take the necessary preventive measures to avoid risk and loss or injury likely to be caused by a hazardous activity and to protect interests of the affected States. Thus, ‘they concern pollution or other environmental damage that is foreseeable through the normal operations of an activity or the use of a product, as well as measures that should be taken to mitigate or prevent harm in case of accidental damage’.  

The nuclear liability conventions define the concept of preventive measures as any reasonable measures to be taken by any person to avoid the occurrence of a nuclear accident and

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to prevent and reduce its harmful consequences.\textsuperscript{71} Similarly, the Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment defines “preventive measures” as ‘any reasonable measures taken by any person, after an incident has occurred to prevent or minimize loss or damage’.\textsuperscript{72} This concept has been affirmed by the ILC Draft Articles on Prevention of Transboundary Harm. This Draft Articles provides that, ‘The State of origin shall take all appropriate measures to prevent significant transboundary harm or at any event to minimize the risk thereof.’\textsuperscript{73} Yet, the concept of preventive measures under this provision still too vague and controversial issue. This is because there is no precise definition to the concept of preventive measures to determine which measures should be taken as well as the scope of the measures and who can take such measures.

As a result, there are two different arguments disputing in determination of the extent of application of the measures. The first considers the measures taken after the occurrence of harm are not technically have preventive character and only aims to reduce damage caused by a hazardous activity and consider them have measures of reparation.\textsuperscript{74} The second view which has been supported by the Special Rapporteur Barboza considers the concept of prevention includes the measures taken for the prevention of an event before the occurrence and those taken for reduction of damage caused to avoid a multiplier impact.\textsuperscript{75} Consequently, preventive measures taken after the accident occurrence to prevent or minimize its transboundary harmful effects are

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\textsuperscript{71} Article I (1) (n), Amended Vienna Convention; Article 1 (a) (ix), Amended Paris Convention.

\textsuperscript{72} Article 2 paragraph 9 of the Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment

\textsuperscript{73} Article 3 of the 2001 ILC Draft Articles on Prevention of Transboundary Harm from Hazardous Activities.

\textsuperscript{74} YILC, 1994, vol. II, Part Two, at p. 154, Para. 364.

\end{flushleft}
preventive measures.\textsuperscript{76} According to Barboza, preventive measures means ‘any measures intended to prevent or intercept that chain of cause and effect relationships which would prevent or reduce the harmful transboundary effects’.\textsuperscript{77} Thus, Barboza in his opinion that the measures taken before the accident to avoid the accident occurrence and those taken after the accident occurrence to reduce its consequences from reaching their full potential are considered as preventive measures as well. This is because such accident might be caused as a result of series of causes and effect relationships which in the end result transboundary environmental damage.\textsuperscript{78}

The Special Rapporteur thus distinguishes between activities involving risks and those with harmful effects and interprets the obligation of prevention in two ways. The first includes the prior measures to be taken before the accident occurrence for the prevention of the accident from the occurrence. This applies in the activities involving risks. The second includes the measures taken after the accident occurrence to reduce the scope and degree of damage caused by the accident. This applies on the activities involving harm.\textsuperscript{79}

Similar view was taken with regard to covering costs of preventive measures under the nuclear liability conventions. These Conventions were covering only costs of preventive measures taken after a nuclear accident. These measures are usually taken after the early notification by the Accident State for a nuclear accident and requesting the assistance in order to prevent and reduce damage caused by the accident. The measures are taken after a nuclear accident in order to restore the environment to its previous conditions and thus those taken before a nuclear accident were not covered. This raised disagreement by the doctrine of international law concerning covering costs of preventive measures taken before a nuclear accident occurrence. This doubt has been eliminated after amending of the nuclear liability conventions to


cover costs of preventive measures in case of imminent threat to cause of a nuclear accident if another State or the victims have taken such measures.\textsuperscript{80}

This view found support in the doctrine of the 1982 UNCLOS which included the two concepts, the prevention and mitigation of environmental damage caused to the maritime environment. This Convention obliges States to prevent, control, and reduce transboundary pollution damage caused to the maritime.\textsuperscript{81} It provides that:

\begin{quote}
States shall take all measures necessary to ensure that activities under their jurisdiction or control are so conducted as not to cause damage by pollution to other States and their environment, and that pollution arising from incidents or activities under their jurisdiction or control does not spread beyond the areas where they exercise sovereign rights in accordance with this Convention\textsuperscript{82}.
\end{quote}

In application of this Convention to nuclear activities, in MOX Plant Case Ireland asked the Tribunal (ITLS):

\begin{quote}
That the United Kingdom has breached its obligations under Articles 192 and 193 and/or Article 194 and/or Article 207 and/or Articles 211 and 213 of UNCLOS in relation to the authorisation of the MOX plant, including by failing to take the necessary measures to prevent, reduce and control pollution of the marine environment of the Irish Sea from (1) intended discharges of radioactive materials and
\end{quote}


\textsuperscript{81} ILM 21, 1261, 1294.

\textsuperscript{82} Article 194 (2) of the 1982 UNCLOS.
or wastes from the MOX plant, and/or (2) accidental releases of radioactive materials and/or wastes from the MOX plant and/or international movements associated the MOX plant, and/or (3) releases of radioactive materials and/or wastes from the MOX plant and/or international movements associated the MOX plant with the of resulting from terrorist act’;  

The obligation of a State to take preventive measures to prevent environmental damage also has been supported by other international instruments. For instance, the Convention on the High Seas imposes an obligation upon the States to take the necessary measures to prevent pollution

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There are also a number of international instruments in the area of international civil liability and the environment support that direction.\footnote{In this relation, Article 3 paragraph 1 of the Convention on the Transboundary Effects of Industrial Accident stated that ‘The Parties shall taking into account efforts already made at national and international levels, take appropriate measures and cooperate within the framework of the Convention, to protect human beings and the environment against industrial accidents by preventing such accidents as far as possible, by reducing their frequency and severity and by mitigating their effects. To this end, prevent, preparedness and response measures, including restoration measures, shall be applied’. ILM, vol. XXXI, 1992, at p. 1333. The Convention was adopted in Helsinki, 17 March 1992. The text of the Convention also is available at: \url{http://sedac.ciesin.columbia.edu/entri/texts/industrial.accidents.1992.html} (accessed on 23.3.2010). Article 2 (1) of the 1991 Espoo Convention obliges the State parties to take either individually or jointly, ‘all appropriate and effective measures to prevent, reduce and control significant adverse transboundary environmental impact from proposed activity’.

In short, there is no precise definition of the concept of preventive measures under the general rules of international law and not clear whether that concept only applies to preventive measures taken before an accident or also includes those taken after the accident. In our point of view that the notion of preventive measures should include measures to be taken before and after a nuclear accident occurrence. This is because according to the rules of international law, the State in whose territory the nuclear activity is located or under its jurisdiction or control the activity is operated should, for instance, issue an authorization for the operation of the activity and enact legislation before commencing the operation of the activity. These are considered forms of preventive measures. The expanding of the concept of preventive measures to cover
measures of prevention and measures of minimizing the damage reflects in expanding the scope of the liability of the State. If the measures of prevention cover only measures to reduce damage, then the State is not liable for costs of other preventive measures.

3.3. Due diligence principle

The principle of due diligence is an old and essential principle in any legal system and stems its basis from the English common law of tort.\textsuperscript{87} It is one of the main elements to achieve the objectives of the duty of prevention and serves as a basis of State responsibility in international law. In relation to nuclear activities, under international law there is an obligation upon the State of origin to take all the possible care to prevent environmental damage caused by a nuclear activity. The principle of due diligence requires legislation and administrative controls to private and public conduct in order to protect other States and the global environment.\textsuperscript{88} Also, the obligation of prevention requires States in whose territory or under jurisdiction or control a hazardous activity have been carried out to exercise due diligence and to act reasonably and in good faith and to regulate such activities in order to avoid damage caused to other States and the environment.\textsuperscript{89} To assess whether or not a State has complied with the requirement of due diligence, it requires an assessment of the conduct of the State to see whether or not it is corresponded with the existing rules and standards established for that conduct. It also entails a comparison of the conduct of the State with the average standard of conduct performed by other States in similar environmental cases.\textsuperscript{90} For instance, the presence or absence of proper

\textsuperscript{87} Xue Hanqin, “Transboundary Damage in International Law”, 2003, at p. 162.

\textsuperscript{88} Patricia W. Birnie and Alan E. Boyle, International Law & the Environment, 1992, at p. 92.


environmental impact assessments carried out by the Installation State can serve as a standard for determining whether or not due diligence has been exercise according to international law. Thus, the failure of a State to control its conduct within the average conduct of other States and to pursue due diligence to prevent significant transboundary environmental damage by a nuclear activity constitutes State responsibility.\textsuperscript{91} The State also is responsible to exercise due diligence to prevent conduct of private person in case of violation of international obligations.\textsuperscript{92}

The principle has been supported by international instruments and doctrine of international law.\textsuperscript{93} In this relation, the 1982 UNCLOS obliges States to take ‘all measures consistent with the Convention that are necessary to prevent, reduce and control pollution of the maritime environment from any source, using for this purpose the best practicable means at their disposal and in accordance with their capabilities…’\textsuperscript{94}

Nevertheless, the due diligence standard to prevent environmental damage was criticized. It was argued that, the obligation of a State under the duty of due diligence is not absolute. In the Case Concerning Gabcikovo-Nagymaros Project Hungary claimed that:


\textsuperscript{92} Smith, 1988, at p. 36.


\textsuperscript{94} Article 194 (1) of the 1982 Convention on the Law of the Sea.
‘the duty of prevention is not ... an absolute one, whether the state has fulfilled its obligations in this regard is measured by the rules of due diligence ... In the context of the present case, due diligence is the means by which the general principle of the harmful use of territory is to be applied taking into account the specific elements of the situation’.

Moreover, this principle does not impose an obligation upon the State of origin to reach certain results. It only imposes an obligation on it to take the reasonable care to prevent the damage according to the available circumstances in a given case. Thus, the standard of care for prevention of harm under the duty of due diligence is a flexible one rather than an absolute prevention standard. Also, the duty of due diligence in customary international law requires effective national legislative and administrative controls. However, this standard is not efficient because the conduct of the States to apply this standard is still vague. This requires more specific definitions of due diligence which can range from the simple best available technology, best practicable means, and best management practices to more elaborate definitions. This view has been expressed by the Institute of International law in its Draft Articles on Responsibility and Liability under International law for Environmental Damage. This Draft Articles provides that, ‘When due diligence is utilized as a test for engaging responsibility it is appropriate that it be measured in accordance with objective standards relating to the conduct to be expected from a

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good government and detached from subjectivity. Generally accepted international rules and standards further provide an objective measurement for the due diligence test.98

Thus, the application of the duty of due diligence in relation to the prevention of environmental damage caused by nuclear accidents is a problematic. This is because nuclear safety standards established by the IAEA are not binding to the States and only guiding them to establish national safety systems.99 Also, the provisions of the 1994 Nuclear Safety Convention and other related instruments are formulated as type of recommendations and do not provide for specific commitments for State to prevent nuclear accidents. In conclusion, prevention of a nuclear accident requires strict standards of care as possible as to meet the demand of the nuclear industry as the most hazardous activities. Similarly, liability for damage caused by such activities requires strict standards of liability. This has been realized after the 1978 Cosmos 954 accident and Chernobyl accident which necessitated reformulation of the existing the rules of liability in more specific to be capable to apply to transboundary environmental damage caused by such accidents.100

3.4. The precautionary principle

Nuclear activities as most hazardous activities are usually conducted with caution and under precautionary measures. Such precaution is required to avoid accidents caused by nuclear activities and to reduce the harmful consequences of such accidents if damage has been already materialized. Therefore, before conducting a nuclear activity, precaution should be

98 Article 3 of the 1997 Draft Articles on “Responsibility and Liability under International Law for Environmental Damage” drafted by the Institute of International law.


taken not only by the Installation State but also by other States likely to be affected by the harmful consequences of a nuclear accident. As Wiener pointed out:

‘Precaution is a strategy for addressing risk. Risk of future harm is always uncertain. At its essence, precaution entails thinking ahead and taking anticipating action to avoid uncertain future risks. Doing so necessitates the capabilities to identify hazards and opportunities, to forecast scenarios and their associated outcomes, and to take anticipated measures to manage causes before adverse substances occur’.

According to Van Dyke, these scenarios and strategies under the precautionary principle should include: developments and initiatives affecting the environment which should be assessed before action is taken place; the establishment of new safe programs and standards; exploring alternative technologies; the absence of full scientific certainty should not limit precautionary measures to protect the environment; postponed or cancelled the action whenever serious or irreversible damage is anticipated.


The precautionary principle is one of the general principles in international law which are necessary for the protection of the environment. The rules governing this process constitute a customary principle of international law and form the basis of State liability for environmental damage caused by nuclear activities. Due to the urgent need to address the environmental problems that emerged with increasing the use of hazardous activities, these rules were adopted in several international instruments and endorsed by some of the doctrine and judicial bodies as a customary principle of international law. The principle has been included in the Stockholm and Rio Declarations and reflected in a number of international instruments. In this relation, Principle 15 of the Rio Declaration provides that, ‘In order to protect the environment, the 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’. Under this principle, there is a presumption that the activity will cause serious harmful consequences to the environment and that is prohibited and it should take precautions to make such risk or injury lower, even if there is no guarantee that risks or injury will materialize.104

The precautionary principle has been adopted in various national and international instruments.105 For instance, it was adopted the 1992 Maastricht Treaty in Article 130 R (2)106

104 Jonathan Verschuuren, “Mensenrechten en milieu”, at Para. 2.1. This article is available at: http://arno.uvt.nl/show.cgi?fid=4974 (accessed on 25.3.2010)


and renumbered Article 174, now renumbered in Lisbon Treaty Article 191 (2), in German law, Swedish law and Swiss law. It also was adopted in the 1999 Canadian Environmental Act Protection, the French Environment Charter of 2004, Article 5 and the Preamble of the French constitution of 2005.108

The precautionary principle has been discussed in certain individual opinions in the Southern Bluefin Tuna Cases (New Zealand v. Japan) (Australia v. Japan) (Request for Provisional Measures, International Tribunal for the Law of Sea, 27 August 1999). However, in this case the precautionary principle was not discussed by the Tribunal and therefore its recognition as legal principle in international law is questionable. It was considered as a precautionary approach and not a precautionary principle. The precautionary principle has been discussed by the judges of the ICJ and received recognition particularly in the Dissenting Opinion of Judge Weeramantry on “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)”, Order of 22 September 1995. The international courts and tribunals are still reluctant to admit the status of the principle as a


customary international law. This is because the precautionary principle is indeed still a novel one emerged as result of increasing the use of hazardous activities and emerging serious environmental problems. These facts have been observed by Judge Wolfrum in his separate opinion in MOX Plant Case in which he stated that:

‘It is still a matter of discussion whether the precautionary principle or the precautionary approach in international environmental law has become part of customary international law. The Tribunal did not speak of the precautionary principle or approach in its Order in the Southern Bluefin Tuna Cases. Note should be taken of the fact, though, that the precautionary principle is part of the OSPAR Convention. This principle or approach applied in international environmental law reflects the necessity of making environment-related decisions in the face of scientific uncertainty about the potential future harm of a particular activity. There is no general agreement as to the consequences which flow from the implementation of this principle other than the fact that the burden of proof concerning the possible impact of a given activity is reversed. A State interested in undertaking or continuing a particular activity has to prove that such activities will not result in any harm, rather than the other side having to prove that it will result in harm’.  

Indeed, it could be argued that the precautionary principle is an application to the due diligence principle which imposes an obligation upon the Installation State to take all the care to control a nuclear activity and to ensure that environmental damage has not been caused by such activity.

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There is a considerable amount of literature discussed in general the emergence of the precautionary principle in international law.\textsuperscript{114} However, as any emerging new legal principle, the principle is still controversial and disputable by the doctrine of international law and not accepted as a customary or general principle of international law. Also, some writers doubt the status of the principle to be environmental policy. This is because there is scientific uncertainty and a straightforward application of the precautionary principle which ‘would have resulted in the impossibility of the proceeding with any activity’.\textsuperscript{115} Yet, whatever it called it precautionary principle or precautionary approach it predicts for growing a legal principle which considers the basis of State responsibility for the protection of the environment. In this relation, it was argued that the precautionary principle is an attempt for the codification of the concept of precaution in law in general and the most prominent and controversial development in international environmental law in the last two decades. As some writers forecast that it could become a fundamental principle in policy and law in general for the protection of the environment.\textsuperscript{116} Brownlie argues that, ‘The point which stands out is that at least some applications of the precautionary approach, which is based upon the principle of foreseeable risk to other States, are encompassed within existing concepts of State responsibility’.\textsuperscript{117} Thus, the precautionary principle will be an affective source of State responsibility to ensure that the


precautionary measures been taken by the State to prevent environmental damage caused by a nuclear activity before a nuclear accident has been taken place.

4. The duty of co-operation to control a nuclear activity

In general, the principle of co-operation is an essential principle in international law required to strengthening the social, political and economic relations between States. The principle has particular importance in respect of the use of nuclear energy as a hazardous activity and the protection of the environment. It is difficult to implement effective measures for the protection of the environment and no State is capable to protect its own environment without close cooperation between States. According to this principle, the Installation State has to co-operate with other States in good faith and to provide the relevant information related to the proposed activity before and during the operation of the activity to prevent environmental damage likely to be caused by a nuclear accident during the normal operation. The States also are obliged to co-operate in case of a nuclear accident to overcome the harmful consequences


119 Declaration on Principles of International Law Friendly Relations and Co-operation Among States in Accordance with the Charter of the United Nations which was adopted by the United Nations General Assembly on 24 October 1970. This Declaration states that, ‘States have the duty to co-operate with one another, irrespective of the differences in their political, economic and social systems, in the various spheres of international relations, in order to maintain international peace and security and to promote international economic stability and progress, the general welfare of nations and international co-operation free from discrimination based on such differences’. The text of the Declaration is available at: http://www.hku.edu/law/conlawhk/conlaw/outline/Outline4/2625.htm (accessed on 31.8.2009)

of the accident and to cope with it in keeping its scope as limited as possible. Thus, the duty of co-operation has two aims; the first is to prevent the accident which may cause damage, the second is to mitigate the effects of the accident which has occurred.\footnote{YILC 1989, vol. II, Part one, at p. 140.}

The fact that it has been recognized that damage caused by a nuclear accident may cross the boundary of the State and then the States have to co-operate to develop a regulatory regime aimed at the safe operation of a nuclear facility and to keep the damage at the minimum level as possible. This cooperation is mainly based on providing the relevant information related to the activity. Thus, the obligation of co-operation is interrelated with other duties such as notification, consultation and negotiation.\footnote{The duty of notification and exchange information (Article 11) and duty to consult (Article 11) of the draft articles on international liability for lawful activities.} Accordingly, the State must co-operate with other States particularly the neighbours in providing, for instance, the relevant information to environmental impact assessment, notification, consultation and negotiations in order to avoid adverse effects caused to the environment.\footnote{Alan E. Boyle “Nuclear Energy and International Law: Environmental Perspective”, in: The British Year Book of International Law, 1989, at p. 279.}

Moreover, it should be noted that, the objectives of the principle of co-operation is incomplete without the reference to the role of international organisations in enhancing the cooperation between States. The main purpose of these organizations is to promote co-operation among States for the purposes for which they have been established. They play an essential role in the assistance and co-ordination between States during construction, operation and in the emergency situations to prevent and reduce damage caused by industrial catastrophes.\footnote{S. Hashim (Hashim, 1991), “International Responsibility for Violation of the Safety of Maritime Environment”, (Arabic edition) Cairo 1991, at p. 533.} In this relation, the IAEA, for instance, plays an important role in coordination between States and
provides them the technical assistance during construction and operation of a nuclear installation as well as in case of a nuclear accident. Thus, the source State is required to co-operate with the affected States and other States and international organisations.

The obligation to co-operate to prevent and reduce nuclear damage is based on the existing rules adopted by customary international law, international conventions and decisions of international courts. The Principle has taken the soft legal status in the 1972 Stockholm and the 1992 Rio Declarations on the Environment and the Development. According to the Stockholm Declaration:

‘International matters concerning the protection and improvement of the environment should be handled in a cooperative spirit by all countries, big and small, on an equal footing.

Cooperation through multilateral or bilateral arrangements or other appropriate means is essential to effectively control, prevent, reduce and eliminate adverse environmental effects resulting from activities conducted in all spheres, in such a way that due account is taken of the sovereignty and interests of all States’.

The principle of cooperation has further developed by the adoption of the 1992 Rio Declaration which provides not only for the cooperation of States in taking effective measures for the protection of the environment, but also in developing national and international liability regime of liability and compensation for damage caused to the environment. In its

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127 Principle 24 of the Stockholm Declaration.

128 Principle 13 of the 1992 Rio Declaration; See also Principles 7, 9, 10, 12, 18, 19, 24 and 27 of this Declaration.
session held from 9-25 May 1978, also the United Nations Environmental Program\textsuperscript{129} prepared draft principles by the Working Group of Experts related to the co-operation in the field of the environment in case of natural resources shared by two or more States.\textsuperscript{130} On 14\textsuperscript{th} of November 1974, a Recommendation was adopted by the Council of the Organisation for Economic Co-operation and Development concerning Transfrontier Pollution.\textsuperscript{131} It recommends Member States to cooperate in developing international law regime applicable to transfrontier pollution.\textsuperscript{132}

The obligation of co-operation between States has further developed in the ILC draft Articles on international liability of the act not prohibited by international law. In order to elaborate this draft articles the Special Rapporteur Quentin Baxter suggested the duty of co-operation between States to reduce and prevent the damage caused by the industrial catastrophes. States are required to co-operate with each other in controlling transboundary effects resulting from industrial catastrophes which cause damage to people, property and the environment. This has been reflected in Article 7 of this Draft Articles which provides for the co-operation between States in good faith in order to prevent and reduce damage caused by such activities. They must endeavour to minimise the effects as soon as possible. The Principle has been affirmed by the ILC Draft Articles on prevention of transboundary harm which states that, ‘States concerned shall cooperate in good faith and, as necessary, seek the assistance of one or more competent international organizations in preventing significant transboundary harm or at any event in

\begin{footnotes}
\item[129] ILM, 17, 1978, p. 1091.
\item[130] ILM, 17, 1978, p. 1097.
\item[131] ILM, 14, 1974, p. 242.
\end{footnotes}
minimizing the risk thereof. The duty has also been reflected in the ILC’s codification of the law of international watercourses. Article 8 of the Draft Articles on the Law of Non-Navigational Uses of International Watercourses provides that ‘watercourse states shall cooperate on the basis of sovereign equality, territorial integrity and mutual benefit in order to attain optimum utilisation and adequate protection of an international watercourse.’ The duty of cooperation is indeed has successful applications in field of international watercourses via international systems.

The duty of co-operation has been reflected also in international practice. It has been adopted, for instance, in Article 3 of the Charter of Economic Rights and Duties of States and in Article 197 of the United Nations Convention on The Law of The Sea in 1982. Moreover, after the Chernobyl accident the Principle was adopted by the 1986 Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency. This Convention imposes upon the Contracting States a general duty to co-operate with each other and with the IAEA to facilitate prompt assistance in the event of a nuclear accident or radiological emergency. The 1992 Convention on the Transboundary Effects of Industrial Accidents aims at the protection of people and the environment from industrial accidents. It provides for taking preventive measures to prevent industrial accidents and providing the necessary information and

133 Article 4 of the 2001 ILC Draft Articles on Prevention of Transboundary Harm from Hazardous Activities.
137 Alan E. Boyle, BYBIL, 1989, at p. 278.
response to accidents in order to reduce harmful impact of such accidents including the impact of accidents caused by natural disasters. It also provides for international cooperation and mutual assistance, research and development, exchange of information and technology to prevent accidents caused by the industrial technology.\textsuperscript{139}

The principle of cooperation has reflected in a number of international instruments related to the protection of the environment. It also reflected in a number of bilateral agreements dealing with nuclear installations. These agreements require a full exchange of information between the Installation State and other States on the proposed nuclear installation so that these States can review the decision-making process and data and offer comments on safety and health protection of people and the rules protecting the environment.\textsuperscript{140} In general, in the sphere of operation of nuclear installations, a number of bilateral agreements between States were concluded on the issues related to liability, radiation protection and safety of nuclear


Concerning the operation of nuclear power plants, a number of agreements were concluded between neighbouring countries. Some of these agreements were adopted by exchange of letters. For instance, the agreement between Belgium and France on Radiological Protection for the Operation of the Ardennes Nuclear Power Station in French territory near the Belgian border was signed on 23 September 1966.\footnote{142}{UNTS, vol. 588, 1967, p. 227.} The agreement between Denmark and the Federal Republic of Germany for the exchange of information regarding the construction of nuclear installations along the border was signed on 4 July 1977.\footnote{143}{ILM, 1978, vol. 17, No. 1, p. 385.} There was an exchange of notes on 16 July 1976 between France and the Union of Soviet Socialist Republics on the prevention of accidental or unauthorised use of nuclear weapons that may cause injuries to the other Contracting Party.\footnote{144}{UNTS, vol. 1036, p. 299.} The agreement between Germany and Switzerland for the reciprocal provision of information concerning the construction and operation of nuclear installations in frontier areas was signed in Bonn on 10 August 1982.\footnote{145}{UNTS, vol. 1387, p. 279.} Although these agreements are not directly relevant to the question of liability, they contain provisions for obligations of States

\begin{itemize}
  \item UNTS, vol. 1036, p. 299.
  \item UNTS, vol. 1387, p. 279.
\end{itemize}
parties to observe international standards of safety on construction and operation of nuclear power plants between the neighbours States. States would be subject to international liability in cases of a breach of the obligations contained in these agreements.

The duty of cooperation has been affirmed by Lake Lanoux arbitration between France and Spain in 1957.\textsuperscript{146} It has applied by the International Tribunal of the Law of the Sea (ITLS) in the Case concerning the MOX Plant which had been brought by Ireland vis-à-vis the United Kingdom in 2001. Ireland requested the Tribunal to order provisional measures in which the UK had to suspend the authorization of the MOX Plant and to take the necessary measures to prevent the operation of the Plant and to ensure that no movement of radioactive substances or material or waste into or out through its waters sovereignty.\textsuperscript{147} Accordingly, the Tribunal ordered the two States to co-operate and, for that purpose, to enter into consultations in this concern. As the judgement stated:

‘Ireland and the United Kingdom shall cooperate and shall, for this purpose, enter into consultations forthwith in order to: (a) exchange further information with regard to possible consequences for the Irish Sea arising out of the commissioning of the MOX plant; monitor risks or the effects of the operation of the MOX plant for the Irish Sea; devise, as appropriate, measures to prevent pollution of the marine environment which might result from the operation of the MOX plant’.\textsuperscript{148}

\textsuperscript{146} PCIJ, Series A / B, No. 42, p. 103.


Similar judgment by the same Tribunal is the Case Concerning Land Reclamation by Singapore in and Around the Straits of Johor. In the judgment the Tribunal ordered the two parties to consult and cooperate in taking appropriate measures to deal with the adverse effects resulting from land reclamation.\textsuperscript{149}

Accordingly, the Installation State should co-operate with other States which are likely to be affected by a nuclear activity, particularly with the neighbour States and the competent organizations in preventing damage caused by such installations and to seek assistance in case a nuclear accident has occurred. This co-operation must be pursued during the different phases of conducting the nuclear activity, before commencing the operation of the activity, during the operation and in case of a nuclear accident. The co-operation may take different forms including providing the relevant information about proposed activity, environmental impact assessment, exchange of information, providing information to the public, consultation, notify other States in case of a nuclear accident and to assist in case of a nuclear accident. The cooperation in these issues is intended to control the activity to not cause environmental damage to other States. This requires close cooperation between the source State and the States likely to be affected by the activity. This particularly important because

\textsuperscript{149} The Tribunal stated that, ‘Malaysia and Singapore shall cooperate and shall, for this purpose, enter into consultations forthwith in order to: (a) establish promptly a group of independent experts with the mandate (i) to conduct a study, on terms of reference to be agreed by Malaysia and Singapore, to determine, within a period not exceeding one year from the date of this Order, the effects of Singapore’s land reclamation and to propose, as appropriate, measures to deal with any adverse effects of such land reclamation; (ii) to prepare, as soon as possible, an interim report on the subject of infilling works in Area D at Pulau Tekong; (b) exchange, on a regular basis, information on, and assess risks or effects of, Singapore’s land reclamation works;’ The Case Concerning Land Reclamation by Singapore in and Around the Straits of Johor, (Malaysia v. Singapore), 8 October 2003 Order, Para. 106. This judgment is available at: http://www.itlos.org/start2_en.html (accessed on 19.8.2009)
the source State has the right to exercise the control not only over activities carried out within its territory, but also when the activity has been conducted under jurisdiction or control in other areas outside its territory. Yet, the concept of control under international law is still vague and ambiguous, as has been used by some jurists and in some instruments in different notions.\(^{150}\)

5. Conclusions

The article investigated the legal basis of the principle of prevention as an essential in international law required for conducting a nuclear activity to prevent and reduce damage caused by a nuclear accident. The investigation concludes that the principle of prevention is a fundamental principle emerged within the body of contemporary international law. It aims at the prevention and reduction of environmental damage by a hazardous activity. The principle is a general principle in international law that can apply to environmental damage caused not only by nuclear activities, but also by other hazardous activities in general. Also, there is evidence in international law that the principle of prevention has become a customary international law principle. Moreover, the principle of prevention has been based on the cooperation between States in taking numerous of general and procedural obligations required to ensure the safe operation of a nuclear installation. These obligations include *inter alia* the obligation of the Installation State to establish a regulatory regime, taking the nuclear safety issues and due diligence, inspection of the installation, taking preventive measures and precaution, providing the necessary information to the public and the States, negotiation and cooperation with other States regarding the assumed activity and notification and assistance in case of a nuclear catastrophe.

These obligations constitute the core of the principle of prevention and should be fulfilled by the Installation State and other States, so that to prevent and reduce environmental damage caused by a nuclear activity. Therefore, the principle of cooperation between States is required in order the principle of prevention to be effective in prevention of a nuclear accident.

Some of these principles emerged in international law since long time ago, e.g., the principles of due diligence, while others are recently developed, e.g., the precautionary principle. These principles are the fundamental obligations which constitute the basis of the obligation of prevention and considered by some writers theories to base the liability under international law in general and for environmental damage in particular. Also, some of these principles are not accepted as customary international law. For instance, the precautionary principle is not accepted by some jurists to be general principles or customary international law principles. These general conclusions led to some other conclusions.

First, apart from the principle of prevention, there are two main procedural duties upon any State conducting a nuclear activity. These include the duties of Installation State to control the nuclear activity and not to cause environmental damage to other States and to cooperate with States likely to be affected by the activity and international organizations. Control of the activity by the Installation State and close cooperation with States likely to be affected by the activity is necessary to avoid the occurrence of nuclear accidents. It also significant to prevent damage caused by a nuclear installation and to reduce harmful consequences if such accidents have occurred. These two main obligations are interrelated with other obligations inter-alia, the establishment of a regulatory regime, prior authorization, inspection and safety of nuclear reactor installations, preventive measures and control of nuclear installations, notification for a nuclear accident and cooperation and assistance in case of a nuclear accident.
Second, these obligations are the content of the general obligation of prevention under international law for the prevention and reduction of environmental damage caused by a nuclear accident. This general obligation enforces the Installation State to take precautionary measures, due diligence and preventive measures to prevent and reduce damage caused by a nuclear accident. Yet, a distinction between the obligation of prevention and the obligation of reduction of the harmful consequences has been made. The obligation of prevention obliges the Source State to take the necessary measures to prevent the occurrence of a nuclear accident and to prevent its harmful consequences. This means that under the principle of prevention, preventive measures should be taken before and after a nuclear accident. However, the obligation of reduction only obliges the source State to take the necessary measures to reduce the consequences of a nuclear accident after occurrence. In other words, the principle of prevention implies in the event of new environmental damage caused by a hazardous activity, while the principle of reduction applies to the existing damage caused by the activity.

Third, the State is not allowed to use nuclear activities in case of negligence to implement the due diligence or due care conditions which may result damage to other States and the environment. In general, the principle of due diligence requires the State to take legislation and administrative controls to private and public conduct within its territory or under jurisdiction or control. Thus, in case of a hazardous activity carried out by the State, it has to exercise due diligence and to act reasonably and in good faith and to regulate such activities in order to avoid damage caused to other States and the environment. The assessment whether or not a State has complied with the requirement of due diligence is subject to comparison of the conduct of the State with the conduct of other States in similar environmental cases. Thus, the principle is based on the comparison of conduct of the State with the average conduct of other States. The failure of a State to meet this standard based on the existing legislation and regulations constitutes State responsibility. Thus, the principle is a basis of State responsibility to prevent nuclear accident to
be taken place. Nevertheless, the prevention of a nuclear accident under the principle is not absolute. This is because State under the duty of due diligence is not absolute. The principle does not impose an obligation upon the Installation State to reach certain results. It only obliges it to take the reasonable care to prevent a nuclear accident according the available circumstances. In addition, nuclear safety standards established by the IAEA under the existing instruments for the safety of nuclear installations are formulated as a type of recommendations. Thus, due diligence doctrine will not meet the demand of nuclear energy which needs strict standard and rules capable to prevent nuclear accidents.

Fourth, the application of the principle of precautionary principle is important for the prevention of environmental damage caused by the nuclear activities. However, the status of principle is still disputed. The precautionary principle is not clear to be considered a general principle or approach. The principle is recently emerged and still controversial to be considered a customary international law principle. It is based on the fact that the State has to take all the preventive measures to prevent a nuclear accident. The failure of a State to take such measures constitutes State responsibility. Therefore, the precautionary principle is an application to the principle of due diligence which is considered as general principle apply in different cases. The principle of precautionary is efficient principle for the protection of the environment. It predicts for the emerging a legal principle for the basis of State responsibility for environmental damage caused by hazardous activities in general and in particular for nuclear activities.