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State Responsibility and Liability for Nuclear Damage

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STATE RESPONSIBILITY AND LIABILITY FOR NUCLEAR DAMAGE[1]

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I. INTRODUCTION

States are responsible for violations of the rules of international law that can be attributed to them.[3] As a matter of customary law, reaffirmed by the UN International Law Commission, breach of an international obligation gives rise to an independent and automatic duty to cease the wrongful act and to make reparation.[4] The question of state responsibility and liability for nuclear damage raises specific questions which must be examined in the general framework of international legal rules related to responsibility and liability. This paper will discuss the most relevant rules adopted in this field by the UN International Law Commission and analyzes first, the question of whether and how far such rules can be applied to the violation of general, mostly customary rules of international law, and second, breaches of treaties related to nuclear activities and damage caused by such activities.

II. NUCLEAR ACTIVITIES AND OBLIGATIONS NOT TO CAUSE TRANSBOUNDARY ENVIRONMENTAL DAMAGE

According to the International Law Commission, every internationally wrongful act of a State entails the international responsibility of that State.[5] A wrongful act is defined as State conduct consisting of an action or omission attributable to the State and constituting a breach of an international obligation of that State.[6] Thus, the first question to ask is whether nuclear activities can constitute a breach of international obligations. Two hypotheses must be examined in this regard. The first concerns the effects that such activities can produce outside the territory of that State. The second question is whether international legal rules prohibit or limit nuclear activities in the absence of any transfrontier effect.

The answer to the first question can be found in customary international law rules, initially formulated in the 1941 arbitral sentence handed down in the *Trail*

1. Originally presented as part of the Conference on the Human Right to a Safe and Healthful Environment and the Responsibility under International Law of Operators of Nuclear Facilities.

2. We regret Professor Kiss, one of the most distinguished international lawyers, passed away.

3. G.A. Res. 56/83, Annex art. 1-2, U.N. Doc. A/RES/56/83 (Dec. 12, 2001).

4. *Id.* at arts. 30(a), 31(1).

5. Draft Articles on Responsibility of States for Internationally Wrongful Acts, G.A. Res. 56/83, Annex art. 1, U.N. Doc. A/RES/56/83 (Dec. 12, 2001) [hereinafter Draft Articles on State Responsibility].

6. *Id.* at art. 2.

Smelter Case between the United States and Canada. The arbitration tribunal declared that:

> [U]nder the principles of international law... 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.[7]

In 1949, the International Court of Justice in the *Corfu Channel Case* affirmed that no State may utilize its territory contrary to the rights of other states.[8] Finally, an arbitral award between France and Spain alluded to the violation of the rights of other states that may result from pollution of boundary waters.[9]

Based on such precedents, the principle of state responsibility for transboundary harm has been proclaimed by numerous international texts. Principle 21 of the Declaration adopted by the 1972 Stockholm Conference on the Human Environment stresses that states have the responsibility to ensure that activities under their jurisdiction or control do not cause damage to the environment of other states or areas beyond national jurisdiction.[10] The Declaration on Environment and Development, adopted by the 1992 Conference held in Rio de Janeiro reaffirms the same principle[11] which can also be found in various global environmental conventions including the 1982 Convention on the Law of the Sea[12] and the Convention on Biological Diversity[13] to which virtually all the States of the world are contracting parties. Finally, the International Court of Justice recognized in its advisory opinion on the *Legality of the Threat or Use of Nuclear Weapons*, "[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."[14]

This statement was repeated in the judgment concerning the *Gabčíkovo-Nagymaros Project,* in which the International Court of Justice also recalled that it has "recently had occasion to stress... the great significance that it attaches to respect for the environment, not only for States but for the whole of mankind."[15]

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7. Trail Smelter (U.S. v. Can.), 3 R. Int'l Arb. Awards 1905 (1938 & 1941) [hereinafter Trail Smelter decision].

8. Corfu Channel (U.K. v. Alb.), 1949 I.C.J. 4, 36 (Apr. 9, 1949).

9. *See generally* Lake Lanoux (Spain v. Fr.), 12 R. Int'l Arb. Awards 281 (1957).

10. Conference on the Human Environment, Stockholm, Swed., June 5-16, 1972, *Report of the United Nations Conference on the Human Environment*, Principle 21, U.N. Doc. A/CONF.48/14/REV.1 (Jan. 1, 1973) [hereinafter *Stockholm Declaration*].

11. Conference on Environment and Development, Rio de Janeiro, Braz., June 3-14, 1992, *Report of the United Nations Conference on Environment and Development*, vol. I, Principle 2, U.N. Doc. A/CONF.151/26/REV.1(VOL.I) (Jan. 1, 1993) [hereinafter *Rio Declaration*].

12. United Nations Convention on the Law of the Sea art. 194(2), Dec. 10, 1982, 1833 U.N.T.S. 3.

13. Convention on Biological Diversity art. 3, June 5, 1992, 1760 U.N.T.S. 79.

14. Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. 226, ¶ 29 (July 8, 1996) [hereinafter Nuclear Weapons Advisory Opinion].

15. Gabčíkovo-Nagymaros Project (Hung. v. Slovk.), 1997 I.C.J. 7, ¶ 53 (Sept. 25, 1997).

Principle 13 of the Declaration of the Conference on Environment and Development held in Rio de Janeiro in 1992 calls on states to "cooperate in an expeditious and more determined manner to develop further international law regarding liability and compensation for adverse effects of environmental damage caused by activities within their jurisdiction or control to areas beyond their jurisdiction."[16] Several international conventions also invite states to cooperate in the formulation and adoption of appropriate rules and procedures for the determination of liability and compensation for damage resulting from violations of obligations under their provisions.[17]

In addition to general international law rules imposing the duty to respect the environment in transfrontier relations, a series of international treaties either prohibits certain nuclear activities or includes prescriptions concerning such activities.

III. INTERNATIONAL TREATIES RELATED TO NUCLEAR ACTIVITIES

A. Prohibition or Regulation of Nuclear Activities

One of the oldest treaties prohibiting nuclear activities is the Antarctic Treaty adopted in Washington, D.C., on December 1, 1959.[18] Article V of the Antarctic Treaty prohibits any nuclear explosions and the disposal of radioactive waste on the sixth continent.[19] Still, the same provision leaves the door open under certain conditions for the conclusion of international agreements concerning the use of nuclear energy, including nuclear explosions and the disposal of radioactive materials. Another general prohibition concerns outer space: placing objects carrying nuclear arms on the moon or in orbit around the moon is forbidden by the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies of December 5, 1979.[20]

Most international nuclear regulations concern nuclear weapons. In 1995, the UN General Assembly asked the International Court of Justice for an advisory opinion on the legality of the threat of use of nuclear weapons.[21] The Court answered the request but reached its conclusions after some difficulty. First, it found by a vote of 11-3 that neither customary nor conventional international law prohibits nuclear weapons as such.[22] According to the Court, however, "threat or use of nuclear weapons should... be compatible with... the principles and rules of

16. *Rio Declaration*, *supra* note 11, Principle 13.

17. Comparable provisions are incorporated in several treaties concerning pollution. Convention on the Transboundary Effects of Industrial Accidents art. 13, Mar. 17, 1992, 2105 U.N.T.S. 457. However, other treaties such as the 1979 Convention on Long-Range Transboundary Air Pollution exclude the issue of responsibility and liability from their coverage. *See* Convention on Long-Range Transboundary Air Pollution, Nov. 13, 1979, T.I.A.S. No. 10,541, 1302 U.N.T.S. 217.

18. Antarctic Treaty, Dec. 1, 1959, 12 U.S.T. 794, 402 U.N.T.S. 71.

19. *Id.* at art. V(1).

20. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies art. 3(3), Dec. 18, 1979, 18 U.S.T. 2410, 1363 U.N.T.S. 21.

21. G.A. Res.49/75[K], U.N. Doc. A/RES/49/75 (Dec. 15, 1994).

22. Nuclear Weapons Advisory Opinion, *supra* note 14, ¶ 105(2)(B).

international humanitarian law, as well as with specific obligations under treaties and other undertakings which expressly deal with nuclear weapons."[23]

The Court noted that certain treaties prohibit the use of nuclear weapons in specific geographic areas, but none of them prohibit the threat of use of nuclear weapons.[24] It added, however, 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."[25]

The Court further recognized "that the use of nuclear weapons could constitute a catastrophe for the environment" which does not represent "an abstraction but... the living space, the quality of life and the very health of human beings, including generations unborn."[26] Given this, the Court held that "States must take environmental considerations into account when assessing what is necessary and proportionate in the pursuit of legitimate military objectives."[27] The Court also referred to provisions of Additional Protocol I to the 1949 Geneva Conventions, embodying "a general obligation to protect the natural environment against widespread, long-term and severe environmental damage."[28]

Nearly all states of the world are party to the oldest international treaty prohibiting specific nuclear activities, the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water, adopted in Moscow on August 5, 1963.[29] Five years later, the Treaty on Non-Proliferation of Nuclear Weapons (Non-Proliferation Treaty) obliged each state having no such weapons to ensure that nuclear materials, equipment, facilities and information are not used to advance military purposes.[30] The Non-Proliferation Treaty requires the more than 175 contracting states to accept international safeguards under the supervision of the International Atomic Energy Agency (IAEA), created in 1956 in order to hasten and increase "the contribution of atomic energy to peace, health and prosperity throughout the world."[31] The IAEA Statute provides for reporting requirements, installation of monitoring equipment, and on-site inspections.[32] More than 145 States have entered into bilateral safeguard agreements with the IAEA.[33] In addition, several regions of the world have declared themselves

23. *Id.* at ¶ 105(D).

24. *Id.* at ¶¶ 62, 63.

25. *Id.* at ¶ 105(E).

26. *Id.* at ¶ 29.

27. *Id.* at ¶ 30.

28. *Id.* at ¶ 31; *see* Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I) arts. 35(3), 55, June 8, 1977, 1125 U.N.T.S. 3.

29. Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water, Aug. 5, 1963, 14 U.S.T. 1313, 480 U.N.T.S. 43.

30. Treaty on the Non-proliferation of Nuclear Weapons art. III(1), July 1, 1968, 21 U.S.T. 483, 729 U.N.T.S. 161 [hereinafter NPT].

31. *Id.*; Statute of the Int'l Atomic Energy Agency [IAEA] art. II, Oct. 23, 1956, 276 U.N.T.S. 3 [hereinafter IAEA Statute].

32. IAEA Statute, *supra* note 31, art. XII.

33. IAEA Safeguards and Verification, http://www.iaea.org/OurWork/SV/Safeguards/sv.html (last

nuclear weapons-free zones. The use of nuclear energy for peaceful purposes is, however, admitted.[34]

The adoption of the Comprehensive Nuclear Test-Ban Treaty in New York on September 10, 1996 provided an important step forward in international nuclear regulatory law. Even though this treaty is not yet in force, practically all states signed and a large majority also ratified it.[35] The basic obligation it imposes upon the contracting parties is not to carry out any nuclear test explosion and to prohibit and prevent any such nuclear explosion under its jurisdiction or control.[36] Furthermore, parties also must "refrain from causing, encouraging, or in any way participating in the carrying out of any nuclear weapon test explosion or any other nuclear explosion."[37] This treaty additionally established the Comprehensive Nuclear Test-Ban Treaty Organization in order to ensure the implementation of its provisions.[38]

Many other international regulations of radiation aim to safeguard human health and life. These regulations are mainly related to the security of nuclear materials and of radioactive wastes. The IAEA Statute foresees that the Agency must adopt norms for nuclear safety and codes of procedure which it then proposes to member states.[39] These norms include radioactive waste management.[40] In the execution of its mandate, the IAEA had adopted guidelines for monitoring and preventing radiological contamination of personnel and the environment, safe handling and the transport of radioactive materials, treatment of radioactive wastes, and containment and safety of nuclear power plants.[41] Unfortunately, not all nuclear states have fully implemented these directives, which are recommendations considered "soft law."[42]

However, IAEA also sponsored legally binding treaties such as the Convention on Nuclear Safety adopted in Vienna on June 17, 1994 which entered into force two years later.[43] The Convention reaffirms "that responsibility for

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visited Oct. 16, 2007).

34. *See, e.g.,* Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean art. 1, Feb. 14, 1967, 634 U.N.T.S. 326; South Pacific Nuclear Free Zone Treaty art. 4, Aug. 6, 1985, 1445 U.N.T.S. 177; Treaty on the Southeast Asia Nuclear Weapon Free Zone art. 4, Dec. 15, 1995, 35 I.L.M. 635; Treaty on the Nuclear Weapon-Free Zone in Africa art. 8, Apr. 11, 1996, 35 I.L.M. 698.

35. Status of signatures and ratifications by geographic region, http://www.ctbto.org/s_r/310707_sigratpdf.pdf (indicating that out of 195 total States, 177 States had signed and 140 of those signatories had ratified as of Sept. 5, 2007) (last visited Oct. 16, 2007).

36. Comprehensive Nuclear Test-Ban Treaty art. I(1), Sept. 10, 1996, 35 I.L.M. 1439.

37. *Id.* at art. I(2).

38. *Id.* at art. II(A)(1).

39. IAEA Statute, *supra* note 31, art. III(A)(6).

40. IAEA Safety Standards: Radioactive waste management, http://www-ns.iaea.org/standards/documents/default.asp?sub=170 (last visited Oct. 16, 2007).

41. *See* Nuclear Safety and Security Publications, http://www-ns.iaea.org/publications/default.htm (last visited Oct. 16, 2007).

42. *See* David B. Dixon, *Transnational Shipments of Nuclear Materials by Sea: Do Current Safeguards Provide Coastal States a Right to Deny Innocent Passage?*, 16 J. TRANSNAT'L L. & POL'Y 73, 84-87 (2006).

43. Convention on Nuclear Safety, June 17, 1994, S. TREATY DOC. NO. 104-6 (1995), 1963

nuclear safety rests with the State having jurisdiction over a nuclear installation."[44] The general obligation of the contracting parties to this convention is "to establish and maintain effective defences in nuclear installations against potential radiological hazards," in particular by reviewing as soon as possible the safety of existing nuclear installations.[45] The Convention stresses the importance of the legislative and regulatory framework which each party shall establish and maintain in order to ensure the safety of the nuclear installations, including a system of licensing, inspection and term of licenses.[46] A regulatory body shall be established or designated in each contracting party[47] and adequate financial resources made "available to support the safety of each nuclear installation throughout its life."[48] State parties must establish and implement quality assurance programs for satisfying specific "requirements for all activities important to nuclear safety throughout the life of a nuclear installation."[49]

The Convention on Environmental Impact Assessment in a Transboundary Context also includes nuclear activities.[50] This instrument was prepared in the framework of the UN Economic Commission for Europe and adopted in Espoo, Finland on February 25, 1991.[51] The Convention obligates 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 activities."[52] In particular, the party of origin of an activity listed in Appendix I to the Convention shall ensure that "an environmental impact assessment is undertaken prior to a decision to authorize or undertake a proposed activity."[53] Nuclear power stations and other nuclear reactors must submit to the procedure of an environmental impact assessment, with the exception of "research installations for the production and conversion of fissionable and fertile materials, whose maximum power does not exceed 1 kilowatt continuous thermal load."[54] Appendix II gives the definition of the content of the environmental impact assessment documentation.[55] Appendix IV institutes an inquiry procedure and foresees mixed inquiry commissions of experts.[56] Appendix V has a particular importance since it provides for post-project analysis in order to monitor "compliance with the conditions as set out in the authorization or approval of the

U.N.T.S. 293 [hereinafter Convention on Nuclear Safety].

44. *Id.* at pmbl. iii.

45. *Id.* at arts. 1(ii), 6.

46. *Id.* at art. 7.

47. *Id.* at art. 8(1).

48. *Id.* at art. 11(1).

49. *Id.* at art. 13.

50. Convention on Environmental Impact Assessment in a Transboundary Context app. I(2)-(3), Feb. 25, 1991, 1989 U.N.T.S. 309.

51. *Id.*

52. *Id.* at art. 2(1).

53. *Id.* at art. 2(3).

54. *Id.* at art. 2(2); *id.* at app. I(2).

55. *Id.* at app. II.

56. *Id.* at app. IV.

activity and the effectiveness of mitigation measures."[57] Furthermore, Appendix V governs the "[r]eview of an impact for proper management and in order to cope with uncertainties" and the "[v]erification of past predictions in order to transfer experience to future activities of the same type."[58]

In Kiev on May 21, 2003, a Protocol to the Espoo Convention was adopted on Strategic Environmental Assessment, expanding the obligations of the contracting parties.[59] This Protocol aims to establish a new procedure providing for a high level of environmental protection by evaluating the likely environmental impacts, including health effects.[60] The procedure "comprises the determination of the scope of an environmental report and its preparation, the carrying out of public participation and consultations, and the taking into account of the environmental report and the results of the public participation and consultations in a plan or programme."[61] Transboundary consultation with concerned authorities shall be held for projects listed in Annex I to the Protocol, which includes decision-making related to production and conversion of fissionable and fertile materials with limited power.[62]

The Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters requires the state parties to take the necessary legislative, regulatory and other measures to achieve the objectives of the Convention.[63] The Aarhus Convention includes the following in the list of activities which must be submitted to the Convention's requirements when deciding whether to permit them:

> Nuclear power stations and other nuclear reactors including the dismantling or decommissioning of such power stations or reactors (except research installations for the production and conversion of fissionable and fertile materials whose maximum power does not exceed 1 kW continuous thermal load); Installations for the reprocessing of irradiated nuclear fuel....[64]

As to the transport of nuclear material, the IAEA adopted a Code of Practice on the International Transboundary Movement of Radioactive Waste in 1991.[65] This Code has the character of a recommendation but has been actually adopted by the UN and all other international organizations concerned with the transport of

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57. *Id.* at app. V(a).

58. *Id.* at app. V(b)-(c).

59. United Nations Economic Commission for Europe [UNECE], *Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context*, pmbl., U.N. Doc. ECE/MP.EIA/2003/2 (May 21, 2003).

60. *Id.* at art. 1.

61. *Id.* at art. 2(6).

62. *Id.* at art. 4(2); *id.* at Annex I(2).

63. Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters art. 3(1), June 25, 1998, 2161 U.N.T.S. 447.

64. *Id.* at art. 6(1)(a); *id.* at Annex I(1).

65. IAEA, *Code of Practice on the International Transboundary Movement of Radioactive Waste*, Gen. Conf. Res. 530, IAEA Doc. GC(XXXIV)/RES/530 (Sept. 21, 1990) [hereinafter *IAEA Code of Practice*].

hazardous materials, as well as by a large number of states.[66] In general, the regulation holds the shipper responsible for design safety and for the correct assembly of the package, as well as for labelling and marking.[67] The carrier is responsible for providing the necessary control measures during transport and storage in transit.[68] In June 2001, amendments to the International Convention for the Safety of Life at Sea sponsored by the International Maritime Organization[69] made mandatory an International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium, and High-Level Radioactive Wastes on Board Ships.[70] The Code's provisions include a shipboard emergency plan for an incident, training, cargo securing arrangements, notification in the event of an incident, and damage stability.[71]

B. Notification of Nuclear Accidents and Assistance

In 1969, the IAEA published directives concerning procedures to be followed in case of a nuclear accident.[72] These directives were further developed in 1981 and 1985 but were not implemented, as demonstrated by the Chernobyl accident of April 26, 1986 which released huge quantities of radioactive material into the air.[73] Although in the short term casualties were only observed in the Soviet Union, foreign consequences were severe. The radioactive cloud moved to Scandinavia first, then to the south, crossing Germany, Austria, Switzerland, Hungary and Italy.[74] No convention or other international regulation applied at the time the accident occurred; the interpretation then given of the Convention on Long-Range Transboundary Air Pollution excluded pollution by radioactive elements.[75] The IAEA was requested to assist in fact-finding concerning the circumstances of the accident and to prepare a text applicable in cases of nuclear accidents of international scope.[76] Two treaties were prepared with an unusual speed and both were adopted on September 26, 1986.[77]

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66. *Id.* at art. 1; *see, e.g.*, Prohibition of the Dumping of Radioactive Wastes, G.A. Res. 60/57, ¶ 3, U.N. Doc. A/RES/60/57 (Dec. 8, 2005); ALEXANDRE KISS & DINAH SHELTON, INTERNATIONAL ENVIRONMENTAL LAW 624 (3d ed. 2004); WORLD NUCLEAR TRANSPORT INSTITUTE, FACT SHEET NO. 1, SAFETY REGULATIONS GOVERNING THE TRANSPORT OF RADIOACTIVE MATERIAL, *available at* http://www.wnti.co.uk/UserFiles/File/public/publications/factsheets/wnti_fs_2007/FS-1.pdf.

67. KISS & SHELTON, *supra* note 66, at 624.

68. *Id.*

69. International Convention for the Safety of Life at Sea ch. VII (as amended June 2001), Nov. 1, 1974, 32 U.S.T. 47, 1184 U.N.T.S. 278.

70. International Maritime Organization [IMO], *International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on Board Ships (INF Code)*, IMO Doc. Resolution MSC.88(71) (May 27, 1999).

71. *Id.* at chs. 10, 9, 6, 11, 2.

72. KISS & SHELTON, *supra* note 66, at 618.

73. *Id.*

74. *Id.*, *supra* note 66, at 619; LORRIS G. COCKERHAM & BARBARA S. SHANE, BASIC ENVIRONMENTAL TOXICOLOGY 246 (CRC Press 1993).

75. KISS & SHELTON, *supra* note 66, at 619; Convention on Long-range Transboundary Air Pollution, Nov. 13, 1979, T.I.A.S. No. 10,541; 1302 U.N.T.S. 217.

76. KISS & SHELTON, *supra* note 66, at 122.

77. Convention on Early Notification of a Nuclear Accident, Sept. 26, 1986, 1439 U.N.T.S. 275,

The first of the two conventions, relating to early notification of a nuclear accident, establishes the essential obligation of states party to the convention to give notice, without delay, of any nuclear accident and to rapidly furnish pertinent available information in order to limit the radioactive consequences in other countries as much as possible.[78] Article 5 details the information to be furnished to the extent the notifying state knows, which includes the exact time, location and the nature of the accident, the installation or activity concerned, the presumed or known cause, the likely evolution of the accident, and the general characteristics of the radioactive discharge.[79] The notifying state should also provide information on current meteorological conditions and measures taken or projected outside the site.[80] This information should be supplemented as new data becomes available.[81] The affected states can demand further information or consultations to limit the radioactive consequences within their jurisdictions.[82] Information furnished confidentially should not be released to the public.[83] Each state should indicate to IAEA – which should also receive the information and transmit it to each state that requests it – the responsible authorities and the points of contact capable of furnishing the notification.[84]

The second convention, adopted on the same day in Vienna, creates a general framework for Assistance in the Case of a Nuclear Accident or Radiological Emergency.[85] This Convention aims at cooperation between the states themselves and with IAEA. The details of this cooperation should be determined by bilateral or multilateral arrangements, or a combination of these, for minimizing injury and damage resulting from the event of a nuclear accident or radiological emergency.[86] If a state party needs assistance, "whether or not such accident or emergency originates within its territory, jurisdiction or control, it may call for such assistance from any other State Party... and from the Agency."[87] A "State Party to which a request for such assistance is directed shall promptly decide... whether it is in a position to render the assistance requested."[88] Thus, the Convention does not impose concrete obligations on states, and the refusal of assistance cannot be considered a violation of an international treaty implying international responsibility.

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25 I.L.M. 1370 [hereinafter Convention on Early Notification]; Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency, Sept. 26, 1986, 1457 U.N.T.S. 133, 25 I.L.M. 1377 [hereinafter Convention on Assistance].

78. Convention on Early Notification, *supra* note 77, art. 2(b).
79. *Id.* at art. 5(1)(a)-(d).
80. *Id.* at art. 5(1)(e).
81. *Id.* at art. 5(2).
82. *Id.* at art. 6.
83. *Id.* at art. 5(3).
84. *Id.* at arts. 4, 7.
85. Convention on Assistance, *supra* note 77, at pmbl.
86. *Id.* at art. 1.
87. *Id.* at art. 2(1).
88. *Id.* at art. 2(3).

C. Nuclear Waste

In many cases, the disposal of radioactive wastes is accomplished within a state's borders. However, the level of international shipments appears to be rising, which poses the problem of international transport and the immersion of radioactive wastes in areas beyond national jurisdiction. Several international conventions contain provisions aimed at the dumping of radioactive wastes. The London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter of December 29, 1972 forbids the immersion of "high-level radioactive wastes or other high level radioactive matter... as unsuitable for dumping at sea."[89] A non-binding resolution adopted by the Consultative Meeting of the Convention established a moratorium on all dumping at sea of radioactive materials pending scientific studies, but several states publicly opted not to comply, including most states possessing nuclear weapons.[90] In 1994, the International Maritime Organization made the ban obligatory.[91] All state parties, with the exception of Russia, accepted this ban. Annex I, paragraph 9 now provides that materials containing more than *de minimis* levels of radioactivity shall not be considered eligible for the dumping.[92] The ban is subject to a 25 year scientific review.[93]

The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, adopted in Vienna on September 5, 1997 and binding upon more than thirty states, reaffirms "that the ultimate responsibility for ensuring the safety of spent fuel and radioactive waste management rests with the State."[94] National measures and international cooperation should be enhanced to achieve and maintain a high level of safety worldwide in spent fuel and radioactive waste management.[95] "This Convention shall apply... when the spent fuel results from the operation of civilian nuclear reactors" and civilian applications but not "to the safety of management of spent fuel or radioactive waste within military or defence programmes" except "when such materials are transferred permanently to and managed within exclusively civilian programmes."[96] "Each Contracting Party shall take the appropriate steps to ensure that at all stages of spent fuel management, individuals, society and the

89. Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter Annex I(6), Dec. 29, 1972, 1046 U.N.T.S. 120, 26 U.S.T. 2403 [hereinafter London Dumping Convention]; KISS & SHELTON, *supra* note 66, at 531.

90. International Maritime Organization [IMO], *Disposal of Radio-Active Wastes And Other Radio-Active Matter at Sea*, Seventh Consultative Meeting, IMO Doc. LDC 7/12, Annex 3 Resolution LDC 14(7) (Feb. 1983); Steven D. Lavine, *Russian Dumping in the Sea of Japan*, 24 DENV. J. INT'L L. & POL'Y 417, 426-27 (1996).

91. IMO, *Amendments to the Annexes to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter*, Sixteenth Consultative Meeting, IMO Doc. LC 16/14, Annex 5, Resolution LC.51(16) (1993).

92. London Dumping Convention, *supra* note 89, at Annex I(9).

93. *Id.* at Annex I(12).

94. Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management pmbl. vi, Sept. 5, 1997, 2153 U.N.T.S. 357.

95. *Id.* at art. 1(i).

96. *Id.* at art. 1-3.

environment are adequately protected against radiological hazards... in the framework of its national legislation which has due regard to internationally endorsed criteria and standards."[97] This legislative and regulatory framework also provides for the establishment of national safety requirements and regulations for radiation safety, a licensing system for spent fuel and radioactive waste management activities and the prohibition of such facilities without a license.[98] Article 21 concerns responsibility, stating that each Contracting Party shall ensure that the prime responsibility for the spent fuel or radioactive waste management rests with the licence holder and each Party will take the appropriate steps to ensure that each license holder meets their responsibility.[99] If there is no license holder, or other responsible party, responsibility rests with the State having jurisdiction over the spent fuel or radioactive waste.[100]

IV. STATE RESPONSIBILITY

According to the articles of the International Law Commission,

> Every internationally wrongful act of a State entails the international responsibility of that State. There is an internationally wrongful act of a State when conduct consisting of an action or omission: (a) Is attributable to the State under international law; and (b) Constitutes a breach of an international obligation of the State.[101]

Nuclear activities are included in the general obligation resulting from customary international law, which entails State responsibility "to ensure that activities within their [a State's] jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction."[102] Whether the damage needs to be the consequence of a fault attributable to the State where the activities took place is the primary question to be determined.

Specific obligations resulting from treaties impose upon the contracting States the obligation to take the necessary measures through exercising due diligence in order to prevent such damage, either by prohibiting or by regulating such activities. The rule that the wrongful act should be attributable to the State is included in the customary law principle that the State has the responsibility to ensure that such activities do not cause damage.[103] In addition, most of the previously discussed treaty provisions related to nuclear activities include specific obligations providing for State control on such activities: licensing, surveillance, or even prohibition if necessary.[104] In reality, it is hard to imagine that a State could ignore nuclear

97. *Id.* at art. 4(iv).

98. *Id.* at art. 19(2)(i)-(iii).

99. *Id.* at art. 21(1).

100. *Id.* at art. 21(2).

101. Draft Articles on State Responsibility, *supra* note 5, arts. 1-2.

102. *See* KISS & SHELTON, *supra* note 66, at 84-85; *Stockholm Declaration*, *supra* note 10, Principle 21.

103. RESTATEMENT (THIRD) OF THE FOREIGN RELATIONS LAW OF THE U.S. § 601(1) (1987).

104. *See* discussion *supra* Part III.

activities and transport within its jurisdiction, with the exception of very minor activities such as isotopes used for medical treatment. Such exemptions are also foreseen by several treaty provisions.

Articles 5 and 7 of the articles of the International Law Commission are quite clear that the conduct of a person or entity which is not an organ of the State but "which is empowered by the law of that State to exercise elements of the governmental authority shall be considered an act of the State under international law....even if it exceeds its authority or contravenes instructions."[105] The same rule applies to persons or groups acting in fact on the instructions of, or under the direction or control, of a State.[106]

While international responsibility is founded on fault imputable to the acting State, it is not necessary that a state intentionally or maliciously violates an international obligation to attribute responsibility. Fault exists if the actor fails to perform a duty or observe a standard, such as omitting to inform an organ designated by a treaty for surveying the implementation of the treaty.[107] Generally, the applicable international rules and standards do not hold a state responsible when it has taken necessary and practicable measures, by exercising due diligence for the prevention of damage or for assisting the potential or real victims.[108]

The articles of the International Law Commission listed in Chapter V describe circumstances precluding wrongfulness.[109] Most circumstances do not seem to be applicable to illegal nuclear activities: self-defense, countermeasures in respect to an internationally wrongful act, and situations of distress.[110] Article 23 precludes the wrongfulness of an act in certain circumstances, namely if the act is due to force majeure – if the "occurrence of an irresistible force or of an unforeseen event, beyond the control of the State" led to a situation of necessity, "making it materially impossible in the circumstances to perform the obligation."[111] This exemption does not apply, however, if the State has assumed the risk of such a situation occurring, which can be linked with the siting of a nuclear installation.[112] Article 25, relating to necessity, is less likely to be invoked by a State as a ground for precluding the wrongfulness of an act not in conformity with an international obligation, unless the act is "the only way for the State to safeguard an essential interest against a grave and imminent peril" and "[d]oes not seriously impair an essential interest of the State or States towards which the obligation exists, or of the international community as a whole."[113] Furthermore, it cannot be invoked

105. Draft Articles on State Responsibility, *supra* note 5, at arts. 5, 7.
106. *Id.* at art. 8.
107. KISS & SHELTON, *supra* note 66, at 320.
108. *Id.* at 320-21.
109. Draft Articles on State Responsibility, *supra* note 5, at ch. V.
110. *Id.* at arts. 21, 22, 24.
111. *Id.* at art. 23(1).
112. *Id.* at art. 23(2)(b).
113. *Id.* at art. 25(1).

when the State has contributed to the situation of necessity.[114] All of these principles of general international law may apply where nuclear activities are involved.

Several treaties also include provisions related to State responsibility in this field. The Vienna Convention on Nuclear Safety adopted on June 17, 1994, reaffirms in its preamble that responsibility for nuclear safety rests with the state having jurisdiction over a nuclear installation.[115] "Nuclear installation" means, as formulated in Article 2(i), "any land-based civil nuclear power plant... including such storage, handling and treatment facilities for radioactive materials as are on the same site and are directly related to the operation of the nuclear power plant."[116] "Such a plant ceases to be a nuclear installation when all nuclear fuel elements have been removed permanently from the reactor core and have been stored safely in accordance with approved procedures, and a decommissioning program has been agreed to by the regulatory body."[117]

According to Article 1(1) of the 1986 Vienna Convention on Early Notification of a Nuclear Accident, which governs the cooperation in this field between the State parties, the Convention "shall apply in the event of any accident involving facilities or activities of a State Party or of persons or legal entities under its jurisdiction or control... from which a release of radioactive material occurs or is likely to occur and which has resulted or may result in an international transboundary release that could be of radiological safety significance for another State."[118] The duty to make the notification is incumbent upon the state or origin.[119]

Principle 13 of the Declaration of the Conference on Environment and Development held in Rio de Janeiro in 1992 calls on states to "cooperate in an expeditious and more determined manner to develop further international law regarding liability and compensation for adverse effects of environmental damage caused by activities within their jurisdiction or control to areas beyond their jurisdiction."[120] Several international conventions also invite states to cooperate in the formulation and adoption of appropriate rules and procedures for the determination of liability and compensation for damage resulting from violations of obligations under their provisions.[121]

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114. *Id.* at art. 25(2)(b).

115. Convention on Nuclear Safety, *supra* note 43, at pmbl. vi.

116. *Id.* at art. 2(i).

117. *Id.*

118. Convention on Early Notification, *supra* note 77, at art. 1(1).

119. *Id.* at art. 2.

120. *Rio Declaration*, *supra* note 11, at Principle 13.

121. Such provisions are incorporated mainly in treaties concerning marine pollution, starting with the 1978 Kuwait Regional Convention for Cooperation on the Protection of the Marine Environment from Pollution. Kuwait Regional Convention for Cooperation on the Protection of the Marine Environment from Pollution art. XIII, Apr. 24, 1978, 1140 U.N.T.S. 155.

V. DAMAGE CAUSED BY A NUCLEAR ACTIVITY

At a relatively early stage of the period during which environmental concern emerged, on May 21, 1963, a Convention on Civil Liability for Nuclear Damage was adopted in Vienna.[122] Article I(1) of this Convention gave a first definition of nuclear damage which could be considered of fundamental importance:

> (k) 'Nuclear damage' means –
>
> (i) loss of life, any personal injury or any loss of, or damage to, property which arises out of or results from the radioactive properties or a combination of radioactive properties with toxic, explosive or other hazardous properties of nuclear fuel or radioactive products or waste in, or of nuclear material coming from, originating in, or sent to, a nuclear installation;
>
> (ii) any other loss or damage so arising or resulting if and to the extent that the law of the competent court so provides; and
>
> (iii) if the law of the Installation State so provides, loss of life, any personal injury or any loss of, or damage to, property which arises out of or results from other ionizing radiation emitted by any other source of radiation inside a nuclear installation.
>
> (l) 'Nuclear incident' means any occurrence or series of occurrences having the same origin which causes nuclear damage.[123]

Although the 1963 Vienna Convention only concerns civil non-State liability and so transfers the problem from interstate responsibility governed by public international law to an inter-individual level of private international law, the definition of nuclear damage can be used in both fields.

A Protocol of September 12, 1997, however, amended this text.[124] While the principal treaty is ratified by more than forty states, the amendments have been accepted only by five. It is thus interesting to compare the two texts. According to the new version:

> (k) 'Nuclear Damage' means –
>
> (i) loss of life, any personal injury;
>
> (ii) loss of or damage to property; and each of the following to the extent determined by the law of the competent court –
>
> (iii) economic loss arising from loss or damage referred to in sub-paragraph (i) or (ii)...;
>
> (iv) the costs of measures of reinstatement of impaired environment...;

122. Vienna Convention on Civil Liability for Nuclear Damage, May 21, 1963, 1063 U.N.T.S. 265.

123. *Id.* at art. I(1)(k)-(l).

124. IAEA, *Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage* Annex, IAEA Doc. INFCIRC/566 (July 22, 1998).

> (v) loss of income deriving from an economic interest in any use or enjoyment of the environment...;
>
> (vi) the costs of preventive measures, and further loss or damage caused by such measures;
>
> (vii) any other economic loss....[125]

It must be stressed again that these provisions inserted in interstate treaties should be considered only as models for the definition of environmental damage and are not applicable by their own terms in relations between states.

VI. REPARATION FOR DAMAGE

According to the articles of the International Law Commission, "[f]ull reparation for the injury caused by the internationally wrongful act shall take the form of restitution," which means the re-establishment of the situation which existed before the wrongful act was committed.[126] The application of this generally recognized principle raises major problems for health and environmental damages. Such damages are not easy to evaluate, and in some situations re-establishment of the situation is not possible. The extinction of a species of wild flora or fauna which had no commercial value provides an example. Nuclear activities can also produce long-term effects on health which only appear after years, so the establishment of the causal link with the activity can be very difficult if not impossible.

The Convention on Supplementary Compensation for Nuclear Damage adopted in Vienna on September 12, 1997, uses the term "reinstatement" instead of the usual word "reparation" of environmental damage.[127] This might be explained by the intention to avoid confusion with the concept of reparation in international law since the Convention mainly concerns national procedures. Still, it can be useful to quote the definition given:

> 'Measures of reinstatement' means any reasonable measures which have been approved by the competent authorities of the State where the measures were taken, and which aim to reinstate or restore damaged or destroyed components of the environment, or to introduce, where reasonable, the equivalent of these components into the environment. The law of the State where the damage is suffered shall determine who is entitled to take such measures.[128]

Although the Convention applies to nuclear damage for which an operator of a nuclear installation used for peaceful purposes situated in the territory of a Contracting Party is liable, the installation state shall ensure the availability of a certain amount for the compensation of nuclear damage.[129] Such compensation

125. Vienna Convention on Civil Liability for Nuclear Damages, *supra* note 122, at art. I(1)(k).

126. Draft Articles on State Responsibility, *supra* note 5, at arts. 34-35.

127. Convention on Supplementary Compensation for Nuclear Damage art. I(g), Sept. 12, 1997, 36 I.L.M. 1473.

128. *Id.*

129. *Id.* at art. III(1).

shall be distributed "without discrimination on the basis of nationality, domicile or residence."[130] The national law of the Contracting Parties should conform to the provisions of the Convention providing for strict liability and requiring the indemnification of any person other than the operator liable for nuclear damage.[131] It flows from the rules of international law that if a contracting party fails to implement such provisions, its international responsibility can be invoked.

According to Article 46 of the articles of the International Law Commission, "[w]here several States are injured by the same internationally wrongful act, each injured State may separately invoke the responsibility of the State which has committed the internationally wrongful act."[132] This principle, which expresses customary international law, could have been invoked by each State whose territory was affected by the consequences of the 1986 Chernobyl accident. It is characteristic that, owing to the difficulty of establishing the causal link between the explosion and the damage to human health, to flora and fauna and to other natural resources on the one hand and the time which could elapse between the accident and the consequences which it produced on the other hand, the reaction of the international community was the exceptionally rapid conclusion of the two Vienna Conventions on information and assistance.

VII. CONCLUSION

The last remark summarizes the use of international legal rules related to State responsibility and liability for nuclear damage. It is certain that these rules are applicable to such damage. The definition of the damage itself and the conditions of proof given the difficulty in establishing the causal link between the damage and the act which is supposed to be at its origin make it, however, very difficult to apply the rules of general international law to nuclear accidents and their consequences. The principle of responsibility for nuclear damage is not denied, but States have found it safer to transfer the solution to the problems raised by responsibility from the inter-State level to that of individual claims brought in national jurisdictions. This transfer is a way to replace inter-State relations governed by international public law with inter-individual litigation, which means using the rules of international private law.

At the inter-State level there remains much to do. IAEA was created during a period where the dominating opinion believed that nuclear energy could solve an important part of the problems of humankind by providing a reliable and long-term source of energy. As a consequence, this institution was invested initially with the task of helping countries develop nuclear energy. The evolution of our knowledge in this field, but also the realities of international life, made us understand that the major problem of nuclear activities was not their promotion, but their surveillance and control. Such tasks can be ensured only by an agency having the exclusive task to ensure nuclear safety. However, the failure of the recent attempt to reform the United Nations showed that any proposal to completely change the mandate of

130. *Id.* at art. III(2).

131. *Id.* at Annex art. 2.

132. Draft Articles on State Responsibility, *supra* note 5, at art. 46.

the IAEA in this direction, or to create a new institution, might not be realistic. At the same time, IAEA has successfully developed international legislation aimed at the improvement of nuclear safety. IAEA has even demonstrated in several situations its capacity to impose its control over certain nuclear activities and thus contribute to the establishment of the conditions of international responsibility and liability. Accordingly, one of the main conclusions of this presentation is the importance of reinforcing the capacity of the institution of Vienna to control and ensure compliance with existing nuclear safety regulations and developing new compulsory rules in this field insisting on the responsibility and liability of States in this domain.

Other conclusions include the following: the determination that States are responsible under international law for any failure to exercise due diligence over the siting and operation of nuclear facilities and the transport and disposal of nuclear wastes; State parties are responsible for any failure to enforce the Paris and Vienna liability treaties; operators of nuclear facilities and shippers are strictly liable for any harm caused by their activities; and States are responsible for transfrontier harm at least when it results from negligence or intentional pollution and possibly even for harm resulting from accidents.[133] Furthermore, the law of state responsibility allows injured states to bring a claim, however, the problem in defining what constitutes sufficient injury in this field should be further studied. Even states only potentially affected, or that cannot prove injury, should be able to claim obligations *erga omnes*. It should be understood that breach of a treaty obligation regarding nuclear activities should permit another state party to invoke state responsibility even in the absence of injury.

133. The current study of the International Law Commission on the latter issue should be followed and supported with contributions to this work to the extent possible.