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10th Anniversary of the International School of Nuclear Law

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NUCLEAR ENERGY AGENCY

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NUCLEAR ENERGY AGENCY
ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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NUCLEAR ENERGY AGENCY

The OECD Nuclear Energy Agency (NEA) was established on 1st February 1958 under the name of the OEEC European Nuclear Energy Agency. It received its present designation on 20th April 1972, when Japan became its first non-European full member. NEA membership today consists of 28 OECD member countries: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, Mexico, the Netherlands, Norway, Portugal, Republic of Korea, the Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The Commission takes part in the work of the Agency.

The mission of the NEA is:

– to assist its member countries in maintaining and further developing, through international co-operation, the scientific, technological and legal bases required for a safe, environmentally friendly and economical use of nuclear energy for peaceful purposes, as well as

– to provide authoritative assessments and to forge common understandings on key issues, as input to government decisions on nuclear energy policy and to broader OECD policy analyses in areas such as energy and sustainable development.

Specific areas of competence of the NEA include safety and regulation of nuclear activities, radioactive waste management, radiological protection, nuclear science, economic and technical analyses of the nuclear fuel cycle, nuclear law and liability, and public information.

The NEA Data Bank provides nuclear data and computer programme services for participating countries. In these and related tasks, the NEA works in close collaboration with the International Atomic Energy Agency in Vienna, with which it has a Co-operation Agreement, as well as with other international organisations in the nuclear field.

Also available in French under the title:

Le droit nucléaire international : Histoire, évolution et perspectives

Foreword

The responsible deployment of safe, clean nuclear energy requires human know-how and the establishment of technical, legal and institutional frameworks capable of successfully managing all aspects of nuclear energy. Many in the current nuclear workforce received their education and started their careers during the rapid build-up of nuclear programmes in the 1960s and 1970s. Most of these people are now close to retirement or have already left the industry. As a result, many countries have recognised the need to secure qualified human resources in the nuclear disciplines and recent international, regional and national initiatives have been aimed at encouraging and facilitating more students to enter the nuclear field.

In August 2010, one such initiative, the International School of Nuclear Law (ISNL), will celebrate a major milestone by convening its 10th anniversary session. It is hard to believe that a decade has already passed since the Nuclear Energy Agency, in co-operation with the University of Montpellier 1 in France, decided to establish a "summer university" programme to teach international nuclear law. The major impetus for doing so was that university law faculties at that time did not offer specialised courses in nuclear law, a situation that has not changed significantly over the years despite the growing interest of the international community in nuclear energy production. At the start of the 21st century, comprehensive national and international legal frameworks covering virtually all aspects of nuclear activities existed in all developed countries without an equivalent educational programme to teach future generations.

The founders of the ISNL, Mr. Patrick Reyners formerly of the Nuclear Energy Agency and Professor Pierre Bringuier from the University of Montpellier 1, embarked on this programme in an attempt to fill this particular educational gap, at least at the international level, and each of them obtained significant support for the project from their respective institutions. From its very inception, the ISNL aimed to attract law students at masters or doctoral level and young professionals in the nuclear sector who wished to expand their knowledge.

Nuclear law is a highly specialised, highly technical subject, a not-so-surprising consequence of the intensely regulated nature of nuclear activities, both at national and international levels. As a result, legal practitioners in the field, whether in the private, public or quasi-public sectors must develop in-depth knowledge of the wide range of national and international legal instruments that comprise that regulatory framework.

Although there was some hesitancy about the success of the school in its early days, we can now proudly state that the ISNL has been, and continues to be, a great accomplishment with a reputation for excellence that spans six continents. The ISNL team is a professional collaboration, not only between the NEA and the University of Montpellier 1, but between the organisers, lecturers and participants of each session. ISNL alumni now number more than 500 participants who come from all around the world, various governmental and non-governmental institutions, representing different nationalities and cultures, different levels of education and experience and diverse age groups. Many of those participants had the opportunity of being financially assisted by the International Atomic Energy Agency. They have all contributed to the further enhancement of the programme and today, the educational value of the ISNL is undisputed.

Participants enrolled in the ISNL programme also have the opportunity of applying for a University Diploma (*Diplôme d'université – DU*) in International Nuclear Law which is offered by the University of Montpellier 1 upon satisfactory completion of a take-home examination, a dissertation and class participation. This diploma is recognised within the European Credit Transfer & Accumulation System (ECTS) and represents 12 credits.

In addition to an intensive programme of lectures, case studies and discussion periods, participants benefit from the knowledge and enthusiasm of guest speakers and mentors, the link to the University of Montpellier 1 and its facilities, and an ideal location in the beautiful South of France. All these elements contribute to a close community of ISNL members, most of whom remain in contact well beyond their two-week stay in Montpellier.

The ISNL is proud of its accomplishments and will do its best to continue providing an excellent education in international nuclear law to both graduate students and professionals from all over the world.

Luis Echávarri
Director-General
OECD Nuclear Energy Agency

Philippe Augé
Professeur des Universités
Président de l'Université Montpellier 1

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The International School of Nuclear Law: A Short History

*by Patrick Reyners**

In France they say that at seven years old you reach the age of reason, but this is clearly premature when it comes to an institution such as the ISNL, all the more so because it has been established at one of the oldest law faculties in Europe. However, the 10th anniversary of the school is an opportunity to look back at this undertaking whose future seemed so uncertain at the beginning and whose success would have surprised even the most enthusiastic of its early supporters.

The plan to set up the school resulted from the coming together of many positive factors, some owing to circumstances and others to personal encounters.

Changes in the 90s: an opportunity for the NEA

The decade of the 1990s began under most unfavourable auspices following the Chernobyl accident. Nevertheless it provided the OECD Nuclear Energy

* Mr. Patrick Reyners, former Head of Legal Affairs at the OECD Nuclear Energy Agency, initiated the creation of the ISNL. He is the Scientific Advisor and Secretary General of the International Nuclear Law Association (INLA). He teaches nuclear law at Dundee (CEPMLP), Montpellier and Poitiers/Angoulême Universities. The author alone is responsible for the facts and opinions expressed in this introduction.

Agency (NEA) and its Legal Affairs Section with the opportunity to redeploy its activities in the nuclear law field, activities which, up until then, were principally dedicated to a programme of studies and of legal publications and to its role as the guardian of the Paris and Brussels Supplementary Conventions on nuclear third party liability.

The dissolution of the Soviet Union, the emancipation of its former "satellites" and the shocking revelation of the precarious state of nuclear safety in that region led to the mobilisation of an important programme of technical and economic assistance by Western states. In this context, the NEA was invited, notably by the G-7, to contribute to this international effort by helping to reinforce nuclear legislation and to train the staff of nuclear regulatory bodies in these countries. This undertaking took the form of bilateral co-operation, particularly with the Russian Federation and the Ukraine, or a series of annual training seminars on the various aspects of nuclear law which benefitted from the active co-operation of the International Atomic Energy Agency (IAEA) and the European Commission.

By the end of this series of seminars, in which dozens of future nuclear regulatory officials from Central and Eastern Europe participated, the NEA had acquired substantial expertise in providing training.

A noticeable absence

It is worth remembering that the end of the 1990s, when the idea of the school was born, was a very different time from today, given the current global renewal of nuclear generated electricity projects. Nuclear energy was still in a downturn and the trauma following the accident at Chernobyl had not dissipated.

Back then, the inevitable aging of skilled personnel at nuclear organisations raised concern about its eventual impact on the safety of installations; although the problem was not of the same nature, this phenomenon was also experienced in connection with the replacement of a generation of lawyers specialised in nuclear law, raising the issue of knowledge transfer in this recent discipline. The International Nuclear Law Association held up the flame but was at pains to attract young lawyers. This situation was exacerbated by the fact that education in nuclear law was, even in "active" nuclear countries, practically non-existent. Universities were largely dis-interested and nuclear institutions, both public and private, did not have the vocation to fill the gap.

Intuition and encounters

In spite of these hardly encouraging perspectives, I had the intuition that there was a need to be satisfied, a case of the supply producing the demand principle so dear to economists. What was, at the beginning, no more than an impression had to be tested and shared, and amongst the colleagues to whom I spoke of the idea, I refer particularly to the members of the INLA Board of Management who, on the occasion of the Congress in Washington DC in 1999 encouraged me to explore this possibility.

Many encounters would prove to be decisive, first of all those with Katia Boustany and Odette Jankowitsch. Professor Katia Boustany, a Lebanese-Canadian with a charismatic personality who taught at the University of Québec, and who was on secondment to the IAEA, was always interested in legal issues relating to advanced technologies. Mrs. Odette Jankowitsch, an Austrian lawyer of European culture, a world citizen and heartfelt supporter of third world countries, was herself at the point of completing an internationally distinguished career at the Agency in Vienna. They both showed a great deal of enthusiasm for this project, provided me with their advice and promised to co-operate.

For its part, the NEA Management agreed to support this doubtful initiative and allowed me to call upon the resources of the Agency. In this respect, I owe a vote of special gratitude to my colleagues at the NEA for their constant support and their dedication to this project. I would also pay tribute to Pierre Strohl, former Deputy Director-General of the NEA, who with his usual intellectual curiosity was interested in the idea of the school and committed himself from the beginning as part of the team.

Why Montpellier?

It had always been obvious to me that the implementation of a teaching programme in nuclear law had to be based – even if led by an international organisation such as the NEA – on the support of an academic institution in order to be fully legitimate. Various possibilities were envisaged during this short "incubation" period, both in France and abroad (notably in Budapest with a Foundation Soros university).

However, it was my encounter with Professor Pierre Bringuier from the University of Montpellier 1 which proved to be decisive. This internationalist was strongly interested in legal issues associated with hazardous activities and thus in nuclear activities. Another quality was his remarkable ability to make the wheels of the university machinery turn and finally, he had the advantage of heading Dideris, the permanent training institute of Montpellier 1 which had experience with "summer universities".

Dideris and Pierre Bringuier offered the location and the necessary logistical support for the future school. One visit convinced me that the future students and lecturers could not but appreciate the charm of this beautiful city and this impression has never been proved wrong.

During 2000, a decision in principle was taken and the statute of the International School of Nuclear Law (ISNL) was quickly adopted by the University of Montpellier 1. The creation of the school would be accompanied by an agreement concluded in 2002 between the Management of the NEA and the President of the University of Montpellier 1 providing the framework for a co-operation which has continued smoothly ever since.

Establishing the school

In a rather short period of time, the parameters of the school were defined: a two-week intensive introductory programme alternating traditional courses and practical sessions, covering all aspects of nuclear law and taking place every year during the same period of time (last week of August and first week of September). Teaching would be done in English by a small group of lecturers and would focus particularly on international nuclear law. The capacity of the school was fixed at 50 to 60 participants in order to ensure better mentoring.

It is worth noting that these decisions, which were taken in a relative hurry and were partially dictated by practical considerations such as the availability of premises, duration of the course or the use of English only, proved to be so right that the functioning of the school has changed very little over the years. Only the programme has changed, as explained below.

First session – first experience

The first session, in the summer of 2001, took place on boulevard Henri IV close to the university district, in the *Écusson*, the name by which the citizens of Montpellier call the old city. Even if participants from Eastern Europe were relatively numerous, thanks notably to financial assistance from the European Commission, the 50 participants came from all around the world, giving the school a truly international character. Several members of the Office of Legal Affairs at the IAEA agreed to come and deliver lectures in their personal capacity, heralding a commitment which would only be enhanced during the years to come. The three "nuclear agencies" were hence present and collaborating right from the first year. Another stroke of luck for the school:

apart from the representatives of these international organisations, other lecturers chosen from amongst the best experts in the nuclear law world responded to my request positively. Without naming them individually, I would like to pay homage to their talent, their generosity and their loyalty to this project.

Besides the courses which took place during the intense heat of the Mediterranean summer, a technical visit was organised to the nuclear research centre of *Marcoule*, and a tradition was inaugurated which would become a must – a visit to cultural sites and vineyards of the region, followed by wine tasting, for many a real discovery.

The diploma in international nuclear law

The idea that an exam would be a logical extension of this training and would give it credit occurred to the founders of the school very early on in the process. However, for many students it would have been impossible to extend their stay in Montpellier in order to sit an exam as they came from far away and were often under time pressure to return to their professional or academic activities. This led to the implementation of a remote, open-book "take-home-exam", combined with the drafting of a dissertation on a subject of choice and evaluation of the quality of participation during the course. This idea was submitted to the university which agreed to create an official diploma in international nuclear law, approved by a *"Jury d'examen"* which sits in Montpellier and to which credit is given by European universities (ECTS credits).

The diploma process was put on trial for the first time following the summer session in 2003, and since that time an increasing number of students opt for this challenge, attesting to its validity.

The adjustment to change: a necessity

Over the years, the school has enjoyed an ever increasing success, taking advantage of "word of mouth" publicity ensured by the students themselves. This success does not, however, take away from the need to evolve both in terms of teaching methods and subject matter. It was in this vein that following the events of September 2001, an important place was reserved for nuclear security issues. More recently, a decision was taken to deal with the impact of environmental laws on the regulation of nuclear activities. In so doing, new lecturers joined the team. Another tradition was established: namely to invite at the end of every session, well-known speakers to talk about interesting and topical subjects in the nuclear world.

In the meantime, the school left the old law faculty building and moved to the new university site at *Richter* to take advantage of enhanced facilities. On the other hand, the tightening of security measures at nuclear sites, linked to the enactment of the plan “Vigipirate”, led to the suspension of the technical visits, hopefully only temporarily. Finally, Professor Pascale Idoux replaced Pierre Bringuier in his capacity of Director of the ISNL.

Future perspectives

Since the establishment of this programme, some 500 students have passed through Montpellier and many of them are active today in the nuclear sector which, of course, is a source of great satisfaction. In reality, the school is also a victim of its success since its limited capacity to accommodate participants makes it unable to satisfy all demands to participate.

In this respect, I have always believed that once legitimised, this programme could expand to other regions of the world and result in co-operation arrangements, as was the case a few years ago with the University of Dundee (CEPMLP) in Scotland. The future will tell if this possibility will come true, given the increasing demands for legal training within the perspective of the nuclear “renaissance”.

At the moment, as I am about to entrust the school to other hands, I am happy to see that it has reached its initial objectives and I am no less confident about its future success.

International/Regional Organisations in Nuclear Law

The Normative Role of the International Atomic Energy Agency, Legal Basis and Legal Sources

*by Odette Jankowitsch-Prevor**

The International Atomic Energy Agency (hereinafter the "Agency") was established in 1957 by a multilateral treaty[1] as an autonomous intergovernmental organisation. The treaty was concluded outside the United Nations.[2] The Agency is not one of the sixteen "specialised agencies" of the UN but rather has a unique status in the United Nations system. Its special links with the United Nations are based on several provisions of the Statute of the International Atomic Energy Agency of 23 October 1956 (the "Statute")[3]

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1. The Statute is a treaty under international law, see e.g. Articles XXI and XXII.

2. See for detailed history: Szasz, Paul C., "Law and Practice of the International Atomic Energy Agency", Chapter 12 (Relationships with international organisations, History), pp. 257-326, Legal Series No. 7 IAEA, Vienna, 1970. See also: "Law and Practice of the IAEA 1970-1980", Supplement 1 to the 1970 Edition Agreements, pp. 599-615.

3. See Statute Article III.A.6 ("where appropriate, in collaboration with the competent organs of the United Nations"), Article III.B.4 (the Agency shall "[s]ubmit reports on its activities annually to the General Assembly of the United

and, in implementation of these provisions, on the Agreement Governing the Relationship between the United Nations and the International Atomic Energy Agency (the "agreement"),[4] a Protocol Concerning the Entry into Force of that Agreement (the "protocol") and a number of administrative agreements,[5] concluded at the same time.

On substance, as regards the role of the Agency within the United Nations, the protocol records the approval by the UN General Assembly of the UN-IAEA Agreement and in this context recalls the understanding that with regard to Paragraph 1 of Article I of the draft agreement, "it is noted that the Agency, which is established for the specific purpose of dealing with the peaceful uses of atomic energy, will have the leading position in this field".[6] The Statute provides that in carrying out its functions, the Agency shall "[c]onduct its activities in accordance with the purposes and principles of the United Nations to promote peace and international co-operation, and in conformity with policies of the United Nations furthering the establishment of safeguarded worldwide disarmament and in conformity with any international agreements entered into pursuant to such policies".[7]

A further unique both formal and substantive link between the Security Council of the United Nations and an international organisation has been established by the Statute in the context of the implementation of Agency safeguards.[8] The safeguards system based on the Agency's Statute predates the

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Nations and, when appropriate, to the Security Council"), Article III.B.5 ("[s]ubmit reports to the Economic and Social Council and other organs of the United Nations", this provision is redundant) and Article XVI.A ("establish an appropriate relationship between the Agency and the United Nations and any other organizations the work of which is related to that of the Agency").

4. i.e. Administrative Arrangement Concerning the Use of the United Nations Laissez-Passer by Officials of the International Atomic Energy Agency and Agreement for the Admission of the International Atomic Energy Agency into the United Nations Joint Staff Pension Fund, see INFCIRC/11, 30 October 1959.

5. The Protocol signed on 10 August 1959 provides details on the background of the agreement, notably the approval of the agreement by the UN General Assembly during its 12th session and entry into force of the agreement on 14 November 1957.

6. Protocol, third paragraph in INFCIRC/11, page 9.

7. Article III.B.1 of the Statute.

8. Article XII.C of the Statute provides for reporting by the IAEA Board to the Security Council and General Assembly of the UN cases of "non-compliance" as

Treaty on the Non-Proliferation of Nuclear Weapons ("NPT") and its specific safeguards agreements. The relevant residual provisions are implemented as provided in the safeguards agreements concluded by the Agency with states that are not parties to the NPT.[9]

The Statute also provides indirectly for the treaty-making capacity of the Agency whilst at the same time limiting its scope of application to the terms of agreements concluded between states or a group of states and the Agency which shall be in accordance with the provisions of the Statute.[10] This provision also clearly establishes that the Agency will not have any supranational role as regards its members by stating that in implementing its functions, "the activities of the Agency shall be carried out with due observance of the sovereign rights of States".

The definitive mandate given to the Agency for the establishment of international norms in the technically defined field of "safety" is its statutory authorisation to "establish or adopt, in consultation and, where appropriate, in collaboration with the competent organs of the United Nations and with the specialised agencies concerned, standards of safety for protection of health and minimisation of danger to life and property (including such standards for labour conditions), and to provide for the application of these standards to its own operations".[11] These standards may also be applied to the Agency's operations involving materials, services, equipment, information etc. made available by the Agency under any bilateral or multilateral arrangement or to a state's activities in the field of atomic energy at that state's request.

Today, the activities of the Agency, including its normative work, are generally categorised according to their purpose or to their substantive content which also corresponds to some extent to the internal structure and *modus operandi* of the organisation. This approach addresses the main areas of nuclear activities and fields of interest of the member states, namely nuclear safety and security, nuclear science and technology, including nuclear techniques for development and environment, safeguards and verification. In the field of nuclear law, this classification based on the scope and content of the norms has

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detailed under B and C of Article XII. This provision of the Statute is included in the UN-IAEA Agreement, see Article III paragraph 2.

9. The Agency's Safeguards System (non-NPT) in INFCIRC/66/Rev.2.

10. Article III.D of the Statute.

11. Article III.A.6 of the Statute.

found a clear expression by the so called "3S" concept, i.e. safety, security, safeguards and (added) liability for nuclear damage.

For the purpose of this paper, however, the substantive content of norms is subordinated to a classification based on the origin and the legal nature of the norms: the first category are international norms established by agreements concluded by the Agency as a party in its capacity as an intergovernmental organisation under international law, with states or with other international organisations within and outside the United Nations system. The second type of "technical norms" are those elaborated, adopted and issued by the Agency within the scope of its mandate. Under the third category fall the international legally binding norms created by the agreements established by member states under the auspices of the Agency.

The source of the Agency's authority to conclude agreements with states and intergovernmental organisations is vested in the Board of Governors, deriving its power from the Statute.[12] The Board delegates to the Director General the right to conclude agreements after approval in principle. However, in practice agreements are concluded and signed[13] by the Director General in co-ordination and co-operation with the Board. Some agreements, notably the relationship agreements with intergovernmental organisations (see below), also require approval by the General Conference.

The Agency is a contracting party

The first type of agreements considered here are those where the Agency is a party. On the basis of both a general and a specific provision of the Statute, as mentioned above, the Agency has concluded agreements with states and with organisations established by groups of states.[14] The Agency's relationships with other organisations are based on bilateral agreements.[15] The Statute provides for specific content of the agreements only as regards the relationship agreement

12. Article VI.F of the Statute; Article XIII and XIV of the Statute for financial matters.

13. Ratification and entry into force depends on the other party (or parties) to such agreement. Specific: safeguards agreements require ratification by the state for entry into force.

14. See *supra*: Article III.D of the Statute providing a general mandate to conclude agreements. Article XVI covers relationship agreements with other organisations; Article XII "Agency safeguards" (pre-NPT) refers to "arrangements". For NPT safeguards agreements see below.

15. Article XVI of the Statute.

with the United Nations and the specialised agencies of the UN which contain *inter alia* certain specific reporting obligations.[16]

Agreements concluded by the Agency with specialised agencies of the UN System and with other intergovernmental organisations[17]

The first, historical objective of the so called interagency agreements was to connect the Agency to the United Nations,[18] the different intergovernmental organisations of the UN system as well as with the two other contemporary organisations of a regional nature working in the nuclear domain, namely the OECD Nuclear Energy Agency and the European Atomic Energy Community ("Euratom").[19]

The agreements negotiated and concluded in 1958/59 with the specialised agencies of the UN, though of historic and legal interest, are of limited relevance for the substantive and procedural co-operative relations of today. Outside the formal co-ordinating mechanism of the UN system, as notably the CEB[20] under the chairmanship of the Secretary General or the reporting practice of the Director General to the General Assembly, relations between the IAEA and both the UN[21] and the specialised agencies are conducted today in a pragmatic programme- and project-oriented manner, replacing the excessively procedural and formalistic representation, consultation and document exchange mechanisms as set forth in the early agreements. Inter-agency relations conducted between headquarters have been replaced in many areas by technical co-operation projects implemented in the field.

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16. Article XVI.B of the Statute.

17. The term "intergovernmental organization" is defined in Article 2(i) of the Vienna Convention on the Law of Treaties, 1969.

18. See *supra* footnote 4. For UN: Texts in INFCIRC/11 and *addenda*. For UN System: Texts in INFCIRC/20 and *addenda*.

19. Texts in INFIRC/25 and *addenda*.

20. CEB: UN System's Chief Executive Board for Coordination established by ECOSOC Decision 2001/321 to replace the Administrative Committee on Coordination (ACC). The CEB is chaired by the UN Secretary General and composed of all executive heads of UN organisations, including the Director General of the IAEA.

21. See *supra*, specifically for IAEA's relation with the General Assembly and the Security Council.

These initial agreements had, however, a direct impact on the then ongoing work of the other existing organisations that had just prior to the creation of the Agency launched a number of programmes in the domain of the peaceful utilisation of nuclear energy.

The first International Conference on the Peaceful Uses of Atomic Energy, held in 1955 in Geneva, had encouraged some of the specialised agencies, notably the World Health Organization and the Food and Agriculture Organization to work in this new promising scientific field.[22] It took some time to negotiate the agreements due to the co-ordination of the Agency's future and certain organisation's existing activities.

The first batch of agreements with the specialised agencies most closely related to the work of the Agency was established, after agreement by the Board and approval by the General Conference, on a streamlined pattern, containing more or less the same provisions and mechanisms (e.g. consultation, co-ordination, mutual representation) and following the same structure. These agreements entered into force in 1959.[23] Others followed to cover all then existing specialised agencies of the UN system and add the newcomers, as e.g. the United Nations Industrial Development Organization (UNIDO). In some cases, additional or supplemental agreements were later concluded, for instance the agreement with UNESCO concerning the Joint Operation of the International Centre for Theoretical Physics at Trieste,[24] which was modified at a later date by two further agreements, one of them a trilateral agreement that included Italy.[25] A similar agreement was concluded later with the United Nations Environmental Programme (UNEP), legally a UN programme, i.e. a subsidiary body under the United Nations General Assembly, and Monaco regarding the IAEA Monaco Laboratories.

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22. See Paul C. Szasz, *op. cit.*, page 281-283.

23. INFCIRC/20 of 23 September 1960: the texts of the Agency's relationship agreements with specialised agencies (UNESCO, ILO, WHO, WMO, ICAO, FAO); INFCIRC/20/Add.1 of 10 April 1962: Agreement with the Inter-Governmental Maritime Consultative Organization (now IMO); INFCIRC/20/Add.2 of March 1988: Relationship Agreement with the UN Industrial Development Organisation.

24. INFCIRC/132 of 1969 and INFCIRC/132/Add.1 of 1975.

25. INFCIRC/498 of 1996: Agreement between the IAEA and the UNESCO and the Government of the Republic of Italy concerning the International Centre for Theoretical Physics at Trieste; INFCIRC/499 of 1996: Agreement between IAEA and the UNESCO.

In the same vein, the Agency concluded co-operation agreements with regional intergovernmental organisations outside the UN system: The first set of such agreements was concluded in the early 1960s with organisations in the nuclear field, notably the "European Nuclear Energy Agency of the Organisation for European Economic Co-operation", today OECD Nuclear Energy Agency, and the Inter-American Nuclear Energy Commission.[26] Co-operation and co-ordination between the Agency and EURATOM, a supranational organisation under international law,[27] evolved essentially around the respective safeguards function of both organisations, notably as applied to the non-nuclear weapon states under Article III of the NPT. The main subjects were the basic relationship, co-ordination and matters regarding the inspection regime. An agreement was concluded in 1973 between the Agency and EURATOM, followed by a further agreement on scientific and technical co-operation in 1976.

Later, agreements were concluded with other regional organisations including *inter alia* the Organisation of African Unity,[28] the League of Arab States,[29] and the agreement with the Agency for the Prohibition of Nuclear Weapons in Latin America.[30]

Agreements concluded by the Agency with states[31]

As noted above, the Agency is authorised specifically by the Statute as well as by general international law to conclude mutually binding agreements with states.

The IAEA, established as an international organisation a full subject of international law, had to enter into agreement with member and non-member states to ensure respect of its legal status as well as that of its staff in terms of privileges and immunities. The Agreement on the Privileges and Immunities

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26. INFCIRC/25 of 1961 covers both agreements.

27. For detailed background information on initial safeguards related agreements between the IAEA and EURATOM: see "Law and Practice of the IAEA 1970-1980", Supplement 1, Legal Series No. 7-S1, pp. 380-389.

28. INFCIRC/25/Add.2 of 1969.

29. INFCIRC/25/Add.3.

30. INFCIRC/725/Add 4.

31. All agreements concluded by the IAEA are published in chronological order under INFCIRC, see www.iaea.org/Publications/Documents/Infcircs/index.html, listed by order of substance and names of states.

("P&I") of the IAEA,[32] modelled on the P&I Agreement of the United Nations, was established and opened for signature and ratification by states.

The first agreement with a state concerned the headquarters of the Agency. After agreement had been reached on the Statute, the Preparatory Commission concluded an agreement with Austria for the convening of the first General Conference of the Agency. This agreement remained provisionally in force for some time. As soon as the decision had been taken to establish the Agency's headquarters in Vienna negotiations began with the Government of Austria on a headquarters agreement.[33] This agreement, concluded in 1959, was updated and amended several times over the past 50 years.

Headquarters agreements of a different nature, also known as host government agreements, were concluded with the states hosting on their territory particular Agency activities, such as the Laboratory in Monaco, the Trieste Centre and offices established for particular purposes in Toronto and individual conferences, symposia etc. held outside the headquarters, which often require conclusion of relevant host government agreements between the Agency and the government concerned. Other agreements concluded on a bilateral or multilateral basis with one or several states concern specific aspects of the Agency's work, or co-operation in a scientific or technical field. Such agreements[34] cover, for instance, joint or sponsored research activities in member states.

Agreement(s) concluded between the Agency and a state party to the NPT[35] – a unique type of bilateral agreement

The treaty practice of the IAEA includes a type of bilateral agreement with states of a unique legal character, namely the safeguards agreements. The rights and obligations of the two parties to these agreements are derived from a

32. Text of the IAEA P&I Agreement: INFCIRC/9/Rev.2 of 26 July 1967.

33. Text of the Agency's Agreements with the Republic of Austria including the Headquarters Agreement and supplemental agreements. INFCIRC/15 of 1959 amended and completed 1975, 1983, 1986, 1990, and 1999. (See sequential numbers of INFCIRC/15 addenda and revisions.

34. This paper does not cover contracts related to research or commerce.

35. INFCIRC/153(corrected): The Structure and Content of Agreements between the Agency and States required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons; INFCIRC/140: Treaty on the Non-Proliferation of Nuclear Weapons. Status of the NPT: 191 parties. Safeguards agreements concluded by the IAEA with states: 170.

specific, qualified obligation set forth by a multilateral treaty, the Treaty on the Non-Proliferation of Nuclear Weapons (NPT).

It is an unusual trilateral legal construct in that a multilateral treaty – the NPT – contains a binding obligation for some of its parties, the non-nuclear weapon states (NNWS) to conclude a bilateral agreement (safeguards) with an intergovernmental organisation (IAEA) for the purpose of allowing verification of fulfilment of their individual obligations under the NPT.

The obligation of the non-nuclear weapon states party to the NPT to conclude a safeguards agreement with the Agency is an obligation incumbent upon all these states and is not limited to member states of the Agency.

Article III of the NPT stipulates as follows:

> "1. Each Non-nuclear weapon State Party to the Treaty undertakes to accept safeguards, as set forth in an agreement to be negotiated and concluded with the International Atomic Energy Agency in accordance with the Statue of the International Atomic Energy Agency and the Agency's safeguards system, for the exclusive purpose of verification of the fulfilment of its obligations assumed under this Treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices. [...]
>
> 4. Non-nuclear-weapon States Party to the Treaty shall conclude agreements with the International Atomic Energy Agency to meet the requirements of this Article […]".

The Agency's own normative work – the standard setting role

One of the key functions of the Agency as stipulated under Article III.A.6 of the Statute is:

> "to establish or adopt […] standards of safety for protection of health and minimization of danger to life and property (including such standards for labour conditions), and to provide for the application of these standards…".

Legal nature of Agency standards

This substantive provision of the Statute does, however, not define the legal nature of such "standards", although it is evident that documents established by experts and published by an organ of the Agency have no independent legal status or any binding force on member states. The term “agreement” is not used in this context. The standards can gain legal force when incorporated into a bilateral or multilateral agreement of states or entered into the domestic law of a state. However, some binding nature, usually of a technical rather than legal nature, attaches to the standards by way of their application by the Agency to its own operations conducted in member states. This could be seen as *ius definitivum* as opposed to *ius cogens* under different legal conditions, e.g. upon request by states, as requested by parties to bilateral or multilateral agreements.

The term “international soft law” is commonly used to refer to all norms that are not international conventions, i.e. binding treaties, or domestic law. In the present context this would designate the standards, guides and codes established and published by the Agency. This terminology, although not Agency specific, also applies to other recommendatory or advisory documents as for example in the area of environmental norms.

For the purpose of this paper, it would however be legally more correct to view certain Agency standards, notably those qualified as “requirements”, e.g. the IAEA Regulation for the Safe Transport of Nuclear Material, as having different legal implications from other types of “soft law” documents. The very purpose of these standards is to “regulate” and to be applied more or less *in integrum* as binding, sole technical norm by way of their incorporation into domestic or international law. Codes and guides on the other hand are addressed to governments with the intention of recommending certain procedures or practices that have international applicability so as to harmonise state practice in these fields.

Impact

The relevance of the Agency standards has grown over the years and continues to gain further importance in harmonising existing technical norms, establishing such norms in new domains and in filling the vacuum left by the absence, obsolescence or inadequacy of international conventions on technical subjects. A case in point is the new nuclear security fundamentals.[36] This evolution is due to a number of different factors: first, there is an internationally shared need to carry out nuclear activities worldwide according to the same harmonised and transparent standards, elaborated and certified by international teams of national experts. Secondly, the open ended accelerating process of technical change and progress in the nuclear field requires updating and adjustment of technical norms on a reliable regular basis. Another reason for the universal acceptance of

36. IAEA Nuclear Security Series No. 7.

the IAEA safety standards is that the process of establishing international conventions of a binding nature cannot keep pace with technical change. The common denominators of the different nuclear activities of states are too small to ensure universal validity of conventions in the technical/scientific domain. Further, the intergovernmental negotiation process cannot be timed, it is never free of other political or economic interests of states; ratification by states is an unpredictable process that is often independent from the nature of a particular instrument, but follows governmental and parliamentary practice.

Therefore, today the Agency applies the standards to its own activities; states incorporate them into domestic law and into international binding treaties and conventions concluded under general international law as notably the mode-related law of transport.[37]

Scope of application

As regards the scope of application of the Agency standards, the Statute's terminology referring exclusively to standards "of safety[38] for protection of health" does not reflect today's usage of terms and appears to limit the subjects that need to be regulated by these documents.

Therefore, both the Secretariat of the Agency and state practice have continuously and exponentially expanded the meaning of "safety" and thereby the scope of the standards. The objective of the Basic Safety Standards[39] ("BSS") is described as "to establish basic requirements for protection against the risks associated with exposure to ionizing radiation […] and for the safety of radiation sources that may deliver such exposure".[40] This descriptive definition by including the "safety of sources" would however seem to be broader than the language of the Statute.

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37. See Jankowitsch-Prevor, O., "The International Transport of Nuclear and Radioactive Material", pp. 187 *et seq.* of this publication.

38. With regard to the terminology note that the meaning of the terms "safety" and "security" has not always been understood as two entirely different concepts: The title of the "safety series" is translated into French as *Collection Sécurité* BSS 1996, or as *Collection normes de Sûreté de l'AIEA*, 1996, TS-R-1 Transport Regulations. Both are entitled "safety" standards in the English version.

39. Safety Series No. 115, IAEA, 1996: "International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources", jointly sponsored by FAO, IAEA, ILO, OECD/NEA, PAHO, WHO.

40. See under title "objective" of the BSS.

The BSS, reaching beyond a narrow definition of safety, also establish requirements for governments to set up a national infrastructure for the control of radioactive sources, provide for licensing procedures and include as a separate provision the "security of sources" in the following terms:[41]

> "Sources shall be kept secure so as to prevent theft or damage and to prevent any unauthorized legal person from carrying out any of the actions specified in the General Obligations for practices of the Standards", by ensuring notably that control of a source not be relinquished, the obligation to inform the relevant authority on "decontrolled, lost, stolen or missing source", the prohibition of transfer of source without authorisation and periodic inventories of movable sources to confirm that they are "secure".

In addition to the BSS, the main safety standards are: the IAEA Regulations for the Safe Transport of Radioactive Material,[42] Legal and Governmental Infrastructure for Nuclear Radiation, Radioactive Waste and Transport Safety,[43] Preparedness and Response for a Nuclear or Radiological Emergency.[44]

A further category of documents of a recommendatory nature prepared by groups of experts convened by the Agency and published under the auspices of the Agency are the codes of conduct and of practice.[45] Under this category fall documents using the quasi-legal term "code" are addressed by the member states, through the Agency's General Conference or directly by the groups of experts that drafted the code,[46] to all states. These are: the 2003 Code of Conduct on the Safety and Security of Radioactive Sources, the 2004 Code of Conduct on the Safety of Research Reactors, all published after 2004, with the

41. Paragraph 2.34 of the BSS, page 26.

42. IAEA Safety Standards: Requirement No. TS-R-1 (2005 Edition).

43. IAEA Safety Standards: Requirements No. GS-R-1.

44. IAEA Safety Standards: Requirements No. GS-R-2 (2002).

45. A substantive discussion of the provisions of the codes would go beyond the purpose of this paper, see detailed analysis by Reyners, P., "Three International Atomic Energy Agency Codes", p. 171 *et seq.* of this publication.

46. 1990 Code of Practice on the Transboundary Movement of Radioactive Waste.

exception of the Code of Practice on the Transboundary Movement of Radioactive Waste,[47] published in 1990.

In two major fields of its activity, the Agency prepares, with the advice of international panels of experts, publishes and applies documents that are binding in practice but recommendatory in legal terms: these are (i) the recommendation to states on the administrative and technical measures required for the physical protection of nuclear material and (ii) the basic documents for the implementation of the Agency's safeguards function.

(i) The document entitled "[t]he Physical Protection of Nuclear Material and Nuclear Facilities"[48] reflects "a broad consensus among Member States on the requirements which should be met by systems for the physical protection of nuclear material and facilities".[49] First issued in the early 1970s, before the establishment of the Convention on the Physical Protection of Nuclear Material ("CPPNM"), the document has since been revised several times linking it with the CPPNM and taking account of relevant state practice and technological progress. In today's practice, this document constitutes the main nuclear security recommendation. It is applied *inter alia* by way of reference in bilateral or multilateral agreements on procedures and technical measures which are to be followed in the framework of nuclear co-operation among individual states.

(ii) Entirely different Agency "norms" are the precise guidelines that are to be applied for the conclusion of safeguards agreements between an individual state party to the NPT and the Agency in connection with the NPT.[50] This document responds to the request by the Agency's Board to the Director General for a document to serve "as the basis for negotiating safeguards agreements between the Agency and non-nuclear-weapon States party to the Treaty on the Non-Proliferation of Nuclear Weapons".[51] A somewhat similar document in legal terms, i.e. the "Model Protocol Additional to the

47. The main provision of the code (published under INFCIRC/386) regarding obligations of states in shipping radioactive waste has been incorporated in Article 27 of the 1997 Joint Convention on the Safety of Radioactive Waste Management and on the Safety of Spent Fuel Management.

48. INFCIRC/225/Rev.4 (Rev. 5 under preparation).

49. INFCIRC/225/Rev.4 Preface.

50. Article III.1 of the NPT, see *supra*, text of the treaty in INFCIRC/140.

51. INFCIRC/153(corrected): The Structure and Content of Agreements between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons.

Agreement(s) between State(s) and the International Atomic Energy Agency for the Application of Safeguards", was prepared and published upon request of the Board to serve as the "standard" for additional protocols[52] to be concluded by states party to comprehensive safeguards agreements with the Agency.

Conventions established under the auspices of the agency

The Statute does not include as one of the Agency's functions[53] the establishment of international conventions or treaties. A substantive provision of the Statute which defines the Agency's work suggests that drafting and negotiation of international instruments is within the statutory role of the Agency, included under the *omnibus* provision[54] which sets forth the objectives of the Agency as to "seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world. It shall ensure, so far as it is able, that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further any military purpose".

Beside this indirect mandate, nothing would seem to prevent member states of an intergovernmental organisation to elaborate, conclude and apply agreements under general international law that are covered by the objectives of that organisation. However, if such instruments entrust the organisation with new or enlarged responsibilities, a relevant decision is required from the policy-making organs, i.e. the Board of Governors and the General Conference.

Conventions and treaties elaborated under IAEA auspices have contributed over the years, continuously, to enlarge and diversify the functions entrusted originally by the Statute to the Director General and the Secretariat. New organisations have been established by IAEA instruments as notably the "Agreement on the Establishment of the ITER International Fusion Energy Organization for the Joint Implementation of the ITER Project" in 2007. The technical preparatory work for that organisation had been carried out under IAEA auspices. The Director General of the Agency is the depositary for the Agreement.[55]

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52. INFCIRC/540(corrected) – Model Protocol Additional to the Agreement(s) between State(s) and the International Atomic Energy Agency for the Application of Safeguards.

53. See also: P. Szasz, *op. cit.*, Chapter 23 "Multilateral Conventions", pp. 03-730.

54. Article II of the Statute.

55. Text of the agreement in INFCIRC/702.

The new mandates and the expanded role of the Agency and its Secretariat, due in particular to the implementation of the safety related instruments adopted after 1986, rarely resulted, however, from the original intentions of the member states or the experts convened to draft and negotiate such instruments. Indeed, none of the conventions provided for the setting up of a convention secretariat or a similar structure, as was done for instance in the international environmental conventions adopted more or less at the same time. It was rather the very mechanisms created by these instruments, notably the information and notification clearing house required by the Notification and Assistance Conventions and the regular peer review meetings of the parties to the Nuclear Safety Convention and the Joint Convention, which needed active and continuous support and attention that only the Agency's Secretariat could provide. The intent of the drafters to create a living commonality of interest among the contracting parties by way of the carefully crafted, compulsory meetings of contracting parties evolved into quasi institutions. The elaboration of conventions and the acceptance of these new activities or functions for the Secretariat has been invariably authorised *ex post factum* by decisions of the Board of Governors, thereby providing the legal basis for any such new activity emanating from an international instrument.

The bulk of international nuclear law which exists today has been codified under the auspices of the Agency over a period of some forty years in response to both specific needs of international nuclear activities and the nuclear industry in particular and, as is well known, to the major nuclear catastrophe at Chernobyl in 1986.

Civil liability for nuclear damage

The first such international legislative project which also created a new function for the IAEA concerned civil liability and state responsibility in relation to nuclear activities:[56]

The 1963 Vienna Convention on Civil Liability for Nuclear Damage[57] was further developed by the 1988 Joint Protocol Relating to the Application of the Vienna Convention and the Paris Conventions,[58] and later by the 1997 Protocol to Amend the 1963 Vienna Convention.[59] A further convention

56. See Paul C. Szasz. The Law and Practice of the International Atomic Energy Agency, Section 23.1.

57. INFCIRC/500.

58. INFCIRC/402.

59. INFCIRC/566 and Add.1.

was established in this domain in 1997, i.e. the Convention on Supplementary Compensation for Nuclear Damage.[60]

The Agency, at an early stage, also assumed responsibilities concerning the legality of immersion of certain radioactive matters under the 1972 London Dumping Convention,[61] and the 1976 Barcelona Convention for the Protection of the Mediterranean Sea Against Pollution (it was notably the role of the Agency to define "high, medium and low-level radioactive wastes" which must not be dumped in the seas).

Physical protection

The development and increase of transport of nuclear material across borders and the related protection and security requirements led to the adoption in 1979 of the Convention on the Physical Protection of Nuclear Material. The substantive content of the convention was based on the earlier recommendations published in 1972 by the Agency.[62] Thirty years after its entry into force, the CPPNM has reached almost universal adherence.[63] The Amendment of the CPPNM adopted in 2005, hampered by the conventions cumbersome entry into force provision, would be a highly welcome international instrument today as it combines security, physical protection, non-proliferation without omitting the well established safety advice.

International binding norms in case of a nuclear accident

As noted earlier, the Agency succeeded in achieving its fastest ever codification process by adopting two international instruments a few months after the power plant accident of April 1986, that literally "shook the world".[64] The Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency were drafted on

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60. INFCIRC/567 and Add.1.

61. The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter was amended after a moratorium in 1992 to prohibit such immersions.

62. See Final Act; the meeting had before it (*inter alia*): IAEA Document INFCIRC/225/Rev.1, in Legal Series No. 12, IAEA 1982.

63. CPPNM: Status: 143 parties (10 March 2010).

64. "The days that shook the world", title of a book by Paul Dowswell on the Russian Revolution 1917.

the basis of existing relevant recommendations,[65] negotiated and adopted on 26 September 1986 under the auspices of the Agency.

The safety of nuclear power plants and the safety of radioactive waste and spent fuel management

The international concern for safety of nuclear power plants remained on the Agency's agenda after the 1986 Chernobyl accident, but it took almost ten years for the Convention on Nuclear Safety[66] to be adopted, applicable only to the safety of land-based civil nuclear power plants. Relevant Agency safety standards had been established earlier and provided the substantive technical base for the international legal norm. The codification process of safety norms had then to also cover the issues of radioactive waste and spent fuel management which in the public's opinion remained a serious concern. After approximately three years of drafting and negotiation, the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management[67] was adopted in 1997. It took another four years for the convention to enter into force.

No new conventions

The only further codification completed in the first decade of the millennium, namely the 2005 Amendment of the CPPNM,[68] was in fact a long postponed negotiation and adoption process following several attempts to update and complete the 1980 CPPNM. The motivation of states to complete this amendment was triggered by the heightened concern at the Agency and the UN for the security of nuclear material in international and in domestic transport as well as when located in the related facilities.

Outlook

The priorities on the international nuclear legal agenda are shifting again. International concern has moved away from the well-regulated field of nuclear safety and related questions towards a redefined global issue of nuclear security.

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65. INFCIRC/310: Guidelines for Mutual Emergency Assistance Arrangements in Connection with a Nuclear Accident or Radiological Emergency. INFCIRC/321: Guidelines on Reportable Events, Integrated Planning and Information Exchange in a Transboundary Release of Radioactive Materials.

66. INFCIRC/449 and Add.1; see also for guidelines: INFCIRC/571, 572, 573.

67. INFCIRC/546.

68. See *supra*.

The question is whether this new priority will create a need for new international legal norms. Do the existing legal norms on safety, physical protection, security and safeguards adequately address nuclear security? Are the new concerns focused on universal applicability, compliance with and enforcement of existing international norms or is there a lack of appropriate laws and regulations?

There is arguably no international perception that the existing instruments have become obsolete or irrelevant. To the contrary, there is international consensus that these instruments established under Agency auspices, notably those recognised and strengthened by decisions of the UN Security Council,[69] are the proper instruments to address the new concerns.

At the same time, the creation of new international treaty obligations does neither appear as the most appropriate means to regulate, harmonise or bind the activities of states in the field of nuclear security nor does it seem to correspond to the spirit of our time, dominated by the sense of utmost urgency on this matter.

The process of international codification, under the auspices of the IAEA or of the United Nations is slow and fraught with delays caused by extraneous matters. It is therefore possible that the *modus operandi* developed and applied with some success during the past decade, namely to assume that enlightened self interest of states[70] is the strongest commitment achievable, combined with encouraging incentives, creates international peer pressure and will be more appropriate to create a new international "security" norm.

The Agency's capacity to establish a variety of norms of different legal nature has been proven and is well established. It will continue to be needed in order to regulate the evolving field of nuclear activities. The question as to the future of the international rule of law in the nuclear field will have to remain on the agenda.

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69. See UNSC Resolutions at www.un.org/terrorism/instruments.shtml. For UN lists of counter-terrorism instruments, see International Instruments Related to the Prevention and Suppression of International Terrorism, United Nations Publication, NY, 2001. See also informal publication "The Universal Instruments against Terrorism", published by UN Office of Drugs and Crime, Vienna No. V.07-86003 (144 pp.).

70. The concepts of global coalition and global initiatives among like minded states such as the 2003 Proliferation Security Initiative, the 2006 U.S.-Russia Global Initiative to Combat Nuclear Terrorism including illicit trafficking, have evolved as quasi agreements with quasi contracting parties.

The OECD Nuclear Energy Agency

*by Julia A. Schwartz**

The Organisation for European Economic Co-operation (OEEC), the predecessor of today's Organisation for Economic Co-operation and Development (OECD) came into being on 16 April 1948. It was created under the OEEC Convention as a permanent organisation for economic co-operation, primarily to administer aid under the Marshall Plan, the post World War II programme for the reconstruction of Europe initiated in 1947. Its founding convention also calls on it to assist sound economic expansion in other countries and to contribute to growth in world trade on a multilateral, non-discriminatory basis.

The OEEC originally had 18 participants: Austria, Belgium, Denmark, France, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Sweden, Switzerland, Turkey, United Kingdom, and Western Germany (originally represented by the combined American/British occupation zones and the French occupation zone).[1] The headquarters of the Organisation was established at the Château de la Muette in Paris, France where it remains today.

During the immediate post World War II period, one of the issues facing European countries as they took up the challenges of national economic reconstruction was energy availability and cost. The Organisation's structure already included a Special Committee on Nuclear Energy which had been

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1. The Anglo-American zone of the Free Territory of Trieste was also a participant in the OEEC until it returned to Italian sovereignty.

established in 1956, but the OEEC Council pursued the idea of establishing within the Organisation an Agency that would take charge of all nuclear energy issues. This idea was largely motivated by the fact that the Council recognised the rapid increase in its member countries' energy needs and the possibilities which nuclear energy presented in that regard.

The European Agency for Nuclear Energy (ENEA) was created by a decision of the OEEC Council made on 20 December 1957; it came into force on 1 February 1958.[2] As defined in Article 1 of its Statute, the purpose of the Agency is "to further the development of the production and uses of nuclear energy, including applications of ionizing radiation, for peaceful purposes by the participating countries, through co-operation between those countries and a harmonization of measures taken at the national level", taking due account of the public interest and mindful of the need to prevent the proliferation of nuclear explosive devices. The original ENEA membership included all European OEEC countries as well as Canada and the United States as associate members.

The Steering Committee for Nuclear Energy was designated as the ENEA's governing board and was given the task, amongst other things, of promoting the harmonisation and development of legislation in the nuclear field, primarily in the areas of public health protection, the prevention of accidents in the nuclear industry and civil liability and insurance against nuclear risks.

From the very beginning, the Agency focused on a selection of co-operation themes, compatible with its limited human and financial resources. Its first act was to sign the Convention on the Establishment of a Security Control in the Field of Nuclear Energy on 20 December 1957.[3] The security control system established under this convention was designed "to ensure that the operation of joint undertakings established by two or more Governments … on the initiative or with the assistance of the Agency, and that materials, equipment and services made available by or under the supervision of the Agency … shall not further any military purpose". Eventually, with the creation of similar systems by the European Atomic Energy Community (EAEC) and the International Atomic Energy Agency (IAEA), the Steering Committee for

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2. It is worth noting that the year 1957 also witnessed the establishment of the European Atomic Energy Community and of the International Atomic Energy Agency.

3. This convention entered into force on 22 July 1959.

Nuclear Energy decided to suspend the application of the NEA's security control system to avoid unnecessary duplication.[4]

In September 1961, the OEEC was superseded by the Organisation for Economic Co-operation and Development (OECD), a worldwide body whose founding convention was signed on 14 December 1960 by the 18 member countries of the OEEC together with Canada and the United States. Since then, the OECD's mission has been to help its member countries achieve sustainable economic growth and employment and to raise the standard of living in member countries while maintaining financial stability. The OECD's focus has progressively broadened to include other countries with eleven additional nations having since joined the Organisation: Australia, Chile, the Czech Republic, Finland, Hungary, Japan, Korea, Mexico, New Zealand, Poland and the Slovak Republic. In addition, four countries are currently in the process of acceding to the OECD (Israel, Estonia, Slovenia and the Russian Federation) and another five countries are participating in OECD activities under the banner of enhanced engagement (Brazil, China, India, Indonesia and South Africa).

In keeping with the OECD's enlargement, the ENEA's membership expanded as well, such that in 1972, when Japan became the first non-European country to join the Agency as a full member, the ENEA changed its name to "OECD Nuclear Energy Agency" (NEA). Today, NEA membership totals 28 countries and the new scope of its increased membership confers upon it a unique position between the limited membership of the European Union and that of the International Atomic Energy Agency (IAEA). In addition, the NEA has gradually developed a policy of extending links with a number of non-member countries involved in nuclear energy development and use, on the basis of co-operation and mutual benefit.

Apart from the European Commission statutorily taking part in the work of the NEA, the Agency has developed strong working links with international organisations or institutions active or interested in peaceful nuclear energy, such as the IAEA, the World Health Organization (WHO), the International Commission on Radiological Protection (ICRP), the International Radiation Protection Association (IRPA) and the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR).

4. The NEA Steering Committee adopted this decision on 14 October 1976.

Early accomplishments: 1960s and 1970s

The first phase of the NEA's programme mainly consisted of laying the foundations for nuclear co-operation, focusing on the launch of several joint research and development undertakings with ambitious objectives and significant financial requirements. Such projects included the Halden and Dragon reactor projects and the prototype Eurochemic plant for the reprocessing of spent nuclear fuels. This period came to a natural end as the experimental phase of nuclear energy evolved into commercial, industrial development. However, while the Eurochemic and Dragon projects ceased operations in the decades to come, the Halden Reactor Project evolved gradually into an important international technical network which continues to this day, supported by a large number of organisations in 20 countries, and performing research and development programmes in various areas of nuclear safety.

As early as 1957, however, the OEEC Council had anticipated that civil liability for damage that could result from the peaceful uses of nuclear energy, as well as the difficulty of obtaining insurance or other financial security to cover that liability, were likely to become serious issues in the years to come. Consequently, the OEEC Special Committee on Nuclear Energy (later the Steering Committee for Nuclear Energy) established a working group to develop proposals for harmonising legislation in the nuclear liability and insurance fields.

The working group was subsequently transformed into the Group of Governmental Experts on Third Party Liability in the Field of Nuclear Energy, which itself evolved into the Nuclear Law Committee (NLC). That group, comprised of lawyers, insurers and technical specialists was asked to draft an international convention on nuclear third party liability, compensation and financial security which would set out the basic principles underlying subsequent national legislation in this field. The group's work was carried out in close consultation with the United States, the EAEC, the IAEA, the European Insurance Committee, the International Union of Producers and Distributors of Electrical Energy (now EURELECTRIC) and other relevant bodies, particularly in the transport field.

The resulting Paris Convention on Third Party Liability in the Field of Nuclear Energy (the "Paris Convention") was adopted under the auspices of the OEEC Council in July 1960. Throughout the ensuing decade, the NEA's Group of Experts on Third Party Liability devoted its work to harmonising that convention with another similar convention, the Vienna Convention on Civil Liability for Nuclear Damage (the "Vienna Convention") which had been adopted under the auspices of the IAEA in 1963. They accomplished this harmonisation primarily by means of an Additional Protocol to the Paris Convention which was adopted in 1964.

In addition, 1963 saw the realisation under the auspices of the ENEA of the Brussels Convention Supplementary to the Paris Convention (the "Brussels Supplementary Convention") aimed at enabling additional compensation to be made available from public funds for nuclear damage incurred as a result of an accident to which the Paris Convention would apply. On the basis of the modifications made to the Paris Convention by the Additional Protocol of 1964, a further Additional Protocol was also drafted and adopted for the Brussels Supplementary Convention.

Towards the end of the 1960s, with the Paris Convention and its Additional Protocol having entered into force,[5] the Group of Experts devoted its time and energy to studying issues relating to the interpretation and implementation of the international liability and compensation conventions. A model certificate of financial guarantee was drafted and became the subject of a recommendation of the NEA Steering Committee in 1968; shortly thereafter the Committee adopted recommendations concerning the application of the Paris Convention to nuclear incidents occurring, or damage suffered, on the high seas and to damage suffered in a contracting state even if the incident causing the damage has taken place in a non-contracting state. Other NEA Steering Committee recommendations and interpretations during the same period of time covered a carrier's renouncing of its right of subrogation where it has accepted the obligations of an operator as well as simplifying the issue of insurance policies for the transport of nuclear substances, confirming the obligation to financially secure third party liability regardless of other insurance that may be in place and excluding small quantities of nuclear substances from the scope of the Paris Convention.[6]

The Committee also carried out considerable research on issues relating to the maritime transport of nuclear substances, this time in co-operation with the International Maritime Organization. An international conference was

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5. The Paris Convention and its 1964 Additional Protocol came into force on 1 April 1968.

6. All decisions, recommendations and interpretations adopted by the NEA Steering Committee in relation to the Paris Convention are contained in "Paris Convention, Decisions, Recommendations, Interpretations", OECD, 1990, or may be accessed at www.nea.fr/html/law/paris-convention-dec-rec-int.pdf. Decisions are legally binding upon the contracting parties to that convention; recommendations and interpretations are not.

organised in December 1971 by the ENEA, the IMO and the IAEA during the course of which the Convention relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material was adopted.[7] The purpose of this convention is to resolve conflicts which might arise from the simultaneous application to nuclear damage of certain maritime conventions dealing with ship owners' liability and other conventions which place liability for such damage on the operator of the nuclear installation from/to which the material was being transported. The 1971 Convention provides that a person otherwise liable for damage caused by a nuclear incident shall be exonerated from liability if the operator of the nuclear installation is also liable for such damage by virtue of the Paris Convention, the Vienna Convention or national law which is similar in the scope of protection given to the persons who suffer damage.

Other important NEA accomplishments took place during the Agency's formative years, particularly in the field of radiological protection. Public health and safety have always been a high priority for governments and in the first instance, a Working Party on Public Health and Safety was established to contribute to the development of radiation protection policies and regulations for workers and the public. Basic norms for the protection of workers and the public, including emergency measures, were adopted by the OEEC Council in 1959 and revised in 1962 to take into account recent work and recommendations developed by the ICRP.

The decade of the 1970s also saw a number of legally binding OECD Council decisions adopted in the radiological protection field. Radiation protection standards were adopted in respect of radioluminous timepieces and for gaseous tritium light devices. Interim radiation protection standards were adopted for the design, construction, testing and control of radioisotopic cardiac pacemakers and the Council also took a legally binding decision to establish a multilateral consultation and surveillance mechanism for the sea dumping of radioactive waste. The NEA Steering Committee, for its part, established Guidelines for Controlling Consumer Products containing Radioactive Substances and Guidelines for the Sea Dumping of Packages of Radioactive Waste.

These decisions and guidelines were abrogated by the OECD Council and NEA Steering Committee respectively some decades later when it was recognised that such matters would be better dealt with by other international organisations in the radiological protection field, such as the ICRP or, in the

7. Adopted on 17 December 1971, this convention entered into force on 15 July 1975.

case of sea dumping of radioactive waste, the International Maritime Organization (IMO). In fact, the NEA has routinely provided authoritative guidance and advice to member countries on the interpretation of the ICRP recommendations in this field and has taken steps to assure that the needs and concerns of radiological protection policy makers, regulators and practitioners are appropriately addressed in those recommendations.

By the mid 1970s, the international context was changing, with industrialised countries being hit hard by the first shock of oil price increases. A significant redirection of the NEA's priorities took place; both government and public attitudes towards nuclear energy were beginning to be influenced by environmental and safety concerns. Increasing attention was paid to radiological protection, the safety of nuclear installations, radioactive waste management and the necessary legal and administrative framework for regulating these activities. New committees were established to carry out the work envisaged in these areas; the Committee on the Safety of the Nuclear Installations (CNSI), the Committee on Radiation Protection and Public Health (CRPPH), the Radioactive Waste Management Committee (RWMC) and the Committee for Technical and Economic Studies on Nuclear Energy Development and the Fuel Cycle (NDC) were all established during this time frame.

A time of change: the 1980s and 1990s

During this era, the NEA's efforts in promoting international co-operation remained strong. The Incident Reporting System (the "IRS") for the exchange of information on incidents in nuclear reactor operations was set up by the NEA's CSNI, the Joint NEA/IAEA Uranium Group was established and the Committee on Nuclear Regulatory Activities (CNRA) was formed. Another substantial contribution of the NEA was the development, in 1989, of an international nuclear event scale of safety significance. Subsequently, the NEA joined the IAEA in a common effort to develop such a scale and as of 1990 the International Nuclear Event Scale (INES) provides a standard instrument to characterise and report nuclear incidents or accidents and communicate with the public.

It was during this decade as well that the Group of Governmental Experts in Third Party Liability, now called the Nuclear Law Committee, after having studied the modernisation of both the Paris and Brussels Supplementary Conventions, concluded that to maintain the efficiency of the regime instituted by these instruments, a number of amendments should be made to their texts. First, it was agreed to replace the unit of account which was based on the official price of gold, with the Special Drawing Right of the International Monetary Fund. Secondly, to counteract the effects of inflation, it was agreed to increase the compensation amounts provided for under the Brussels Supplementary Convention, both as regards the state compensation tier and the collective contribution tier. Thirdly, it was agreed to make a number of amendments whose purpose was to facilitate the implementation of the two conventions or to further harmonise their application. Protocols to amend both the Paris and Brussels Supplementary Conventions were thus adopted by the contracting parties to those instruments on 16 November 1982. The Paris Convention Protocol came into effect on 7 October 1988 and the Brussels Supplementary Convention Protocol on 1 August 1991.

The Nuclear Law Committee also studied the application of a nuclear civil liability regime to the long-term management of radioactive waste, a study that eventually led the Committee to examine the means of applying the Paris Convention to radioactive waste management installations. That study terminated with the adoption, by the NEA Steering Committee in 1984, of a legally binding decision relative to the inclusion of radioactive waste disposal installations within the scope of the Paris Convention.

During the early to mid 1980s the Nuclear Law Committee also spent considerable time drafting a new recommendation on liability for damage to nuclear substances in the course of transport, which was adopted by the NEA Steering Committee in 1981, and a new interpretation determining nuclear installations in the course of being decommissioned to be covered by the Paris Convention regime.[8] That interpretation was followed a few years later by a legally binding decision of the NEA Steering Committee permitting installations in the course of being decommissioned to be exempted from the application of the Paris Convention where certain technical criteria are complied with.

On 26 April 1986, the tragic accident which took place at the Chernobyl nuclear power plant in Ukraine brought to light the limitations and deficiencies of the legal regimes that were in place at that time, both in terms of preventing nuclear accidents and in terms of compensating victims thereof in the event of their occurrence. When coupled with the Three Mile Island accident which took place in 1979, it became apparent that refined approaches to safety and regulatory aspects were needed as was increased international co-operation to ensure that such events were prevented or at least properly remedied in the future.

8. With the progressive ageing of nuclear installations, the issue of decommissioning was becoming an increasingly real and relevant problem.

The NEA Steering Committee met in September 1986 to examine the information to be derived from the accident and it decided, amongst other important initiatives, to reinforce the NEA’s work in the area of civil liability for nuclear damage. The Nuclear Law Committee was thus instructed to reorient its work to address the gaps in the nuclear liability regime made evident by the Chernobyl accident.

That instruction would be transformed into, amongst other things, interfaces with other international regulatory bodies in charge of developing norms and guides affecting nuclear activities. For example, following the completion of the new recommendations of the International Commission on Radiological Protection (ICRP 60) experts from nuclear safety and radiation protection communities met to review the implications of these recommendations on nuclear safety and regulatory policies as well as to discuss issues of interface between their respective disciplines. In the course of this time period, the NEA, the European Commission, the Council for Mutual Economic Assistance, the Food and Agriculture Organization, the IAEA, the International Labour Organization, UNSCEAR and the WHO co-operated to revise the joint Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources (BSS).

That instruction would also be transformed into a reactivation of work in co-operation with the IAEA aimed at establishing a link between the Paris and Vienna Conventions through means of a Joint Protocol relating to the Application of the Vienna Convention and the Paris Convention. Work on the development of this instrument concluded with its adoption in 1988 and its entry into force in 1992. Under its terms, rights of compensation granted to victims in states party to the Joint Protocol and one of those two conventions will be the same as the rights granted to victims in states party to the Joint Protocol and the other of the two conventions, effectively extending the geographic scope of application of each convention to cover victims in states party to the other. At the same time, the Joint Protocol ensures that only one of the two conventions will apply to any on nuclear accident.

Yet another study undertaken by the Nuclear Law Committee in the context of the Chernobyl accident addressed the issue of including the cost of preventive measures in the concept of nuclear damage and about the same time the Committee began to consider increasing the amount of the operator’s liability and required financial security.

Within the IAEA, a revision of the Vienna Convention was undertaken in the late 1980s/early 1990s with negotiating states being determined that any revision of that convention should be accompanied by the adoption of a supplementary compensation system for nuclear damage. The Nuclear Law Committee closely followed that revision work, including the drafting of both the 1997 Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage and the new Convention on Supplementary Compensation for Nuclear Damage, both of which were adopted in September 1997.

These new instruments prompted the Nuclear Law Committee to examine revising the Paris Convention and its accompanying Brussels Supplementary Convention, but before doing so, the NEA Steering Committee agreed to two recommendations designed to serve on an interim basis: first that contracting parties which establish a lower liability amount for reduced risk activities and facilities should arrange for public funds to be made available to compensate any excess damage up to the general liability amount and that contracting parties adopt a significantly increased maximum liability amount.

Subsequently, work on modernising the two conventions began in 1998 and was carried out by the conventions' contracting parties together with invited observers from Slovenia and Switzerland who had indicated their intention to join the revised conventions (the "CPPC Group"). Throughout the negotiations, the CPPC Group kept the Nuclear Law Committee informed of its progress until the work of the CPPC Group came to an end with the adoption, on 12 February 2004 of Protocols to amend both the Paris and Brussels Supplementary Conventions.

The 21st century: 2000-2010

For the first time, the NEA developed a strategic plan defining the Agency's role as a forum for exchanging information and experience, a centre of nuclear competence and a contributor of nuclear policy analyses and assessments. International co-operation through the NEA contributed significantly to keeping the nuclear energy option open during the early part of this period by helping preserve and develop scientific and technical know-how and by maintaining adequate human resources in both quantity and quality. Today, the NEA is active in a wide variety of topical areas including nuclear safety and regulation, radioactive waste management, radiation protection and public health, economics, resources and technology, nuclear science, legal affairs, data bank and information and communications.

The events which took place in the USA on 11 September 2001 represented another new challenge for the NEA, this time focusing on questions related to terrorism. To address these new concerns, the NLC carried out a study devoted to the availability of insurance to cover an operator's liability for damage resulting from a nuclear accident caused by a terrorist act and how obstacles to limitations on that cover could be overcome. Other new subjects also emerged, reflecting national concerns or developments in technology. A study on liability and financial security issues applicable to nuclear fusion installations was carried out at the request of the French delegation, whose country is hosting the ITER reactor. More recently the NLC has been studying the Aarhus Convention, its implementation and its influence on nuclear projects and activities.

This panorama of activities would not be complete without mentioning the NLC's important role as a forum for the exchange of information between states, international organisations and non-governmental organisations, not just in the field of international third party nuclear liability but also in relation to nuclear law in general. The NLC regularly shares information on the drafting of new international nuclear law instruments or regulations which may have consequences on nuclear energy activities, (in particular EAEC legislation and IAEA conventions/codes). It also looks regularly at developments in national legislation and regulations in member and observer countries.

At the beginning of this same decade the NEA set up a Forum on Stakeholder Confidence to facilitate the sharing of member country experience in addressing the societal dimension of radioactive waste management. Comprehensive stakeholder participation activities were also carried out in the radiological protection field, particularly in connection with the role played by the CRPPH in the development of the new ICRP recommendations that will significantly influence national regulations and international standards in radiological protection in the future.

It was during this period that the Information System on Occupational Exposure (ISOE) was founded, the Fuel Incident Notification and Accident System was created, the first International Nuclear Emergency Exercise (INEX) was conducted and the International School of Nuclear Law (ISNL) was launched.

In addition, the NEA was invited to provide technical secretariat services to the Generation IV International Forum (GIF), an international co-operative effort to carry out the necessary research and development needed to bring promising new reactor systems to the point of commercialisation and under whose framework agreement the OECD Secretary-General is designated as depositary. Similarly, the NEA was invited to provide legal and secretariat services to the committee established under the framework agreement and protocol concluded for the Multilateral Nuclear Environmental Programme in the Russian Federation and for which the OECD Secretary-General is designated as co-depositary. Finally, the NEA provides technical secretariat services to the Multinational Design Evaluation Programme (MDEP) under which some ten countries share resources and knowledge in the course of assessing new reactor designs to improve both the efficiency and effectiveness of that process.

Looking towards tomorrow

The NEA now holds a half century of experience to its credit. Those fifty years stand witness to the NEA's record in emphasising safety as a key concern for the safe utilisation of nuclear energy, its competence and stamina in conducting its programmes in a constantly evolving political, economic and social environment and its capacity to offer new services to a membership desirous to contribute, in a multilateral context, to the development of the next generations of nuclear power plants and related nuclear fuel cycles. Its aim has been to respond in an efficient and timely manner to the challenges which international events have posed during that time.

The NEA is a recognised actor on the intergovernmental nuclear energy co-operation scene, gathering interested OECD countries and non-member nations across the globe. Its current initiative for enlarging co-operation with emerging countries which will need large energy production capacities to feed their economic development, while minimising their impact on the environment, come at a time when nuclear energy is increasingly recognised as an indispensible component of the world energy mix.

Many important tasks remain to be accomplished by the Agency as its member countries face new challenges. The NEA Secretariat looks forward to working with all of the Agency's committees on those important tasks and to sharing the challenges that lie ahead.

The European Atomic Energy Community and its Primary and Secondary Law

*by Wolfgang Kilb**

In the field of nuclear energy, the treaty establishing the European Atomic Energy Community ("Euratom Treaty")[1] is binding primary law for 27 member states of the European Union with almost 500 million inhabitants. It is the basis for the peaceful uses of nuclear energy of two nuclear weapon states,[2] 15 countries[3] using nuclear power for electricity generation, and in all member states it serves a number of other goals, such as protection of health and safety. With a total of just under 150 nuclear power plants,[4]

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1. Consolidated version in O.J. C 84 of 30 March 2010; overview at http://europa.eu/legislation_summaries/institutional_affairs/treaties/treaties_euratom_en.htm.

2. France and the United Kingdom.

3. Belgium, Bulgaria, the Czech Republic, Finland, France, Germany, Hungary, Sweden, Lithuania, the Netherlands, Romania, Slovak Republic, Slovenia, Spain and the United Kingdom.

4. As of July 2010.

generating almost one third of its electricity needs, the European Union is the world's largest producer of nuclear energy.[5]

Since its entry into force in 1958, the Euratom Treaty has remained largely unchanged while the European Economic Community (EEC) has evolved into the European Community (EC) and recently into the European Union (EU).[6] Another founding treaty, the Treaty establishing the European Coal and Steel Community, expired in 2002 and was absorbed by the EC/EU Treaty. By contrast, the Euratom Treaty has so far only been modified in line with the institutional changes of the last treaties, namely the 1965 Merger Treaty, the 1986 Single European Act, the 1992 Treaty of Maastricht, the 1997 Treaty of Amsterdam, the 2001 Treaty of Nice and the 2007 Treaty of Lisbon.[7] Its substantial provisions remained largely the same as they were in 1958. The Lisbon Treaty of 2007[8] was the latest step in modernising and adapting the European Union to the requirements of an enlarged and more diverse supranational European Union. It entered into force on 1 December 2009.

It is evident that the Euratom Treaty is not totally disconnected from the rest of the European Union with its other two primary law basis, i.e. the Treaty on European Union (EU Treaty) and the Treaty on the Functioning of the European Union (TFEU).[9] Although the European Atomic Energy Community's (EAEC) primary law remains mostly untouched, there are a number of legal aspects that merit discussion. This article deals, on the one hand, with the *status quo* of the primary and secondary law of the EAEC and, on the other hand, with a number of key politico-legal questions arising from the fact that the EAEC remains a separate legal construction. Whereas Part A is of descriptive and educational nature, addressed to readers who are less familiar

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5. See report of the European Nuclear Safety Regulators Group, July 2009, page 4 at http://ec.europa.eu/energy/nuclear/ensreg/doc/2009_ensreg_report.pdf and Kriener, Manfred, "Kernkraft gegen Klimawandel?", in: Petermann, Jürgen (editor), Sichere Energie im 21. Jahrhundert, Hamburg: Hoffmann und Campe, 2008, page 159 (160).

6. O.J. C 325 of 24 December 2002.

7. See the evolution of the European integration in Oppermann, Thomas, Europarecht, München, C.H. Beck, 3rd Edition, 2005, pages 1-19.

8. O.J. C 115 of 9 May 2008 (consolidated version of the Lisbon Treaty).

9. O.J. C 115 of 9 May 2008 (consolidated versions of both treaties – EU Treaty and TFEU).

with European law, Part B is for those who are already knowledgeable about European law. The article finishes with a look towards the future.

A. The legal framework under the Euratom Treaty

This part of the study deals with the Euratom Treaty as primary law and its more detailed secondary law provisions based thereon. The study then continues to discuss in Part B a number of legal issues that, most likely, will not only be subject to legal and political debate but will potentially also come under judicial scrutiny in the future.

At the outset and before introducing Euratom's legislative framework, the terms "supranational" and "intergovernmental" shall be explained.

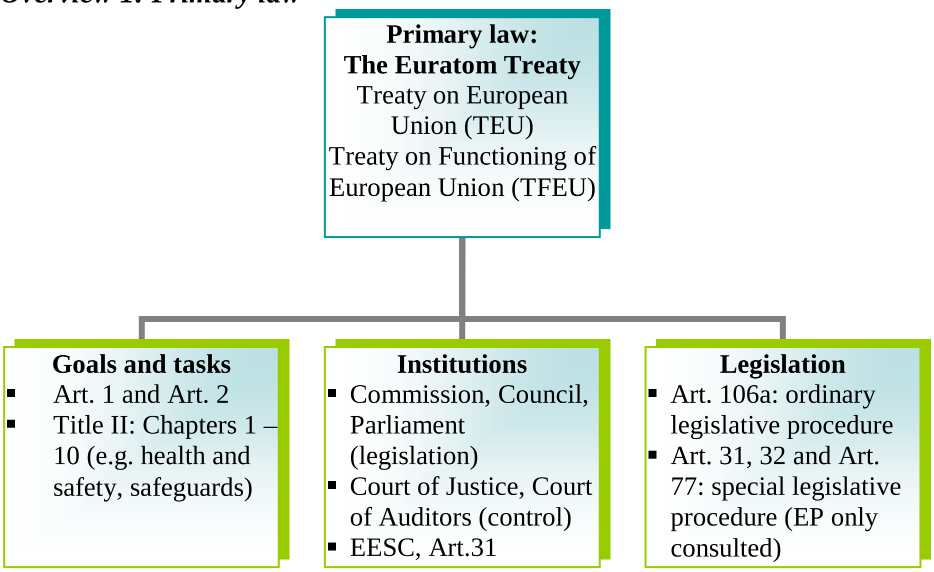
Both intergovernmental and supranational co-operation is performed between the member states of the EU. What makes the EU unique is its supranational character which means that powers of member states in various fields are delegated to EU institutions and that the rules adopted at the EU level within the defined powers and procedures bind the member states and establish rights and obligations of the citizens. Most areas covered by both the TFEU and the Euratom Treaty are subject to supranational co-operation. Intergovernmental co-operation is the traditional form of international co-operation between sovereign states. The rules are adopted by the states, e.g. at meetings of the European Council, and bind only the state with the obligation to approve the rules domestically before they can have effect on the citizens. Only some matters are decided by intergovernmental agreements, such as security and defence issues.

This part deals with the Euratom Treaty as primary European law, including the recent changes introduced by the Lisbon Treaty, and its relationship with the other treaties. Secondary law, namely regulations, directives, decisions and soft law, for which the Euratom Treaty is the legal basis, will also be presented.

I. Primary law

Primary law means the original supreme source of law in the European Union. It consists mainly of the founding treaties and is directly applicable in the EU member states. This section defines (a) the relationship between the three founding treaties, one of which is the Euratom Treaty, (b) its goals and tasks, (c) its institutions and (d) the legislative procedures.

Overview 1: Primary law



1. Relationship between the three primary law treaties in the field of energy

The European Atomic Energy Community is based on the Euratom Treaty and exists as a separate legal entity next to the European Union based on both the Treaty on European Union and the Treaty on the Functioning of the European Union. This is reconfirmed by the Preamble to Protocol No. 2 of the Lisbon Treaty amending the Euratom Treaty.[10] However, the three treaties cannot be strictly separated as they are not only linked by several legal provisions but also because of the identity of their institutions. In the field of energy, the following are the key provisions:

Article 4(2)(i) TFEU

1. The Union shall share competence with the Member States where the Treaties confer on it a competence which does not relate to the areas referred to in Articles 3 and 6.
2. Shared competence between the Union and the Member States applies in the following principal areas:
   […]
   (i) energy

10. "Recalling the necessity that the provisions of the Treaty establishing the European Atomic Energy Community should continue to have full legal effect".

Energy is a field of “standard” shared competence between the Union and the member states as it is neither an area of exclusive competence[11] nor a mere supporting competence[12] of the EU.

Article 194 TFEU

1. In the context of the establishment and functioning of the internal market and with regard for the need to preserve and improve the environment, Union policy on energy shall aim, in a spirit of solidarity between Member States, to:

   (a) ensure the functioning of the energy market;
   (b) ensure security of supply in the Union;
   (c) promote energy efficiency and energy saving and the development of new and renewable forms of energy; and
   (d) promote the interconnection of energy networks.

2. Without prejudice to the application of other provisions of the Treaties, the European Parliament and the Council, acting in accordance with the ordinary legislative procedure, shall establish the measures necessary to achieve the objectives in paragraph 1. Such measures shall be adopted after consultation of the Economic and Social Committee and the Committee of the Regions.

   Such measures shall not affect a Member State’s right to determine the conditions for exploiting its energy resources, its choice between different energy sources and the general structure of its energy supply, without prejudice to Article 192(2)(c).

Energy has thus evolved to a full-fledged policy, whereas in the past, legislative initiatives of the EU in this field had to be based on other legal provisions such as approximation of laws,[13] Trans-European networks[14] or environment.[15]

11. Article 3: customs, competition, monetary policy, fisheries, commercial policy.

12. Article 6: health, industry, culture, tourism, education.

13. Article 94 *et seq.* EC Treaty.

14. Article 154 *et seq.* EC Treaty.

15. Article 174 *et seq.* EC Treaty.

Article 106a Euratom Treaty

1. Article 7, Articles 13 to 19, Article 48(2) to (5), and Articles 49 and 50 of the Treaty on European Union, and Article 15, Articles 223 to 236, Articles 237 to 244, Article 245, Articles 246 to 270, Articles 272, 273 and 274, Articles 277 to 281, Articles 285 to 304, Articles 310 to 320, Articles 322 to 325 and Articles 336, 342 and 344 of the Treaty on the Functioning of the European Union, and the Protocol on Transitional Provisions, shall apply to this Treaty.

2. Within the framework of this Treaty, the references to the Union, to the "Treaty on European Union", to the "Treaty on the Functioning of the European Union" or to the "Treaties" in the provisions referred to in paragraph 1 and those in the protocols annexed both to those Treaties and to this Treaty shall be taken, respectively, as references to the European Atomic Energy Community and to this Treaty.

3. The provisions of the Treaty on European Union and of the Treaty on the Functioning of the European Union shall not derogate from the provisions of this Treaty.

This is the central norm which makes a number of provisions of the EU Treaty and TFEU resulting from the Lisbon Treaty directly applicable to the Euratom Treaty. In detail they concern:

- defence of values of the EU (Article 7 EU Treaty);

- ordinary revision procedure [Article 48(2)-(5) EU Treaty]; application and admission to the EU (Article 49 EU Treaty) and withdrawal from the EU (Article 50 EU Treaty);

- institutional framework (Articles 13-19 EU Treaty), e.g. the functioning of the European Parliament (Articles 223-236 TFEU), the Council (Articles 237-243 TFEU), the Commission (Articles 244-250 TFEU), the Court of Justice (Articles 251-281 TFEU), the Court of Auditors (Articles 285-287 TFEU) and of the Economic and Social Committee (Articles 300-304 TFEU);

- legislative instruments and procedure (Articles 288-299 TFEU) and financial provisions (Articles 310-325 TFEU);

- staff rules (Article 336 TFEU), language rules (Article 342 TFEU) and settlement of disputes (Article 344 TFEU).

The majority of these modifications are merely institutional changes or modifications to keep the Euratom Treaty – as has been done in the past – in line with the EU Treaty and the TFEU's general provisions, while leaving the core and the specificities of the Euratom Treaty unchanged.

2. Goal and tasks in the Euratom Treaty

The Euratom Treaty creates a wide range of competences for the European institutions in the field of peaceful uses of nuclear energy. By promoting co-operation between member states in this strategic area, the Euratom Treaty has enabled them, for more than 50 years, to share the resources needed to develop nuclear energy in Europe – from funding to fissile materials and scientific knowledge. Whether for the nuclear fuel cycle or for industrial or medical activities, its provisions cover, regulate and control the majority of civil nuclear applications (see Article 1 of the Euratom Treaty on the goal to "contribute to the raising of the standard of living in the Member States" and Article 2).[16]

The tasks as enumerated in Article 2 of the Euratom Treaty are the following:

- promote research and development and ensure the dissemination of technical information (Articles 4-29);
- establish uniform safety standards to protect the health of workers and of the general public and monitor their application (Articles 30-39);
- facilitate investment and promote initiatives by undertakings in the field of nuclear energy (Articles 40-51);
- ensure that all users in the Community receive a regular and equitable supply of nuclear materials (Articles 52-76);
- guarantee that nuclear materials are not diverted to purposes other than those intended (Articles 77-85);
- exercise the right of ownership conferred upon it with respect to fissile materials (Articles 86-91);
- ensure wide markets and access to the best technical facilities through the creation of a nuclear common market (Articles 92-100); and

16. See "EURATOM – 50 years of nuclear energy serving Europe", European Communities, 2007, pages 4, 10, 11 and 18.

- establish relations with other countries and international organisations to foster progress in the peaceful use of nuclear energy (Articles 101-106).

Hence, the tasks correspond to the chapters of the Euratom Treaty as follows:[17]

Overview 2: Goals and tasks

Article 2	Contents	Corresponding chapter in the second section, provisions aimed at promoting progress in the nuclear field	
a)	Promotion of research	Chapter 1	Promotion of research
		Chapter 2	Dissemination of information
b)	Protection of health	Chapter 3	Health and Safety
c)	Promotion of investments	Chapter 4	Investment
		Chapter 5	Joint Undertakings
d)	Security of supply	Chapter 6	Supplies
e)	Safeguards	Chapter 7	Safeguards
f)	Intervention in the external market	Chapter 8	Property ownership
g)	Liberalisation of the internal market	Chapter 9	The nuclear common market
h)	External relations and international organisations	Chapter 10	External relations

17. See Prieto, Nuria, “Security of Supply in the Euratom Treaty”, Research Work – PhD Programme on European Studies, Fundacíon Ortega y Gasset, Madrid, Spain, October 2005, page 23.

a. Health and safety (radiation protection)

The overall objective of radiation protection is to protect the health of exposed workers and members of the public against the dangers arising from ionizing radiation, resulting from practices using radiation or radioactive substances, e.g. medical and industrial applications as well as the nuclear fuel cycle. In addition to natural radiation sources, artificial radioactivity is present in the environment. To this end, a variety of secondary legislation was passed under Article 31 of the Euratom Treaty which is described below.

b. Safeguards

Primary law stipulates the main rights and duties of the European Commission safeguards inspectors on the one hand and nuclear operators and member states on the other hand.

Euratom inspectors are "responsible for obtaining and verifying the records referred to in Article 79" (Article 82 of the Euratom Treaty). These are "operating records […] to permit accounting for ores, source materials and special fissile materials used or produced" [Article 79(1) Euratom Treaty]. They shall at all times have "access to all places and data and to all persons who […] deal with materials, equipment or installations subject to the safeguards provided for […] to the extent necessary in order to apply such safeguards …" and they "shall not thereby be delayed or otherwise impeded in the performance of their duties", [Article 81(2) Euratom Treaty].

This correlates to the rights and duties of the operators and member states in which nuclear installations are located *vis-à-vis* Euratom inspectors: They can only request "the presentation of a document establishing their authority" and can have them "accompanied by representatives of the authorities of that State" [Article 81(2) of the Euratom Treaty]. More generally, it is the member state's duty "to take all appropriate measures, whether general or particular, to ensure the fulfilment of the obligations arising out of this Treaty […] and to "facilitate the achievement of the Community's tasks". Put the other way, they "shall abstain from any measure which could jeopardise the attainment of the objectives".

Secondary legislation under Article 79 of the Euratom Treaty and examples for infringements under Articles 82 and 83 of the Euratom Treaty are described below.

3. Institutions under the Euratom Treaty

a. Overview

The main institutions under Article 13(1) of the Treaty on European Union (EU Treaty) are the European Parliament,[18] the European Council,[19] the Council,[20] the European Commission,[21] the Court of Justice of the European Union[22] and the Court of Auditors.[23] Article 13(4) of the EU Treaty defines the European Economic and Social Committee[24] as advisory body. These are common institutions to both the European Union and the European Atomic Energy Community, while Article 13 of the EU Treaty moreover establishes a Committee of the Regions[25] and the European Central Bank[26] which have no function in the context of the European Atomic Energy Community.

The Euratom Treaty has created specific entities that support and complement the acts of the above mentioned institutions, such as the Joint Nuclear Research Centre in Article 8, the Euratom Supply Agency (ESA) in Article 52, the Scientific and Technical Committee in Article 134 and the scientific group of public health experts in Article 31.

b. Functions

The primary functions of the main institutions are the following:

- The European Council is the institution of the European Union comprising the heads of state or government of the member states. It defines the general political directions and priorities of nuclear energy policy (Article 15 EU Treaty).

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18. www.europarl.europa.eu/.

19. www.european-council.europa.eu/.

20. www.consilium.europa.eu/index.asp.

21. http://ec.europa.eu/.

22. http://curia.europa.eu/jcms/jcms/Jo1_6308/.

23. http://eca.europa.eu/portal/page/portal/eca_main_pages/splash_page.

24. www.eesc.europa.eu/index_en.asp.

25. www.cor.europa.eu/.

26. www.ecb.int/home/html/index.en.html.

- The Commission (acting as a College of 27 Commissioners) promotes the general interest of the Union and has the sole right of initiative for all legislative proposals (Article 17 EU Treaty). In its role as the "guardian of the treaties", the Commission oversees the application of EU law [Article 17(1), 3rd sentence EU Treaty].

- The Council (of Ministers) consists of a representative of each member state and has legislative and budgetary functions (Article 16 EU Treaty).

- The European Parliament represents the Union's citizens in the 27 member states and is, in principle, co-legislator with the Council (Article 14 EU Treaty). However, its role under the special legislative procedures of the Euratom Treaty is a merely consultative one, comparable to the advisory function of the Economic and Social Committee [Article 13(4) EU Treaty].

- The Court of Justice of the European Union (including the Court of Justice, the General Court and specialised courts) ensures that in the interpretation and application of the treaties (including secondary legislation) the law is observed [Articles 13(1), 19 EU Treaty, Article 251 *et seq.* TFEU].

- The independent Court of Auditors (composed of one member from each member state) carries out the Union's audit (Article 285 TFEU) by examining the accounts of all revenue and expenditure in the Union [Article 287(1) TFEU].

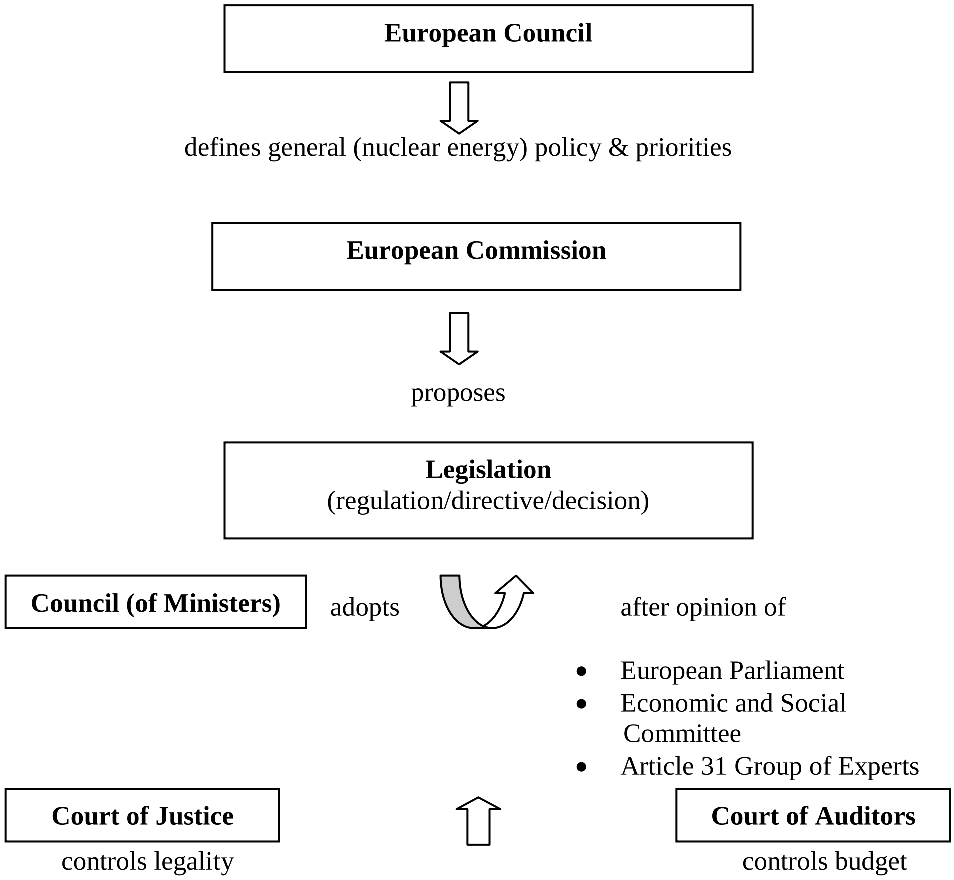
- A special feature of the Euratom Treaty is the advisory group of scientific experts on health and safety (Article 31 Euratom Treaty).

Overview 3: Institutions

Institutions	Legal basis	Function under EAEC
European Council	Art. 13, 15 EU Treaty Art. 235, 236 TFEU Art. 106a Euratom Treaty	Define general political directions and priorities thereof
European Commission	Art. 13, 17 EU Treaty Art. 244 *et seq.* TFEU Art. 106a Euratom Treaty	Take initiatives in general interest of the Union (legislative initiative) and ensure application of the treaties ("guardian of the treaties")
Council (of Ministers)	Art. 13, 16 EU Treaty Art. 237 *et seq.* TFEU Art. 106a Euratom Treaty	Legislator and budgetary authority
European Parliament	Art. 13, 14 EU Treaty Art. 223 *et seq.* TFEU Art. 106a Euratom Treaty	Legislation (consultation only) and budgetary authority
Economic and Social Committee	Art. 13 EU Treaty Art. 300, 301 *et seq.* TFEU Art. 106a Euratom Treaty	Advisory function (as representative of civil society parties)
Court of Justice of the European Union, including 1. Court of Justice 2. General Court 3. Specialised Courts	Art. 13, 19 EU Treaty Art. 251 *et seq.* TFEU Art. 106a Euratom Treaty	Ensure legal interpretation and application of European law (constitutional and administrative judicial control)

Institutions	**Legal basis**	**Function under EAEC**
Court of Auditors	Art. 13 EU Treaty Art. 285 *et seq.* TFEU Art. 106a Euratom Treaty	Budgetary control
	Special to EAEC	
Joint Nuclear Research Centre	Art. 8 Euratom Treaty	Ensure research programmes and other tasks assigned to it by the Commission
Euratom Supply Agency	Art. 52 *et seq.* Euratom Treaty	Ensure equal access to ores, source materials and special fissile materials (under supervision of Commission)
Scientific and Technical Committee	Art. 134 Euratom Treaty	Advise the Commission upon consultation
Group of public health experts	Art. 31 Euratom Treaty	Advise the Commission on health and safety standards
	No function under EAEC	
Committee of the Regions	Art. 13 EU Treaty Art. 300, 305 *et seq.* TFEU	Advisory function (as representative of regional and local bodies)
European Central Bank	Art. 13 EU Treaty Art. 127 *et seq.* TFEU Art. 282-284 TFEU	Monetary policy (price stability as priority and support of general economic policies) and issue of euro banknotes

Overview 4: Institutions in the legislative process



4. Legislative procedures under the Euratom Treaty

Unlike most policy fields under the TFEU, where co-decision between the two equal legislators Council of Ministers and Parliament prevails [Article 189(1) TFEU], the EAEC – despite *de jure* making the ordinary legislative procedure applicable (Article 106a Euratom Treaty) has *de facto* kept the original 1957 balance of powers, in which the special legislative procedures (Articles 31, 32 and Article 79 of the Euratom Treaty), are maintained. Here, the Council legislates upon a proposal of the Commission. The Parliament and the Economic and Social Committee are only consulted.

Overview 5: Legislation

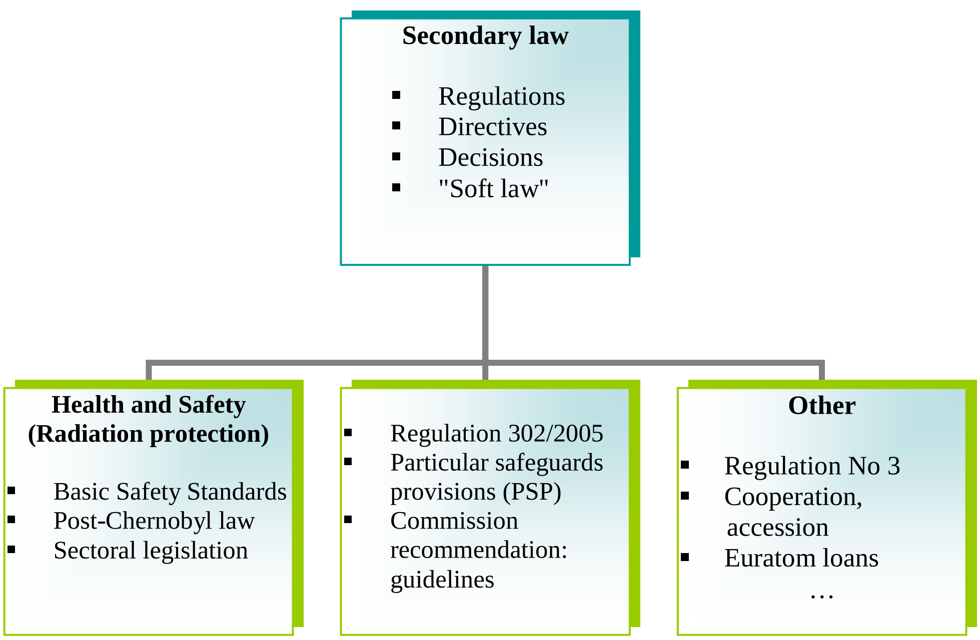
	EU Treaty / TFEU	**EAEC**
1. Preparatory works	"White book" "Green book"	Technical experts, e.g. Art. 31 Group
2. Right of initiative	European Commission only Art. 17(2) EU Treaty Art. 289 TFEU	European Commission only Art. 106a Euratom Treaty
3. Legal acts ▪ *Regulation* (binding and directly applicable in all member states) ▪ *Directive* (binding result, member states may choose form and method of implementation) ▪ *Decision* (binding to whom it is addressed) ▪ *Recommendation* (non legally binding soft law) ▪ *Opinion* (non legally binding soft law)	Art. 288 TFEU Art. 296 TFEU	Art. 106a Euratom Treaty
4. Choice of procedure	Rule: Ordinary legislative procedure Art. 289(1) TFEU Exception: Special legislative procedure Art. 289(2) TFEU	Rule: Ordinary legislative procedure, Art. 106a Euratom Treaty *De facto*: Euratom Treaty as *lex specialis* Special legislative procedures**,** e.g. Articles 31, 32, 79
5. Actors	Commission proposes Council and European Parliament legislate ("co-decision"), Art. 294; Economic and Social Committee (Art. 304 TFEU) and Committee of the Regions (Art. 307 TFEU) are consulted "where the treaties so provide"	Commission proposes Council legislates alone [e.g. Art. 79(3)] European Parliament, Economic and Social Committee and Art. 31 Group are consulted

	EU Treaty / TFEU	EAEC
6. Formalities	Signature by Presidents of Council and Parliament Publication in Official Journal Art. 297 TFEU	Signature by President of Council Publication in Official Journal Art. 106a Euratom Treaty
7. Judicial Control	Court of Justice Art. 263 TFEU	Court of Justice Art. 106a Euratom Treaty

II. Secondary law based on the Euratom Treaty

This section gives an overview of the secondary legislation based on the Euratom Treaty.

Overview 6: Secondary law



1. Health and safety – radiation protection

As an institution of the European Atomic Energy Community, the European Commission's main legal activities are:[27]

- to propose and to implement Community legislation in respect of radiation protection issues and to co-ordinate this work through meetings of independent experts;

- to check the legal and operational implementation of Community legislation;

- to draw up Basic Safety Standards for the protection of workers and the general public;

- to verify that member states perform their statutory duties in respect of obligatory monitoring of environmental radioactivity;

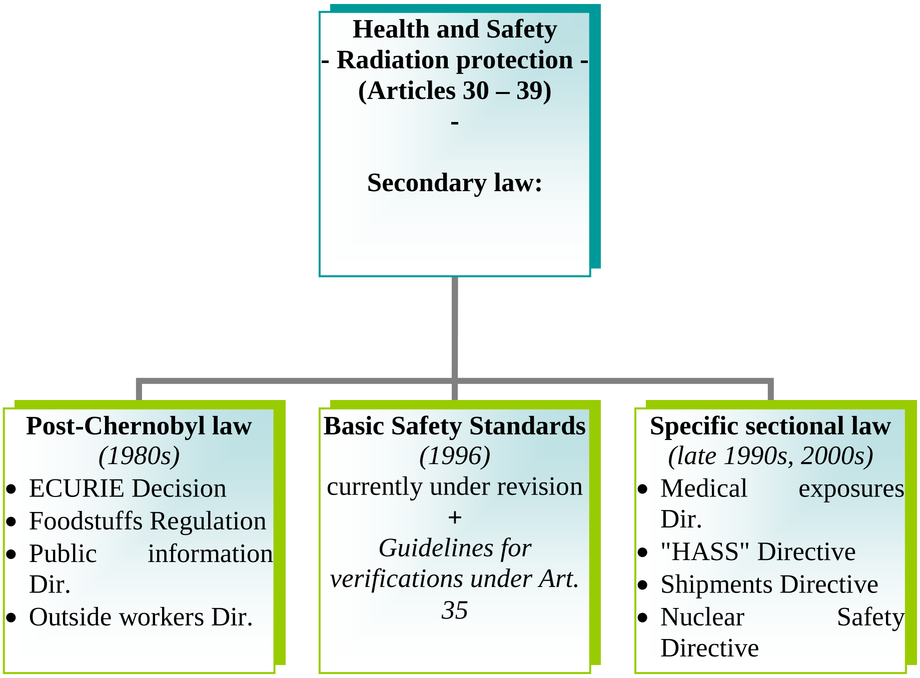
- to provide a system of rapid information exchange in case of nuclear incidents;

- to ensure implementation of maximum permitted levels of radioactivity in foodstuffs, laid down after the Chernobyl accident and the introduction of similar levels in case of a future accident.

The European Atomic Energy Community has legislated most of its secondary law in the field of health and safety based on Articles 31 and 32 of the Euratom Treaty.

27. See overview at http://ec.europa.eu/energy/nuclear/radiation_protection/radiation_protection_en.htm.

Overview 7: Health and Safety (Radiation protection) legislation



a. Post-Chernobyl legislation of the late 1980s

Historically, two legislative "eras" can be distinguished: on the one hand, the post-Chernobyl era of the late 1980s, during which a number of essential secondary legislation was passed quickly to cope with imminent dangers related to the catastrophe. Hence, the urgent need for a Europe-wide warning system, how to deal with potentially contaminated food, the way to warn the general public and questions on the protection of professionals lead to the adoption of the following acts:

- 1987 ECURIE Decision[28]
- 1987 Foodstuffs Regulation[29]

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28. Council Decision 87/600/Euratom of 14 December 1987 on Community arrangements for the early exchange of information in the event of a radiological emergency, in: O.J. L 371, 30 December 1987, pages 76-78.

- 1989 Public Information Directive[30]
- 1990 Outside Workers Directive[31]

Further, a Commission Communication (soft law) deals with the implementation of the Public Information Directive.[32]

b. Subsequent directives in the 1990s and 2000s

On the other hand, one can distinguish the subsequent era starting with the 1996 Basic Safety Standards Directive,[33] which is the foundation of a number of complementary directives on radiation protection:

1996 Basic Safety Standards

The directive applies to all practices which involve a risk from ionizing radiation, either from an artificial source or from a natural source. Each member state must:

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29. Council Regulation (Euratom) No. 3954/87 of 22 December 1987 laying down maximum permitted levels of radioactive contamination of foodstuffs and of feeding stuffs following a nuclear accident or any other case of radiological emergency, in: O.J. L 371 of 30 December 1987; see also Council Regulation (EC) No. 733/2008 of 15 July 2008 on the conditions governing imports of agricultural products originating in third countries following the accident at the Chernobyl nuclear power station, in: O.J. L 201 of 30 July 2008, as amended by Council Regulation (EC) No. 1048/2009 of 23 October 2009 amending Regulation (EC) No. 733/2008 on the conditions governing imports of agricultural products originating in third countries following the accident at the Chernobyl nuclear power station, in O.J. L 290 of 6 November 2009.

30. Council Directive 89/618/EURATOM of 27 November 1989 on informing the general public about health protection measures to be applied and steps to be taken in the event of a radiological emergency, in: O.J. L 357, 7 December 1989, pp. 31-34.

31. Council Directive 90/641/EURATOM of 4 December 1990 on the operational protection of outside workers exposed to the risk of ionising radiation during their activities in controlled areas, in: O.J. L 349, 13 December 1990, pp. 21-25.

32. Commission Communication 91/C103/03 on the implementation of Council Directive 89/618/Euratom, O.J. C 103 of 19 April 1991, page 12.

33. Council Directive 96/29/EURATOM of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation, in: O.J. L 159 of 29 June 1996, pages 1-114.

- require the use of these practices to be reported, unless there are exceptional cases;

- require prior authorisation for practices that may involve a risk of ionizing radiation;

- ensure that new classes or practices resulting in exposure to ionizing radiation are justified on the basis that their economic, social or other benefits outweigh any adverse effects on health.

To this end, member states shall:

- not permit radioactive substances to be deliberately added during the production of foodstuffs, toys, personal ornaments or cosmetics, neither shall they permit their import or export;

- ensure that optimum radiological protection should include dose constraints;

- prohibit that persons under the age of 18 be assigned to any work which would make them exposed workers.

Only in exceptional circumstances, excluding radiological emergencies, the competent authorities may authorise a certain number of designated workers to exceed the individual occupational exposure limits. Each member state must take reasonable steps to ensure that exposure of the population is kept as low as reasonably achievable ("ALARA" principle). The directive also establishes exposure prevention measures and prescribes details of exposure assessment. The latter involves monitoring the workplace, the individual and special monitoring in the event of accidental or emergency exposure.

Each member state must:

- establish one or more systems for carrying out inspections in order to enforce the directive;

- require workers to be given access to the results of any individual monitoring relating to them;

- ensure that the necessary means for proper radiation protection are made available.

Each member state must create the conditions necessary to ensure optimum protection of the population and that appropriate action plans are drawn and tested at regular intervals. Two Commission communications[34] are dealing with this directive (and its repealed predecessor).

Special sectional legislation

In the following directives, different aspects such as the problems linked to medical use of nuclear material, highly active sealed sources and orphan sources, trans-border shipment of nuclear material and, most recently, the safety of nuclear installations were regulated:

- 1997 Medical Exposures Directive[35]
- 2003 "HASS" Directive[36]
- 2006 Shipments Directive[37] and
- 2009 Nuclear Safety Directive[38]

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34. Communication 98/C133/03 from the Commission concerning the implementation of Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation, O.J. C 133 of 30 April 1998, page 3; and Communication 85/C347/03 from the Commission concerning the implementation of Council Directives 80/836/Euratom and 84/467/Euratom of 3 September 1984 amending Directive 80/836/Euratom, in: O.J. C 347 of 31 December 1985, page 9.

35. Council Directive 97/43/EURATOM of 30 June 1997 on health protection of individuals against the dangers of ionising radiation in relation to medical exposure, in O.J. L 180 of 9 July 1997.

36. Council Directive 2003/122/EURATOM of 22 December 2003 on the control of high-activity sealed radioactive sources and orphan sources, in: O.J. L 346 of 31 December 2003, pages 57-64.

37. Council Directive 2006/117/EURATOM of 20 November 2006 on the supervision and control of shipments of radioactive waste and spent fuel, in: O.J. L337 of 5 December 2006, pages 21-32.

38. Council Directive 2009/71/EURATOM of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations, in: O.J. L172 of 2 July 2009, pages 18-22. See overview in Garribba, M., Chirteş, A., Nauduzaite, M., "The Directive Establishing a Community Framework for the Nuclear Safety of Nuclear Installations: The EU Approach to Nuclear Safety", *Nuclear Law Bulletin* No. 84 (2009/2), pages 23 *et seq*.

The European Commission currently works on a recast in order to simplify radiation protection laws which is scattered in different legal acts, incorporating the sectional legislation into the revised Basic Safety Standards.

Verification by the European Commission

Article 35 of the Euratom Treaty states that each member state "shall establish the facilities necessary to carry out continuous monitoring of the level of radioactivity in the air, water and soil and to ensure compliance with the basic standards. The Commission shall have the right of access to such facilities; it may verify their operation and efficiency".

Hence, the primary responsibility of monitoring radioactivity in the environment lies with the member states, which, in turn, may be controlled by European Commission inspectors. On a practical note, the Commission has issued guidelines for the conduct of verification visits in member states.[39] The reports of the findings are published on the internet so as to ensure a maximum level of transparency.[40]

Other recommendations

Finally, the European Commission has issued several recommendations on specific questions:

- Commission Recommendation 2004/2/Euratom of 18 December 2003 on standardised information on radioactive airborne and liquid discharges into the environment from nuclear power reactors and reprocessing plants in normal operation.[41]

- Commission Recommendation 2000/473/Euratom of 8 June 2000 on the application of Article 36 of the Euratom Treaty concerning the monitoring of the levels of radioactivity in the environment for the purpose of assessing the exposure of the population as a whole.[42]

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39. Verification of environmental radioactivity monitoring facilities under the terms of Article 35 of the Euratom Treaty – Practical arrangements for the conduct of verification visits in member states, in: O.J. C 155 of 4 July 2006, pages 2-5.

40. http://ec.europa.eu/energy/nuclear/radiation_protection/article_35_en.htm.

41. O.J. L 2 of 6 January 2004, page 36.

42. O.J. L 191 of 27 July 2000, page 37.

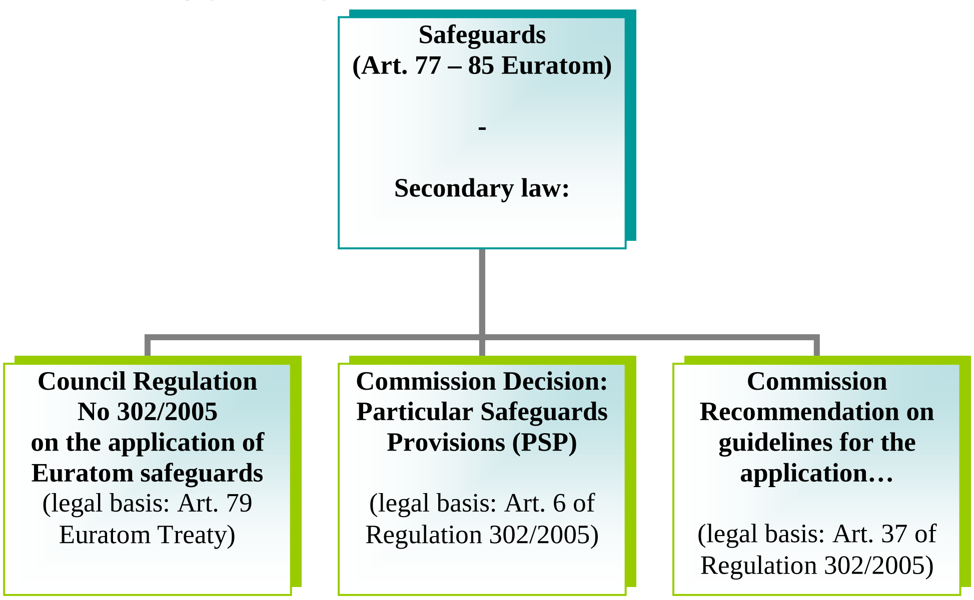
- Commission Recommendation 99/829/Euratom of 6 December 1999 on the application of Article 37 of the Euratom Treaty.[43]

- Commission Recommendation 91/444/Euratom of 26 July 1991 on the application of the third and fourth paragraphs of Article 33 of the Euratom Treaty.[44]

2. Safeguards

The second important field of secondary legislation is based on Chapter 7 of the Euratom Treaty. While primary law spells out the main rights and duties of European Commission safeguards inspectors on the one hand and nuclear operators and member states on the other (see above), secondary law deals with the technical aspects of Euratom safeguards inspections.

Overview 8: Safeguards legislation



In practical terms, for safeguards under Article 77 of the Euratom Treaty, Regulation No. 302/2005 sets out in detail the requirements placed on holders of nuclear materials (plutonium, uranium and thorium).[45] European Commission

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43. O.J. L 324 of 16 December 1999, page 23.

44. O.J. L 238 of 27 August 1991 page 31.

45. Commission Regulation (Euratom) No. 302/2005 of 8 February 2005 on the application of Euratom safeguards, in: O.J. L 54 of 28 February 2005, pp. 1-70.

officials carry out safeguards inspections under Article 81 of the Euratom Treaty. These are governed by particular safeguards provisions that are adopted as Commission decisions under Article 6(1) of Regulation No. 302/2005, which are "addressed to the person or undertaking concerned, taking account of operational and technical constraints and in close consultation with the person or undertaking concerned and the relevant Member State". Further, the Commission has issued, on the basis of Article 37 of Regulation No. 302/2005, a recommendation on guidelines for the application of this regulation.[46] The document sets out in great technical detail rights and obligations of the inspector, the operator and the member state (e.g. how to fill in which technical document).

3. Other

One of the first secondary law acts was Regulation (Euratom) No. 3 implementing Article 24 of the Euratom Treaty, dealing with security grades and the security measures to be applied to information.[47] Other legal instruments deal with the specific aspects of co-operation with third and accession countries[48] and financial instruments such as Euratom loans under Article 172 of the Euratom Treaty.[49]

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46. Commission Recommendation of 15 December 2005 on guidelines for the application of Regulation (Euratom) No. 302/2005 on the application of Euratom safeguards, in: O.J. L 28 of 1 February 2006, pp. 1-85.

47. O.J. No. 17, 6 October 1958, pages 406-458.

48. Council Decisions 2006/970/Euratom of 19 December 2006 concerning the Specific Programme "Co-operation" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013), in: O.J. L400/60 of 30 December 2006, page 60 as amended by O.J. L 54 of 22 February 2007, page 4;

    Council Regulation (Euratom) No. 300/2007 of 19 February 2007 establishing an Instrument for Nuclear Safety Cooperation, in: O.J. L 81 of 22 March 2007, p. 1.

    Council Regulation (Euratom) No. 549/2007 of 14 May 2007 on the implementation of Protocol No 9 on Unit 1 and Unit 2 of the Bohunice V1 nuclear power plant in Slovakia to the Act concerning the conditions of accession to the European Union of the Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and Slovakia, in: O.J. L 131 of 23 May 2007;

Other issues such as radioactive waste and spent nuclear fuel, transport, decommissioning of nuclear installations[50] and nuclear liability[51] are given serious thought; possible legal instruments will be discussed in the near future (see outlook below).

4. Infringements

a. Overview

Infringements are violations of European (primary or secondary) law. The Euratom Treaty's and the TFEU's infringement procedures now run in parallel with the following steps (Articles 258 to 260 TFEU, applicable by virtue of Article 106a of the Euratom Treaty):[52]

Council Regulation (EC) No. 1990/2006 of 21 December 2006 on the implementation of Protocol No. 4 on the Ignalina nuclear power plant in Lithuania to the Act of accession of the Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and Slovakia "Ignalina Programme", in: O.J. L 27 of 2 February 2007, page 7 and Corrigendum to Council Regulation (EC) No. 1990/2006 of 21 December 2006 on the implementation of Protocol No. 4 on the Ignalina nuclear power plant in Lithuania to the Act of Accession of the Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and Slovakia "Ignalina Programme", in: O.J. L 411 of 30 December 2006, page 1.

49. Council decision 77/270/Euratom of 29 March 1977 empowering the Commission to issue Euratom loans for the purpose of contributing to the financing of nuclear power stations, in: O.J. L 88, 6 April 1977, page 11 and Council decision 94/179/Euratom of 21 March 1994 amending decision 77/270/Euratom, to authorise the Commission to contract Euratom borrowings in order to contribute to the financing required for improving the degree of safety and efficiency of nuclear power stations in certain non member countries, in: O.J. L 112, 3 May 1990, page 26.

50. See overview at http://ec.europa.eu/energy/nuclear/decommissioning/decommissionning_en.htm and Commission Recommendation No. 2006/851/Euratom of 24 October 2006 on the management of financial resources for the decommissioning of nuclear installations, spent fuel and radioactive *waste*, in: O.J. L 330 of 28 November 2006, page 31.

51. See study under the auspices of the European Commission published at http://ec.europa.eu/energy/nuclear/studies/doc/2009_12_accession_euratom.pdf.

52. See summary at http://ec.europa.eu/community_law/infringements/infringements_en.htm and list of infringements at http://ec.europa.eu/community_law/eulaw/decisions/dec_20091120.htm.

Each member state is responsible for the implementation of Community law, i.e. adoption of implementing measures before a specified deadline, conformity and correct application, within its own legal system. Under the Euratom Treaty and the TFEU, the European Commission is responsible for ensuring that Community law is correctly applied ("guardian of the treaties"). Consequently, where a member state fails to comply with Euratom law, the Commission has powers of its own (action for non-compliance) to try to bring the infringement to an end and, where necessary, it may refer the case to the Court of Justice of the European Union. The Commission takes whatever action it deems appropriate in response to either a complaint or indications of infringements which it detects itself. Non-compliance means failure by a member state to fulfil its obligations under Euratom (or European Union) law. It may also consist either of action or omission and is irrespective of the authority – central, regional or local – to which the compliance is attributable within a certain member state.

Under the non-compliance procedure started by the Commission, the first phase is the pre-litigation administrative phase also called "infringement proceedings". The purpose of this pre-litigation stage is to enable the member state to voluntarily conform with the requirements of the treaty. There are several formal stages in the infringement procedure: the Commission may first have to carry out some investigation, namely when infringement procedures are launched further to a complaint. The letter of formal notice represents the first stage in the pre-litigation procedure, during which the Commission requests a member state to submit its observations on an identified problem regarding the application of Community law within a given period of time. The purpose of the reasoned opinion is to set out the Commission's position on the infringement and to determine the subject matter of any action, requesting the member state to comply within a given time limit. The reasoned opinion must give a coherent and detailed statement, based on the letter of formal notice, of the reasons that have led it to conclude that the member state concerned has failed to fulfil one or more of its obligations under primary or secondary law. Referral by the Commission to the Court of Justice opens the litigation procedure. In this respect, the Commission must point out that, in accordance with the established case law of the Court of Justice, it enjoys a discretionary power in deciding whether or not to commence infringement proceedings and to refer a case to the court. The court has also acknowledged the Commission's power to decide at its own discretion when to commence an action.

A specificity of the infringement procedure concerning safeguards is the possibility, in case the member state does not comply with the Commission "directive" within the time limit set, to refer the matter to the Court of Justice of the European Union directly [Article 82(4) Euratom Treaty].

b. Examples

Infringements can concern merely formal violations of (procedural) law such as the non-transposition of a directive within the time limit set in secondary law. Hence, when a member state fails to notify the Commission of the timely transposition into national law of the Directive on the supervision and control of shipments of radioactive waste and nuclear spent fuel, the Commission can take action and send a reasoned opinion to that member state.[53] More seriously, infringement procedures also deal with substantial issues such as violations of the duties related to safeguards under Chapter 7 of the Euratom Treaty. Consequently, the Commission can issue a "directive" (which in fact is a decision) under Article 82 of the Euratom Treaty against the member state for the impossibility for Euratom inspectors to perform safeguards verifications.

Another specificity of the Euratom Treaty is the possibility to take direct action against a person or undertaking under Article 83 Euratom Treaty. In line with these powers, the Commission has issued several warnings against nuclear operators – not member states – for reasons of infringing different aspects of primary and secondary safeguards provisions.[54] In one case, the Commission

53. For example http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/1798&language=en.

54. Summary of Commission Decision of 3 August 2009 repealing Commission Decision C(2006) 412 of 15 February 2006, in: O.J. C 16 of 22 January 2010, pages 16/17;

Commission Decision of 15 February 2006 pursuant to Article 83 of the Treaty establishing the European Atomic Energy Community (2006/626/Euratom), in: O.J. L255 of 19 September 2006, page 5-6 (British Nuclear Group Sellafield, United Kingdom);

Commission Decision of 12 December 1997 relating to a procedure in application of Article 83 of the Euratom Treaty (97/873/Euratom), in: O.J. L 354 of 30 December 1997, pages 30-33 (*Enusa Juzbado*, Spain);

Commission Decision of 21 December 1994 relating to a procedure pursuant to Article 83 of the Euratom Treaty (94/955/Euratom), in: O.J. L 371 of 31 December 1994, pages 16-17 (*Escuela Técnica Superior de Ingenieros Industriales de la Universidad Politécnica de Madrid*, Spain);

Commission Decision of 13 November 1996 relating to a procedure in application of Article 83 of the Euratom Treaty (96/671/Euratom), in: O.J. L 313 of 3 December 1996, pages 20-24 (*Jenson Tungsten Ltd, Hemel Hempstead*, United Kingdom);

even placed a nuclear operator under administration for four months for accidentally exporting nuclear material outside the European Union.[55] This most severe sanction so far was subsequently upheld by the European Court of Justice.[56]

B. Legal questions of primary law

The following questions arising from the new situation under the revised Euratom Treaty concern, on the one hand, general and institutional problems and, on the other hand, relate to specific policy fields.

I. Choice of energy sources

Article 194(2) subparagraph 2 of the TFEU makes clear that the new provision on a common energy policy "shall not affect a Member State's right to determine the conditions for exploiting its energy resources, its choice between different energy sources and the general structure of its energy supply". A similar provision is lacking in the Euratom Treaty. Instead the treaty aims at "creating the conditions necessary for the speedy establishment and growth of nuclear industries" (Article 1 of the Euratom Treaty). However, from the outset member states were never obliged to use nuclear energy which explains why some member states have never started a nuclear industry and other could opt to phase out nuclear energy without being subject to infringement procedures.

This stance was confirmed by the common declaration of Austria, Finland and Sweden when they acceded in 1995:[57]

> "The Contracting Parties, recalling that the Treaties on which the European Union is founded apply to all Member States on a non-discriminatory basis and without prejudice to the rules governing the internal market, acknowledge that, as Contracting Parties to the Treaty

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Commission Decision of 4 March 1992 relating to a procedure in application of Article 83 of the Euratom Treaty (92/194/Euratom), in: O.J. L 88 of 3 April 1992, pages 54-58 (*UKAEA Dounreay*, United Kingdom).

55. Commission Decision of 1 August 1990 relating to a procedure in application of Article 83 of the Euratom Treaty (90/413/Euratom), in: O.J. L 209 of 8 August 1990, pages 27-30 (*Advanced Nuclear Fuels*, Germany).

56. Order of the Court of 7 December 1990 – Advanced *Nuclear Fuels GmbH v Commission of the European Communities* (Case C-308/90), in: European Court Reports 1990, page I-4499.

57. O.J. C 241 of 29 August 1994, page 382.

establishing the European Atomic Energy Community, member states decide to produce or not to produce nuclear energy according to their specific policy orientations. As regards the back end of the nuclear fuel cycle, it is the responsibility of each Member State to define its own policy".

However, as there was no possibility to join the European Union without becoming member of Euratom, the rules on health and safety, supply, safeguards, the common market and external relations were *ius cogens*, regardless of whether the member states use nuclear energy for electricity generation or not. Its general rules are binding *aquis communautaire* or, as some claim, the Euratom Treaty constituted the first environmental and consumer protection law, long before the EEC/EC Treaty did so.

The possibility for all member states to opt for or against nuclear power remains unchanged. There is no obligation to use nuclear energy.

II. The European Parliament's involvement: a dual legal basis?

1. Different legal procedures

The Lisbon Treaty has not only introduced new institutional provisions to the Euratom Treaty but has also modified the legislative process. The ordinary legislative procedure of Article 289(1) of the TFEU "consist[s] in the joint adoption by the European Parliament and the Council of a regulation, directive or decision on a proposal from the Commission". The European Parliament has successfully fought its way to becoming a real co-legislator next to the Council. This has led to a situation when the European Parliament's rights under both treaties is very different because "in the specific cases provided for by the Treaties, the adoption of a regulation, directive or decision by the European Parliament with the participation of the Council, or by the latter with the participation of the European Parliament, shall constitute a special legislative procedure", Article 289(2) of the TFEU.

While the ordinary legislative procedure dominates the TFEU, there continues to be a lack of subjects for it in the Euratom Treaty to which it is applicable.[58] The Euratom Treaty remains governed by what Article 289(2) of

58. Thomas, S., "Der Vertrag von Lissabon (EUV) und die Rolle des Europäischen Parlaments im Rahmen der Europäischen Atomgemeinschaft (EURATOM/ EAGV) (The Treaty of Lisbon and the role of the European Parliament in the framework of the European Atomic Energy Community)", in: www.kernenergie.de/Informationen zur friedlichen Nutzung der Kernenergie, No. V.

the TFEU calls the "special legislative procedure", which is better known as the consultation procedure. The main legal basis for most legislation[59] under the Euratom Treaty is Article 31 for the basic (health and) safety standards (BSS). This has been reinforced by the ECJ in Case C-29/99 which acknowledged the existence of an intrinsic link between radiation protection and nuclear safety,[60] thereby extending the scope of application for this legal basis.

The key provision, Article 31 of the Euratom Treaty, states:

> "The basic standards shall be worked out by the Commission after it has obtained the opinion of a group of persons appointed by the Scientific and Technical Committee from among the scientific experts, and in particular public health experts, in the Member States.
>
> The Commission shall obtain the opinion of the Economic and Social Committee on these basic standards. After consulting the European Parliament the Council shall, on a proposal from the Commission, which shall forward to it the opinions obtained from these Committees, establish the basis standards; the Council shall act by qualified majority".

The wording shows the dominant role of both the Commission which makes the proposal and the Council which adopts the legislation by qualified majority. Article 31 gives the scientific experts (the so-called "Article 31 Group") and the Economic and Social Committee (ESC) also a prominent role, while it is sufficient to only consult the European Parliament. Therefore, the discussions on which legal basis is applicable for legislative acts are likely to continue. In the past, the European Parliament has expressed the opinion that, even when subjects fall under the Euratom Treaty while also touching upon EC Treaty matters (such as environmental protection) a dual legal basis should be used. The latest example was the attempt by the European Parliament's Committee on Legal Affairs to introduce a second legal basis in the form of Article 175 of the EC Treaty (now: Article 192 TFEU) next to Articles 31 and 32 of the Euratom Treaty in the Nuclear Safety Directive.[61] The consequence of

59. See the enumeration of secondary legislation in Overview 6.

60. Judgement of 10 December 2002 (Commission *v* Council), in: O.J. C 19 of 25 January 2003.

61. Council Directive 2009/71/EURATOM of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations, in: O.J. L 172 of 2 July 2009, pages 18-22, also reproduced in *Nuclear Law Bulletin* No. 84 (2009/2).

"thereby giving Parliament the benefit of the co-decision procedure"[62] was expressly mentioned.

2. More than one legal basis?

The European Court of Justice (ECJ) – renamed to Court of Justice of the European Union – assessed in its case law the criteria to be used for identifying the appropriate legal basis of a legislative instrument. As an example, the ECJ ruling in the Case C-178/03[63] confirmed that:

- The choice of the legal basis for a Community measure must be based on objective factors which are amenable to judicial review and include in particular the aim and content of the measure.[64]

- If the examination of a Community measure reveals that it pursues a twofold purpose or that it has a twofold component and if one of those is identifiable as the main or predominant purpose or component, whereas the other is merely incidental, the act must be based on a single legal basis, namely that required by the main or predominant purpose or component.[65]

- Exceptionally, if on the other hand it is established that the act simultaneously pursues a number of objectives or has several components that are indissociably linked without one being secondary and indirect in relation to the other, such an act will have to be founded on the various corresponding legal bases.[66]

- However, recourse to a dual legal basis is not possible where the procedures laid down for each legal basis are incompatible with

62. www.europarl.europa.eu/sides/getDoc.do?type=REPORT&reference=A6-2009-0236&language=EN.

63. Commission of the European Communities v European Parliament and Council of the European Union (Action for annulment – Regulation (EC) No 304/2003 of the European Parliament and of the Council of 28 January 2003 concerning the export and import of dangerous chemicals Choice of legal basis: Articles 133 EC/175 EC.

64. Paragraph 41.

65. Paragraph 42.

66. Paragraph 43.

> each other or where the use of two legal bases is liable to undermine the rights of the Parliament.[67]

From the above it results that, in practice, the choice of a dual legal basis is allowed only in exceptional cases, and that the recourse to such a derogatory procedure should ensure that the following three cumulative criteria are fully respected:

- the act pursues two intrinsically linked objectives/components;
- no incompatible decision-making procedures are involved;
- the rights of the European Parliament are not undermined by the choice of procedure.

It should be noted that the existing ECJ jurisprudence on this topic has assessed only cases when the different legal basis under scrutiny originated from the *same* treaty (i.e. EEC/EC).[68] However, by way of analogy, it can be considered that the ECJ reasoning could be used for allowing the exceptional use of a double legal basis originating from two different treaties (e.g. the TFEU and the Euratom Treaty), but only if the above mentioned cumulative conditions are met.

With the specific legal basis for energy policy under the TFEU having entered into force, the European Parliament is likely to reinforce its claims. However, in light of the above criteria, a claim of the EP in favour of using of Article 194(2) of the TFEU as a single legal basis for proposed legal acts, the following counter argument can be identified, arising from the ECJ ruling in the Case C-269/97,[69] according to which:

> "the choice of the legal basis for a measure must rest on objective factors which are amenable to judicial review. Those factors include in particular the aim and the content of the measure. In this connection, the fact that an institution wishes to participate more fully in the adoption of a given measure, the work carried out in other respects in the sphere of action

67. Paragraph 57.

68. For instance, ECJ Case C-178/03 assesses the cumulative use of EC Treaties Articles 133 and 175, the Case C-300/89 refers to the cumulative use of EEC Treaty Articles 100a, 130s and 149(2).

69. Judgement of the Court of 4 April 2000, Commission of the European Communities *v* Council of the European Union; Regulation (EC) No 820/97 – Legal basis; Case C-269/97.

> covered by the measure and the context in which the measure was adopted are irrelevant”.[70]

In support of the existence of a procedural incompatibility between consultation and formal consent of the EP, the ECJ ruling in Case C-300/89[71] could be cited as an analogy.[72] According to this judgment:

> “Where an institution’s power is based on two provisions of the Treaty, it is bound to adopt the relevant measures on the basis of the two relevant provisions. However, […] use of both of them as a joint legal basis would divest the co-operation procedure of its very substance, the purpose of that procedure being to increase the involvement of the European Parliament in the legislative process of the Community. That participation reflects a fundamental democratic principle that the peoples should take part in the exercise of power through the intermediary of a representative assembly. It follows that in such a case recourse to a dual legal basis is excluded and that it is necessary to determine which of those two provisions is the appropriate legal basis”.

The use of a dual legal basis is, for most conceivable situations, not foreseen. Hence, participation of the European Parliament in matters governed by the Euratom Treaty remains significantly less influential than under the TFEU.

III. External relations

The field of external relations is the one where most institutional changes have been introduced by the Lisbon Treaty, whilst the concrete organisational structure is in the process of being put in place. Legally, the question of “who does what” will give rise to interesting challenges and interpretations, especially for the European Commission’s Euratom directorates.

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70. Paragraph 43-45.

71. Judgement of the Court of 11 June 1991 – Commission of the European Communities *v* Council of the European Communities; Directive on waste from the titanium dioxide industry; Legal basis – Case C-300/89.

72. This judgement refers to the concomitant use of the co-operation and consultation procedure, while the present case under scrutiny deals with the concomitant use of the consent/assent procedure and of the consultation procedure.

1. Status quo

Until the entering into force of the Lisbon Treaty, the bulk of the external relations were handled by the European Commission's directorates of the so-called "RELEX family".[73] For example, the Delegation of the European Commission to the International Organisations in Vienna, as a diplomatic mission, is responsible for the interests of the European Union to the Vienna-based international organisations, specialised agencies and bodies. Hence, the European Commission is represented at the International Atomic Energy Agency (IAEA) but also the Nuclear Suppliers Group (NSG), the Zangger Committee, the Wassenaar Arrangement and the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO). Its aim is, on the one hand, the participation of the Commission in the co-ordination and co-operation activities of the European Union with a view to promote Community actions, policies and interests and, on the other hand, fostering close co-operation at the operational level between Commission services and related services of the OSCE and the UN respectively on projects and activities of common interests.[74]

2. The High Representative and the European External Action Service

The Treaty of Lisbon has brought institutional changes within the entire structure of the European Union which also influence the Euratom Treaty. The High Representative of the Union for Foreign Affairs and Security Policy merges the former positions of the High Representative for the Common Foreign and Security Policy and of the European Commissioner for External Relations. The new Treaty on European Union (EU Treaty) foresees in Title V general provisions on the Union's external action and specific provisions on the common foreign and security policy. Title VI of the Treaty on the Functioning of the European Union (TFEU) refers to the institutions created by the EU Treaty. This main organisational innovation, although not directly made applicable by Article 106a Euratom Treaty, touches upon the European Atomic Energy Community and its external relations.

Article 18 of the EU Treaty provides: "The High Representative shall conduct the Union's common foreign and security policy. He shall contribute by his proposal to the development of that policy, which he shall carry out as

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73. The "external relations" family currently includes the Directorates for External Relations, Enlargement, Development, Humanitarian Aid, EuropeAid and Trade (see http://ec.europa.eu/about/ds_en.htm).

74. See website of the delegation: www.delvie.ec.europa.eu/en/eu_un/un_agencies_in_vienna.htm.

mandated by the Council". Furthermore, Article 24(1) of the EU Treaty foresees a comprehensive competence on all areas of foreign policy of the High Representative of the Union for Foreign Affairs and Security Policy, shared with the member states. Finally, Article 26(2) of the EU Treaty defines as one of the goals the unity, consistency and effectiveness of foreign policy actions.

Hence, the wording suggests an all encompassing "unitarian" tendency to all matters dealing with foreign policy. On the organisational side, Article 27(3) of the EU Treaty creates a European External Action Service in which the Commission is represented next to the General Secretariat of the Council and the member states, the concrete functioning of which is still to be decided upon.

Diplomats from two significantly distinct European institutions and from 27 member states' diplomatic services will thus have to be amalgamated into a single European *corps diplomatique*. Finally, Article 40 of the EU Treaty protects the *status quo* of powers of the institutions as defined by the treaties: "The implementation of the common foreign and security policy shall not affect the application of the procedures and the extent of the powers of the institutions laid down by the Treaties for the exercise of the Union competences referred to in Articles 3 to 6 of the Treaty on the Functioning of the European Union. Similarly, the implementation of the policies listed in those articles shall not affect the application of the procedures and the extent of the powers of the institutions lay down by the Treaties for the exercise of the Union competences under this chapter".

According to Articles 220 and 221 under Title VI of the TFEU on the Union's relations with international organisations and third countries and Union delegations' appropriate forms of co-operation via Union delegations in third countries and at international organisations shall be ensured "under the authority of the High Representative of the Union for Foreign Affairs and Security Policy".

Primary law foresees a unified European External Action Service, staffed with officials from EU institutions and diplomats from the member states whilst strictly respecting the powers as defined in the EU Treaty, the TFEU and the Euratom Treaty.

3. Euratom representation at international organisations

As a general rule, according to Article 17(1) 5th sentence of the EU Treaty, the external representation will be carried out by the Commission. This article stipulates that with the exception of the common foreign and security policy, and other areas provided for in the treaties, the Commission shall ensure the Union's external representation.

It would therefore appear logical that delegations will continue to employ Commission officials other than those of the "RELEX family" in order to provide expertise, especially in the specific technical field of nuclear energy. As there is no precedent for the organisation and the functioning of the European External Action Service, and as the Council Decision has not yet been taken, the above mentioned legal basis suggest that in order to ensure adequate representation of experts from the European Commission's Euratom directorates,[75] reference could be made to the close links between Euratom and the IAEA and their long standing history of co-operation. When the proposal for a Council Decision establishing the organisation and functioning of the European External Action Service (of 25 March 2010)[76] is negotiated, the Commission could make its consent [required under Article 26(3) of the EU Treaty] conditional on the continuing representation of a Commission agent. This would be within the organisational framework of the European External Action Service while excluding agents from either the Council General Secretariat or the member states. There is thus a possible contradiction between the institutional unity of the European External Action Service and the High Representative on the one hand, and the substantial provision of Article 17(1) of the EU Treaty which states that the Commission is in charge of the external representation of the Union.

It appears most likely that Commission agents will continue to represent the European Union at international organisations, especially in specialised areas such as nuclear energy and at specialised agencies such as the IAEA.

4. International agreements in Euratom matters

The Euratom Treaty is explicit on the external representation in its Article 101. It is the European Commission which negotiates and concludes agreements. Its Article 199 states that the Commission ensures the maintenance of all appropriate relations with the organs of the United Nations, of its specialised agencies, the World Trade Organization and with all other international organisations. To this end, the procedure for concluding international agreements under the Euratom Treaty will as *lex specialis* continue unaltered without the involvement of the European Parliament. However, the relation between old Article 101 and revised Article 206 of the Euratom Treaty remains

75. http://ec.europa.eu/energy/nuclear/euratom/euratom_en.htm.

76. http://eeas.europa.eu/docs/eeas_draft_decision_250310_en.pdf.

blurred as to the (limited) involvement of the European Parliament. Whereas Article 101 Euratom Treaty does not even mention the European Parliament, its consultation is foreseen in Article 206 of the Euratom Treaty. Under the TFEU, the procedure to negotiate and conclude agreements with third countries or international organisations is defined in detail (Articles 216 *et seq.*) with the requirement to obtain the European Parliament's consent in specific cases, see Article 218(6)(a) of the TFEU. In light of the *lex specialis* character of the Euratom Treaty which "continue[s] to have full legal effect" (Preamble of Protocol No. 2), the European Parliament is only marginally participating in subject matters dealing with the peaceful uses of nuclear energy.

The European Commission will continue to solely negotiate and to conclude international agreements in Euratom matters.

IV. Non-proliferation

The Euratom Treaty might by some be seen as a treaty that, from the outset, had no explicit non-proliferation goals.[77] The treaty more directly aimed at promoting the pooling of all resources, at regulating the development of a then new technology, at establishing a European free zone for nuclear fuel and at controlling the fuel cycle in the six founding states of 1957. However, the fundamental political objective underlying the Euratom Treaty was also to prevent proliferation. Notably the Commission "opinions" on new investments in the sector (Chapter 4) and the Community ownership of nuclear materials (Chapter 6) were designed so that a close eye could be kept on what was done on the nuclear front. Safeguards (Chapter 7) were a logical instrument to verify that reported information was true and an important tool to prevent proliferation. Institutionally, important changes will ensure more coherence and to gradually "speak with one voice". This will be the case through the President of the European Council appointed for two and a half years [Article 15(5) EU Treaty] and the strengthening of the role of the High Representative of the Union for Foreign Affairs and Security Policy who is also a Vice-President of the Commission in charge of external relations (Article 18 EU Treaty). On the other hand, key players in the member states will continue acting as heavyweights on the Council side in this important and largely non-supranational field.

77. Kobia, Roland, "The EU and Non-Proliferation: Need for a Quantum Leap?", in: *Nuclear Law Bulletin* No. 81 (2008/1), pages 31-53 (pages 39/40).

Any enhancement of the non-proliferation aspects of the Euratom Treaty will depend on the political will of the key personalities acting in the sphere of external relations of the European Union.

V. Competition and state aid

As demonstrated above, the *lex specialis* Euratom Treaty takes precedence over the general law of the EU/FEU Treaties. However, the consequences of the common supply policy (Chapter 6 Euratom Treaty) and the competition rules, especially on state aid[78] (Articles 107 *et seq.* TFEU) will continue to play a role that goes beyond the narrow scope of the Euratom Treaty.[79] In the long run, the role of the Euratom Supply Agency as a mediator in cases of a scarcity of supply of ores will possibly provoke more rulings by the Court of Justice of the European Union.[80] In the field of competition rules, it seems likely that, as the liberalisation of the energy markets continues, the interplay of TFEU and Euratom Treaty rules will continue. From an international perspective, nuclear energy has become increasingly subject to competition rules of the market; the monitoring of abuse of dominant positions or monopolies as well as subsidies is also increasing.[81]

The interface between the rules in both treaties is likely to become a matter which will arise with greater frequency as the wider impact of EU electricity market reform is felt and the more integrated character of the European nuclear industry becomes more evident.

VI. Supply policy and the Euratom Supply Agency

Chapter 6 of the Euratom Treaty deals with the supply of ores, source materials and special fissile materials. The main functions of the only Agency created under primary law, the Euratom Supply Agency (ESA),[82] are to ensure that all

78. See Schärf, Wolf-Georg, Europäisches Nuklearrecht, Berlin: de Gruyter, 1. Auflage (1st edition) 2008, Chapter V. 5.

79. Cameron, Peter Duncanson, Competition in Energy Markets, page 250 *et seq*.

80. The following two judgements are among the few cases dealing with nuclear energy dealing with the common supply policy: Case C-357/95 *ENU v Commission* [1997] ECR I-1329 and Case C-161/97 KLE *v* Commission [1999] ECR I-2057 on the supply policy.

81. Cameron, *op. cit.*, page 258.

82. Council Decision of 12 February 2008 establishing Statutes for the Euratom Supply Agency (2008/114/EC, Euratom), in: O.J. L 41 of 15 February 2008, pages 15-20.

users in the Community receive a regular and equitable supply of ores and nuclear fuels [Article 2(d) Euratom Treaty] and to exercise the Community's right of ownership with respect to special fissile materials [Article 2(f) Euratom Treaty].[83] In the future, uranium will be object to increasing competition with more and more states worldwide either enlarging their existing nuclear programmes or starting new ones. The EU is user of 30% of the world's uranium production and largely depends on imports from third countries, mainly Kazakhstan, the Russian Federation and Australia.[84] The prudent vision of the founding fathers of Euratom included the necessity to equitably distribute a scarce resource, to create emergency stocks [Article 72(2) Euratom Treaty] and to set and fix prices [Article 68(2) and 69(1) Euratom Treaty] may become a reality sooner than expected. This will also mean that the European Commission, under whose supervision ESA acts (Article 53 Euratom Treaty), will be called upon more often than in the past.[85] It will have to determine whether the provision "to share out the supplies proportionately among the orders relating to each offer" by the ESA [Article 60(4) Euratom Treaty] is an acceptable rule "to determine the manner in which demand is to be balanced against supply" [Article 60(5) Euratom Treaty].

Depending on the economic developments concerning the supply of fissile material the litmus test is still to come.

VII. Emergency exceptions

Declaration on Article 194 of the Treaty on the Functioning of the European Union (Declaration No. 35) reinforces the following: "The Conference believes that Article 194 does not affect the right of the Member States to take the necessary measures to ensure their energy supply under the conditions provided

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83. Bouquet, André, "How current are Euratom provisions on nuclear supply and ownership in view of the European Union's enlargement", *Nuclear Law Bulletin* No. 68 (2001/2), page 7 *et seq*.

84. Euratom Supply Agency: *Annual Report 2008*, pages 9/10.

85. So far, only very few Commission decisions dealt with ESA findings on supply questions: Commission Decision of 4 February 1994 relating to a procedure in application of the second paragraph of Article 53 of the Euratom Treaty (Case KLE), in: O.J. L 048, 19 February 1994 page 45; Commission Decision of 21 February 1994 relating to a procedure in application of the second paragraph of Article 53 of the Euratom Treaty (case KLE), in: O.J. L 122, 17 May 1994 page 30; Commission Decision of 19 July 1993 on a procedure for the application of the second paragraph of Article 53 of the Euratom Treaty (Case ENU), in: O.J. L 197, 6 August 1993 page 54.

for in Article 347". Article 347 of the TFEU stipulates that "Member States shall consult each other with a view to taking together the steps needed to prevent the functioning of the internal market being affected by measures which a Member State may be called upon to take in the event of serious internal disturbances affecting the maintenance of law and order, in the event of war, serious international tension constituting a threat of war, or in order to carry out obligations it has accepted for the purpose of maintaining peace and international security".

In the light of past experience, notably the repeated gas crises since 2006[86] which seriously affected the supply in several EU member states during winter this provision is likely to prove important. The question arises whether the internal market, which includes the general energy market with nuclear energy being one part, could be affected by decisions to replace missing fossil fuels for heating, such as gas, by electric heat generated by nuclear power plants. So far, the question has arisen from a different angle: in winter 2008/2009, the question was raised whether or not a nuclear power plant which had to be shut down after accession of a new member state to the European Union could be kept operating.[87] This did not concern the internal market rules as such but the primary law obligations of a member state in its Accession Treaty. However, the question is related to the one concerning the application of Articles 194 and 347 of the TFEU: to which extent do emergency situations justify the non-application of normally binding European law?[88]

86. With Russia cutting off gas supplies to the Ukraine.

87. See www.europarl.europa.eu/meetdocs/2009_2014/documents/peti/cm/786/786472/786472en.pdf.

88. With the closure of Russian gas supplies to Europe and the resultant disastrous situation in Bulgaria, the re-opening of closed units at nuclear power plant Kozloduy was discussed. The units concerned were closed down on the basis of a memorandum concluded in the context of accession negotiations, while Article 36(1) of the Accession Treaty states that, Bulgaria may, in the event of serious difficulties which may persistently affect an economic sector, or of difficulties which could seriously worsen the economic situation in a particular district, apply for authorisation to use protective measures, making it possible to restore the balance and adapt the sector concerned to the economy of the internal market. Protective measures need to be authorised by the European Commission and possible derogations may be granted only to such an extent and for such periods as are strictly necessary. Re-opening of a nuclear reactor which in any case takes time did not seem as an appropriate solution to be applied to a situation of a sudden and temporary gas shortage. Moreover, according to constant case law of the ECJ, member states cannot invoke "urgency" or

C. Outlook

This chapter attempts to address two topics that are of importance when looking ahead: first, the scope of further revisions of the Euratom Treaty and secondly, the initiatives which the European Atomic Energy Community may take under the revised Euratom Treaty in order to address the burning issues of its citizens.

I. Revision under Article 48 of the EU Treaty

For a revision of the Euratom Treaty, Article 48 EU Treaty offers the possibility of a reshuffling of competencies between the European Union and the member states. There is either the option to undertake minor adjustments ("small option" without a Convention) or the path of convening a Convention ("big option" of a complete overhaul in a Conference of Representatives of all member states, national parliaments and the Commission). Article 48 of the EU Treaty, the paragraphs (2), (3), (4) and (5) of which by virtue of Article 106a of the Euratom Treaty also apply to it, sets up the possibility to either increase or to reduce the competences:

2. The Government of any Member State, the European Parliament or the Commission may submit to the Council proposals for the amendment of the Treaties. These proposals may, *inter alia*, serve either to increase or to reduce the competences conferred on the Union in the Treaties. […]

3. If the European Council, after consulting the European Parliament and the Commission, adopts by a simple majority a decision in favour of examining the proposed amendments, the President of the European Council shall convene a Convention composed of representatives of the national Parliaments, of the Heads of State or Government of the Member States, of the European Parliament and of the Commission. […] The European Council may decide by a simple majority, after obtaining the consent of the European Parliament, not to convene a Convention should this not be justified by the extent of the proposed amendments. […]

4. A conference of representatives of the governments of the Member States shall be convened by the President of the Council for the

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"seriousness of the situation" to justify any unilateral action. As a result, the Commission opposed such an exception. Thanks to the re-opening of the gas supplies the case did not have to be decided by a formal decision nor was it referred to the ECJ.

> purpose of determining by common accord the amendments to be made to the Treaties. The amendments shall enter into force after being ratified by all the Member States in accordance with their respective constitutional requirement.

The question remains where to draw the line between a simple technical amendment without convening a Convention and a major overhaul involving a Convention of all member states.

1. Ordinary revision procedure without convention

Concerning the Euratom Treaty, minor adjustments without convening a Convention may be envisaged in order to clear up "forgotten" terminological or technical amendments.

The Euratom Treaty's terminology in Articles 38(2) and 82(3), which both mention "directives against a member state", needs to be brought in line with the overall terminology of legal instruments in Article 288 of the TFEU. A directive is, according to its definition in Article 288(3) TFEU clearly an instrument of general application. A directive shall be binding as to the result to be achieved, upon each member state to which it is addressed, but shall leave to the national authorities the choice of form and methods. The "directives" mentioned in the Euratom Treaty are in fact individual "decisions" against one member state which has failed to comply with its obligations. According to Article 288(4) of the TFEU a decision shall be binding in its entirety, and a decision which specifies those to whom it is addressed shall be binding only on them. Such terminological "clean up" should be acceptable to all member states.

Moreover, the Euratom Treaty often specifies in great detail technicalities which today appear odd in primary law. For example, it obliges the Commission to publish non-legislative information in Article 40:

> "In order to stimulate action by persons and undertakings and to facilitate coordinated development of their investment in the nuclear field, the Commission shall periodically publish illustrative programmes indicating in particular nuclear energy production targets and all the types of investment required for their attainment. The Commission shall obtain the opinion of the Economic and Social Committee on such programmes before their publication".

By virtue of this article, the so called "PINC" (*Programme illustratif nucléaire de la Commission*)[89] not only needs to be approved by the full Commission College, it also needs to undergo the consultation procedure with the Economic and Social Committee. Such procedures are contrary to the content of a mainly descriptive publication of information, and they are not foreseen for other Commission communications. It could be abolished to bring the Euratom Treaty in line with common practice of the Commission in other areas.

2. Ordinary revision procedure with Convention

After almost a decade of drafting, revising and ratification of what has become the Lisbon Treaty, the European Union is suffering from a certain reform fatigue. Many voices claim that this treaty for 27 member states will be the last in a long time to come. However, a number of member states have issued Declaration No. 54 that leads into the future: "Germany, Ireland, Hungary, Austria and Sweden note that the core provisions of the Treaty establishing the European Atomic Energy Community have not been substantially amended since its entry into force and need to be brought up to date. They therefore support the idea of a Conference of the Representatives of the Governments of the Member States, which should be convened as soon as possible".

At least these five member states see the necessity of a major overhaul of the Euratom Treaty beyond the – mostly technical – changes described above.[90] However, this means that 22 member states, at least for the moment, prefer not to address the politically sensitive substantial issues which divide the European Union into pro and con nuclear energy member states. The motto proclaimed by many is "consolidate, don't reform any further".

It thus appears unlikely that the substantial parts of the Euratom Treaty will be subject to a major reform in the short or mid-term.

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89. COM(2006) 844 final of 10 January 2007 at: http://eur-lex.europa.eu/LexUriServ/site/en/com/2006/com2006_0844en01.pdf, plus two annexes – documents SEC(2007) 1261 and SEC(2007) 1262; Commission Communication COM(2007) 565 final of 4 October 2007 and Commission Communication COM(2008) 776 final of 13 November 2008 on its update.

90. Such necessity was shared by The Greens/European Free Alliance in the European Parliament, "The Future of the Euratom Treaty in the Framework of the new European Convention" (analysis and recommendations), Brussels, 21 January 2003, which calls for a modification of the Euratom Treaty and for nuclear safety to be put under a "Community authority".

II. Possible future initiatives in the field of nuclear energy

The Commission is at the core of some key decisions which need to be taken. Opinion polls among the European population[91] point to the conclusion that most citizens might accept the civil use of nuclear energy under three conditions: safe nuclear installations, a solution to the radioactive waste and spent fuel problem, to which could be added a strong nuclear liability regime. These issues and the question of medical applications are at the core of possible future initiatives under the revised Euratom Treaty:

1. Nuclear Safety

The 2009 Nuclear Safety Directive,[92] a legally binding instrument addressed to member states,[93] has been qualified as a milestone legal act under the Euratom Treaty. The directive is based especially on the Safety Fundamentals[94] and the Convention on Nuclear Safety,[95] established under the auspices of the IAEA.

The objective of the directive is to maintain and continuously improve nuclear safety and its regulation as well as to ensure that appropriate national arrangements for a high level of nuclear safety to protect the workers and the general public against the dangers arising from ionizing radiations from nuclear installations are taken (Article 1). It aims at achieving continuous improvements of member states' legislative, regulatory and organisational nuclear safety frameworks, enhancing the role and reinforcing the independence of national regulatory authorities and at ensuring that the prime responsibility for nuclear

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91. See European Commission: Eurobarometer survey *Europeans and Nuclear Safety*, February 2007 at http://ec.europa.eu/public_opinion/archives/ebs/ebs_271_en.pdf: safety (page 25), waste (page 29), conclusion (page 57).

92. Council Directive 2009/71/EURATOM of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations, in: O.J. L 172 of 2 July 2009, pages 18-22.

93. Garribba, M., *et al.*, "The Directive Establishing a Community Framework for the Nuclear Safety of Nuclear Installations: The EU Approach to Nuclear Safety", *Nuclear Law Bulletin* No. 84 (2009/2), page 23 *et seq*. See also article/commentary on the Nuclear Safety Directive by Pouleur, Y., Krs, P., "The Momentum of the European Directive on Nuclear Safety", *Nuclear Law Bulletin* No. 85 (2010/1), page 5 *et seq*.

94. Published as IAEA Safety Series 110; latest version in IAEA Safety Standard Series No. SF-1 (2006).

95. Published as INFCIRC/449 on 5 July 1994.

safety rests with the licence holders under the control of the competent regulatory authorities.

Its scope of application covers all civilian nuclear installations operating under a licence at all stages (nuclear power plants, enrichment plants, nuclear fuel fabrication plants, reprocessing plants, research reactor facilities, spent fuel storage facilities and storage facilities for radioactive waste that are on the same site and are directly related to nuclear installations).

Once the transposition into national legislation has been completed (by 22 June 2011 at the latest), these rules will be subject to judicial scrutiny by the Court of Justice of the European Union. Hence, the binding "supranational" force (of previously "only" international rules) makes it possible to coerce member states into obliging by means of Article 260(2) of the TFEU, which allows the imposition of sanctions, i.e. either a lump sum or a penalty payment in case of non-compliance.

2. Radioactive waste, spent nuclear fuel and transport of nuclear material

At present, the management of spent fuel and radioactive waste is the responsibility of member states with Community legislation only covering a small range of the issues involved, such as supervision and control of shipments of radioactive waste and spent fuel.[96] As for radioactive waste and spent fuel, the scope of the above mentioned Nuclear Safety Directive is limited to storage facilities for radioactive waste and spent fuel that are on the same site and are directly related to nuclear installations [see Article 3(1)(b) of the directive]. The European Commission has thus announced the re-launching of the legislative proposal governing the management of spent fuel and radioactive waste.[97]

96. Council Directive 2006/117/Euratom of 20 November 2006 on the supervision and control of shipments of radioactive waste and spent fuel; Commission Recommendation 2008/956/Euratom of 4 December 2008 on criteria for the export of radioactive waste and spent fuel to third countries.

97. A first such initiative was launched in 2003 and in 2004 and has not been successful, COM(2004) 526 final.

3. Nuclear liability

In the field of nuclear third party liability, the 27 EU member states remain divided[98] mainly between member states contracting parties to the Paris Convention,[99] those contracting parties to the Vienna Convention,[100] with or without adhering to the Joint Protocol.[101] The problem is global[102] and not limited to the European Union. However, it is most evident within Europe where many other aspects are widely harmonised. The system of protection against nuclear damage is, apart from some EU member states with unlimited liability, limited under several international conventions with regard to (1) the definition of nuclear damage (e.g. inclusion of environmental damage or not), (2) limitation of liability amounts, (3) channelling towards the operator as the sole responsible player, (4) limitation in time and other questions.

The European Commission has published a legal study for the accession of Euratom to the Paris Convention on Third Party Liability in the Field of Nuclear Energy on its website.[103] In this field, Article 98 Euratom Treaty continues to foresee the following:

> "Member States shall take all measures necessary to facilitate the conclusion of insurance contracts covering nuclear risks. The Council, acting by a qualified majority on a proposal from the Commission, which

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98. See in detail Handrlica, Jakub, "Harmonisation of Nuclear Liability in the European Union: Challenges, Options and Limits", *Nuclear Law Bulletin* No. 84, (2009/2), pages 37-69.

99. Paris Convention on Third Party Liability in the Field of Nuclear Energy (Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960, as amended by the Additional Protocol of 28 January 1964, by the Protocol of 16 November 1982 and by the Protocol of 12 February 2004).

100. Vienna Convention on Civil Liability for Nuclear Damage of 21 May 1963 (published as INFCIRC/500 on 20 March 1996), as amended by the Protocol of 12 September 1997, Convention on Supplementary Compensation, Joint Protocol.

101. Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention (published as INFCIRC/402 in May 1992).

102. See the detailed analysis of the situation in the United States of America by Faure, Michael/Vanden Borre, Tom, "Compensating nuclear damage: a comparative economic analysis of the U.S. and international liability schemes", in: William & Mary Environmental Law and Policy Review, Volume 33, 2008, pages 219-287.

103. http://ec.europa.eu/energy/nuclear/studies/nuclear_en.htm.

> shall first request the opinion of the Economic and Social Committee, shall, after consulting the European Parliament, issue directives for the application of this article".

The possible content of an eventual directive would aim at the highest possible level of protection for the European citizen. However, it should not complicate the already complex situation (several international conventions with modifications in different phases of ratification) by adding another legal act to the existing ones. It remains to be seen whether the 27 member states can agree to a common European approach which avoids further complications. Possible initiatives are currently being discussed by the European Commission and other stakeholders.

4. Radioisotopes for medical use

On 15 December 2009, the Council drew conclusions on the problem of the shortage of radioisotopes, used for medical diagnostics and therapy, and their role in successful medical treatment. On a worldwide scale, the problem of ageing production facilities, i.e. research reactors, their limited residual life time and outages for maintenance caused concerns about the increased frequency of disturbances in the supply of radioisotopes for medical uses. The Council, among others, invited the European Commission "to investigate with relevant stakeholders different possible short-, medium- and long-term solutions to secure the supply of radioisotopes for medical use in the European Union, taking due account of production facility projects in Member States, of technical developments and predictions of future demand of radioisotopes in medical applications".[104]

It remains to be seen how the role of the European institutions will evolve or whether market forces and private investors will be able to find a mid- to long-term solution.

Conclusion

The European Union *acquis communautaire* forms a unique body of primary law (i.e. the founding treaties), secondary law and political initiatives. Together, it covers the most extensive fields of co-operation existent between states in the world. The Union's institutions, their unique roles and powers, the frequency of

104. See Council Conclusions on the security of supply of radioisotopes for medical use (2986th Agriculture and Fisheries Council meeting in Brussels, 15 December 2009) at www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/agricult/112204.pdf page 45.

changes to the treaties render the European Union a complex set-up difficult to appreciate by non-European but also European citizens.

This paper aimed at presenting the *sui generis* character of the European Atomic Energy Community and the Euratom Treaty. The Community is an important player in the field of nuclear energy next to the International Atomic Energy Agency and the OECD Nuclear Energy Agency. Its impact has gradually grown with its increase from 6 member states in 1957 to 27 member states since 2007. The recently enhanced legal and political initiatives by the European Commission, e.g. the Nuclear Safety Directive with other legislative project to follow, the establishment of the European High Level Group on Nuclear Safety and Waste Management, the European Nuclear Energy Forum to name but a few, make the Community more visible and more importantly will provide it with a framework which can be called a comprehensive European law governing all nuclear activities.

The United Nations Security Council and Nuclear Law

*by Carlton Stoiber**

Since its foundation at the beginning of the nuclear age, the United Nations Security Council (UNSC) has been engaged in dealing with the implications of the technology for international peace and security. The initial focus of the Council's attention was the confrontation between nuclear weapon states in the context of the "Cold War" and later on how to prevent the spread of nuclear weapons to additional states.[1] Following major terrorist incidents since 2001, the Council has also recognised the need to address the so called "sub-national threat", i.e. that radioactive materials might be used for malevolent purposes by individuals or groups. However, only recently has the Council moved beyond specific cases of concern to develop broader measures of significance for the development of international nuclear law.

Unlike the International Atomic Energy Agency and OECD Nuclear Energy Agency, the Security Council is not engaged with nuclear matters on a

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1. As early as 1992, the Council explicitly affirmed that "[t]he proliferation of all weapons of mass destruction constitutes a threat to international peace and security". See Note by the President of the Security Council, Document S/23500, 31 January 1992.

daily basis. Neither does the Council possess a secretariat with the expertise necessary to deal with detailed technical nuclear issues and their legal implications. Indeed, the United Nations Charter does not mention a role for the Council in developing legal instruments. The Charter does recognise a role for the General Assembly in initiating studies and making recommendations for "encouraging the progressive development of international law and its codification" in Article 13(1)(a). The General Assembly has contributed to the development of nuclear law, most notably in the promulgation of a number of conventions addressing terrorism, including nuclear terrorism.[2]

Article 92 of the Charter establishes the International Court of Justice (ICJ) as the United Nation's "principal judicial organ". However, the ICJ's role in nuclear law has been very circumscribed, largely because member states have not seen the court as an appropriate venue for resolving legal issues arising in the nuclear field.[3]

The notion that the Security Council is empowered to exercise a legislative function for UN member states is a matter of continuing debate. A considerable amount of literature has developed on the subject.[4] However, notwithstanding the debate, the Council has recently become what one commentator has called "a single-issue legislator" with regard to threats to

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2. This development is not addressed in this paper, but in a separate article in this publication, at page 219 *et seq*.

3. See Nuclear Test Case (Australia *v* France), 1974, I.C.J. Rep. 253-457. Note, also, that Article XVII.A of the IAEA Statute provides that "[a]ny question or dispute concerning the interpretation or application of this Statute which is not settled by negotiation shall be referred to the International Court of Justice". Article XVII.B of the Statute provides that the Agency's policy-making organs can request the ICJ to give an advisory opinion on "any legal question arising within the scope of the Agency's activities". The Agency has not utilised these provisions in any concrete case.

4. The following listing represents only a partial selection of the more relevant and accessible academic articles on the subject: Caron, D., "The Legitimacy of the Collective Authority of the Security Council", 87 AJIL 552, 1993; Schachter, O., "United Nations Law", 88 AJIL 1, 1994; Szasz, P., "The Security Council Starts Legislating", 96 AJIL 901, 2002; De Wet, E., "The Chapter VII Powers of the United Nations Security Council", Oxford, 2004; Malone, D., (ed.), "The UN Security Council from the Cold War to the 21st Century", Index, Boulder, CO, 2004; Talmon, S., "The Security Council as World Legislator", in: 99 American Journal of International Law (hereinafter AJIL) 175, 2005; Johnstone, I., "Legislation and Adjudication in the UN Security Council: Bringing Down the Deliberative Deficit", 102 AJIL 275, 2008.

international peace and security.[5] The Council's ability to influence the development of nuclear law rests on two provisions of the UN Charter. Under Chapter VII – specifically Article 39 – the Council is empowered to "decide what measures shall be taken [...] to maintain or restore international peace and security" in the event that a threat to the peace has been identified.[6] Under Chapter V – specifically Article 25 – members of the UN "agree to accept and carry out the decisions of the Security Council in accordance with the present Charter". Thus, in the relatively narrow field of international security, the Council possesses a powerful instrument to impose requirements of a legal nature on all member states. In a sense, this law-making authority is broader than that of IAEA policy organs under Articles V and VI of the Agency's Statute or than that of the OECD Nuclear Energy Agency under Article 8 of its Statute.

It should also be mentioned that the Security Council's involvement in nuclear-related matters can arise under Article XII.C of the IAEA Statute, which provides that any non-compliance by a state with an Agency safeguards arrangement shall be reported by the Board of Governors "to the Security Council and General Assembly of the United Nations". Such referrals may trigger the application of Security Council measures under Chapter VII of the Charter, including sanctions.

Finally, as will be discussed, in addition to imposing mandatory (so called "hard law") requirements on member states, the Council has also adopted non-binding recommendations in the nuclear area that may also have legal significance as "soft law".

This paper will explore two aspects of Security Council law making in the nuclear field. The first is the adoption of measures, including sanctions, intended to address specific cases of concern for weapons of mass destruction (WMD) proliferation, with specific reference to nuclear weapons or other radiological devices. The second is the adoption of more general measures – both binding and non-binding – and the establishment of institutional arrangements, intended to restrain the spread of WMD, including nuclear weapons, and to prevent nuclear-related terrorist activities. Finally, on the basis of this analysis, it is possible to identify some emerging norms (or elements) in the nuclear non-proliferation and security fields that have acquired legal support through Security Council "legislative" action. In another article in this Volume – "Nuclear Security: Legal Aspects of Physical Protection, Combating Illicit

5. See Talmon, *supra* at note 4 at page 182.

6. See also, UN Charter Articles 40 and 41.

Trafficking and Terrorism"[7] – I have gone further to describe the development of these norms/elements in relation to other international legal instruments and guidance documents. Therefore, in this paper the ten elements are only briefly listed.

A. Addressing specific cases of proliferation concern

Prior to developing generic legal approaches to nuclear-related proliferation and terrorist threats, the Security Council acted to address a number of specific situations involving such threats. In such situations the Council routinely based its action on its Chapter VII authority to adopt mandatory decisions to maintain international peace and security. As will be seen, the Council's experience with these "problem cases" has led to the development of broader approaches, including the creation of institutional arrangements for addressing the WMD threat.

Iraq

An early example of the Security Council's approach to nuclear security issues was its experience with the effort to determine the nature and extent of Iraq's WMD programmes after its expulsion from Kuwait in 1991 as a result of the Gulf War and during the years prior to and after the 2003 offensive in Iraq by Coalition forces.[8]

UNSC Resolution 687, adopted on 3 April 1991, specifically addressed Iraq's nuclear programme and mandated nuclear inspections in the regime of the new UN Special Commission (UNSCOM) created by the same resolution.[9] The resolution required Iraq to reaffirm its obligations under the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and established a joint UNSCOM-IAEA programme of verification activities, including on-site inspection of Iraq's nuclear capabilities and a schedule of reporting to the Council.[10] Notably, the resolution also required Iraq to take action and to renounce "all acts, methods and practices of terrorism", presumably including nuclear terrorism.[11] Without rehearsing the detailed history of inspection efforts

7. See page 219 *et seq.* of this publication.

8. For an authoritative insider view of this complex series of events, see Blix, H., "Disarming Iraq: The Search for Weapons of Mass Destruction", Pantheon (2004).

9. UNSCR 687 Part C at paragraph 9.b.i.

10. UNSCR 687 at paragraphs 11-13.

11. UNSCR 687 at paragraph 32.

in Iraq, by late 1998, it was clear that the inspection regime had failed to meet many of its primary objectives. The Iraqi government had excluded UNSCOM inspectors, and it became clear that a new Security Council initiative was needed to re-establish an effective monitoring programme. After a year of debate, on 17 December 1999 the Security Council adopted UNSC Resolution 1284 which created the new UN Monitoring, Verification and Inspection Commission (UNMOVIC) to replace UNSCOM. Following three years of unsuccessful attempts to implement the verification regime, the Security Council again acted by adopting UNSC Resolution 1441 on 8 November 2002. The Chapter VII resolution included several mandatory decisions requiring Iraq to provide "immediate, unconditional and unrestricted access" to locations and persons determined by UNMOVIC and IAEA to facilitate its verification activities.[12] As is well known, the efforts of inspectors failed to convince the United States and its Coalition partners that the regime had successfully accounted for Iraq's WMD-related activities. On 20 March 2003, the offensive that toppled Saddam Hussein was launched.

While the particulars of the Iraq war will certainly be debated, for purposes of this paper, one can agree with the conclusion of UNMOVIC Director and former IAEA Director General Hans Blix that "[t]here is much to be learned from this system and its application".[13] One lesson the Security Council seems to have learned is that a regime intended to provide confidence that nuclear proliferation or terrorist activities are identified and controlled must have international credibility and legitimacy. The UNSCOM-UNMOVIC regime included a rigorous inspection programme, backed by military pressure and sanctions to control exports of concern. However, in the end, the regime did not prevent states from launching military action they considered necessary to pre-empt the emergence of a WMD threat.

Democratic People's Republic of Korea (DPRK)

United Nations Security Council involvement in the security situation on the Korean Peninsula is of long standing. Indeed, a series of UN Security Council resolutions between the outbreak of the so called Korean War in June 1950 and the declaration of an armistice in July 1953 engaged the United Nations in that conflict.[14] However, some four decades passed before the Security Council

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12. UNSCR 1441 at paragraph 5.

13. See Blix, *op. cit.*, footnote 8 at page 273.

14. See, in particular, UNSC Resolution 82 (25 June 1950; UNSC Resolution 83 (27 June 1950); UNSC Resolution 84 (7 July 1950; UNSC Resolution 85 (30 July 1950); and UNSC Resolution 88 (8 November 1950).

became directly engaged in matters arising from nuclear-related conduct by the DPRK.

On 11 May 1993, the Council adopted UNSC Resolution 825 in response to the DPRK's announcement that it intended to withdraw from the NPT. That resolution (not adopted as mandatory under Chapter VII of the Charter) called upon the DPRK to reconsider its announcement and to honour its commitments under the NPT. Unsuccessful negotiations were conducted over the next decade, involving various parties and forums (most notably in the so called Six-Party Talks including the DPRK, the Republic of Korea, Japan, China, the Russian Federation and the United States). The WMD issue regarding the DPRK was revived in July 2006 when the DPRK conducted multiple ballistic missile launches. The Council responded by adopting UNSC Resolution 1695 (15 July 2006) calling upon the DPRK to suspend missile tests and return to the NPT and the Six-Party talks. When the DPRK announced that it had conducted a nuclear weapons test on 9 October 2006, the Council responded five days later by adopting UNSC Resolution 1718 (14 October 2006). This time the resolution cited Chapter VII of the Charter and included the Council's binding decision condemning the nuclear test, demanding that the DPRK retract its withdrawal from the NPT, suspend its missile activities and abide by its IAEA safeguards commitments. The resolution also adopted a series of sanctions, including a ban on certain military exports to the DPRK and other measures to prevent its acquisition of sensitive materials and technology.[15] The latest Security Council action regarding the DPRK was reflected in UNSC Resolution 1874 (12 June 2009). The resolution condemns the DPRK's conduct of another nuclear test on 25 May 2009 and imposes a further set of sanctions measures as well as calling for the DPRK to return to the Six-Party Talks.

The legal implications of this series of resolutions basically reaffirms other Security Council decisions, namely that WMD proliferation threatens international peace and security and that UN member states and relevant international bodies are required to take certain actions – including compliance with UNSC sanctions measures – to prevent nuclear proliferation by a non-nuclear weapons state.

Iran

In July 2006, having considered numerous reports by the IAEA Director General that the Agency was unable to conclude that Iran was not conducting undeclared nuclear activities which were inconsistent with its safeguards

15. See UNSC Resolution 1718 at paragraph 8.

agreement, the Security Council adopted the first of six resolutions addressing the situation. UNSC Resolution 1696 (31 July 2006) was adopted under Chapter VII of the Charter and called upon Iran to comply with its safeguards obligations and suspend all enrichment related and reprocessing activities. Member states were called upon to prevent transfers of items, materials, goods and technology that could contribute to Iran's sensitive nuclear and ballistic missile programmes. Iran failed to comply with this resolution, and five months later, the Security Council adopted UNSC Resolution 1737 (23 December 2006) reiterating its earlier decisions and imposing a range of sanctions measures, including freezing of funds and financial assets of entities and persons involved in Iran's nuclear or ballistic missile programmes.[16] A third resolution (UNSC Resolution 1747 of 24 March 2007) adopted what might be called a "carrot and stick" approach. Although it extended sanctions to additional persons and entities (see Annex I), it also offered (in Annex II) a number of incentives that could be included in a long-term agreement confirming the peaceful nature of Iran's nuclear programme. With little perceived progress, a fourth sanctions resolution (UNSC Resolution 1803 of 3 March 2008) cited "Iran's continuing failure to comply with the provisions" of the three previous resolutions and extended sanctions to additional Iranian persons and entities. In another brief resolution (UNSC Resolution 1835 of 27 September 2008), the Council affirmed its previous Iran resolutions while supporting a so called "dual-track" negotiating approach offered by the governments of China, France, Germany, the Russian Federation, the United Kingdom, the United States and the European Union. Finally on 9 June 2010, the UNSC adopted UNSC Resolution 1929 which builds on previous sanctions by deciding that Iran should not acquire an interest in any commercial activity in another state involving uranium mining, production or use of nuclear materials and technology. States shall take all necessary measures to prevent the transfer to Iran of technology or technical assistance related to ballistic missiles capable of delivering nuclear weapons. In addition, the resolution contains provisions to help block Iran's use of the international financial system, particularly its banks when they may be used to fund proliferation and nuclear activities.

As with the DPRK, the Security Council's actions regarding Iran illustrate the difficulty of achieving progress with cases involving nuclear proliferation by politically isolated states, including the limited utility of sanctions measures as a means of achieving compliance with the Council's binding decisions under Chapter VII.

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16. See UNSC Resolution 1737 at paragraph 12 and Annex.

B. General initiatives to address WMD (nuclear) proliferation and terrorism

Over the past several years, the Security Council has adopted a number of resolutions concerning WMD. However, for purposes of this limited review, only three of these resolutions will be specifically addressed as most relevant. They deal with financing of terrorism, preventing proliferation of WMD and addressing nuclear proliferation.

Security Council Resolution 1373

Adopted on 28 September 2001, under Chapter VII of the Charter, this resolution is focused on preventing and suppressing the financing of terrorist acts. Some twenty measures to be taken by states are set forth in the resolution. Eleven of these are mandatory decisions of the Council requiring UN member states to:

- prevent and suppress terrorist financing,
- criminalise funding of terrorism,
- freeze funds and financial assets of persons involved in terrorist acts,
- prohibit making funds available for the benefit of persons committing terrorist acts,
- refrain from any form of support to terrorists,
- take necessary steps to prevent terrorist acts,
- deny safe haven to terrorists or financers of terrorism,
- prevent terrorists from using their territories against other states,
- bring terrorists and those financing terrorism to justice with appropriate penalties,
- assist in criminal investigations and proceedings,
- prevent terrorist movement through border controls and controls on identity papers.

Member states are called upon to take the following nine additional measures on a voluntary basis:

- accelerate exchange of operational data on terrorists and networks;
- exchange legal information and co-operate in administrative and judicial matters;
- co-operate through bilateral and multilateral arrangements to prevent terrorist attacks;
- become parties to counter-terrorism instruments;

- fully implement relevant counter-terrorism convention and Security Council Resolutions;
- ensure that refugees or asylum-seekers have not participated in terrorist acts;
- ensure that refugee status is not abused to facilitate terrorism;
- strengthen a global response to illegal trafficking;
- report to the UN Counter-Terrorism Committee.

Only one of the provisions (operative paragraph 4) specifically mentions nuclear materials, although another (operative paragraph 3.a) uses the term “weapons of mass destruction” that is uniformly understood to include nuclear weapons.[17]

Security Council Resolution 1540

Adopted on 28 April 2004, UNSC Resolution 1540 imposes a range of requirements intended to restrain the spread of weapons of mass destruction, including nuclear weapons, and creates an institutional mechanism for monitoring implementation.[18] The resolution affirms that the “proliferation of nuclear [...] weapons, as well as their means of delivery, constitutes a threat to international peace and security”.[19] This has the legal effect of bringing its decisions within the scope of Chapter VII of the Charter, making them binding on all UN member states.

The resolution notably addresses the activities of “non-state actors”. These are defined as an “individual or entity, not acting under the lawful authority of any state in conducting activities which come within the scope of this resolution”.

With regard to measures addressed to UN member states, the operative paragraphs of UNSC Resolution 1540 are divided into two categories. Eight measures are mandatory under the Council’s Chapter VII authority. Nine other

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17. Although not so called “dirty bombs” or radiation dispersal devices.

18. Detailed information on implementation the resolution can be found on the website of the 1540 Committee at www.un.org/sc/1540/ and at the website of the UN Office for Disarmament Affairs (ODA) at www.un.org/disarmament/WMD/1540/index.shtml.

19. Resolution 1540 covers all types of weapons of mass destruction, including nuclear weapons. The term “nuclear weapons” would seem to exclude radiological dispersal devices (RDDs) or “dirty bombs” from its scope.

measures are voluntary recommendations which UN members are invited or called upon to undertake.

The eight required actions include:

- refraining from supporting nuclear weapons proliferation;
- adopting laws prohibiting nuclear weapons development;
- establishing domestic controls to prevent proliferation;
- adopting measures to account for and secure items of proliferation significance;
- adopting physical protection measures;
- adopting border controls and law enforcement efforts to prevent illicit trafficking;
- establishing border controls;
- establishing and enforcing penalties for export control violations.

The nine voluntary actions include:

- reporting on implementation;
- developing national control lists;
- providing assistance in implementation;
- promoting universal adoption and full implementation of non-proliferation treaties;
- adopting national rules and regulations;
- renewing multilateral co-operation within the framework of the IAEA;
- working with industry;
- promoting dialogue and co-operation on non-proliferation;
- taking co-operative action to prevent illicit trafficking.

Security Council Resolution 1887

Adopted on 24 September 2009, UNSC Resolution 1887 is both the latest and the first Council Resolution to address nuclear proliferation in detail. The primary impetus for the resolution was the obvious need for the Council to support efforts to preserve the existing nuclear non-proliferation regime, as represented by the NPT. The specific focus is on the fifth NPT review conference in May 2010. In light of the perceived failure of the fourth NPT review conference in 2005, the Council felt it important to affirm the value of the treaty and to call upon member states to take actions to effectively implement their NPT obligations. The resolution contains the familiar recitation that "proliferation of weapons of mass destruction, and their means of delivery, constitute a threat to international peace and security".[20] However, the resolution was not adopted pursuant to Chapter VII and, thus, its provisions constitute non-binding recommendations, rather than mandatory decisions.

The resolution begins with a lengthy preamble (23 paragraphs) that includes provisions *inter alia*:

- supporting the NPT as the cornerstone of the nuclear non-proliferation regime;
- calling for further progress on disarmament;
- welcoming recent negotiations by the U.S. and the Russian Federation on arms control;
- welcoming nuclear-weapon-free zone initiatives;
- reaffirming previous UNSC resolutions on the DPRK and Iran;
- expressing concern about the threat of nuclear terrorism;
- affirming support for the peaceful uses of nuclear energy;
- supporting the Convention on the Physical Protection of Nuclear Materials (CPPNM) and its 2005 Amendment and the International Convention for the Suppression of Nuclear Terrorism;
- recognising the Global Initiative to Combat Nuclear Terrorism;
- reaffirming UNSC Resolution 1540.

The following 29 operative paragraphs parallel the preamble, expressing the Council's call for member states to take various actions or welcoming steps by various entities. These include:

- affirming that in situations of non-compliance with non-proliferation obligations the Security Council is primarily responsible for addressing such threats (para. 1);

- calling upon NPT parties to fulfil their obligations and to co-operate on achieving a successful 2010 Review Conference (paras. 2 and 6);

- support for the Comprehensive Nuclear-Test-Ban Treaty (para. 7);

- support for a Fissile Material Cut-Off Treaty (para. 8);

- support for security assurances by the five nuclear-weapon states (para. 9);

20. See UNSC Resolution 1887 preamble at paragraph 4.

- concern about major challenges to the non-proliferation regime (presumably meaning Iran and DPRK) and calling for negotiated solutions (para. 10);

- support for peaceful uses of nuclear energy under Article IV of the NPT (paras. 11-12);

- call for stricter export controls on sensitive technologies (para. 13);

- support for the work of the IAEA, with emphasis on safeguards and multilateral approaches to the fuel cycle (paras. 14-16);

- affirming the need for states to promptly address a notice by a state to withdraw from the treaty (para. 17), including the right to return of supplied equipment or material (para. 18);

- encouraging states to consider the additional protocol in making export decisions (para. 19);

- requiring continued safeguards in the event of NPT withdrawal (para. 20);

- calling for universal adherence to the CPPNM and its 2005 Amendment and the International Convention for the Suppression of Acts of Nuclear Terrorism (para. 21);

- supporting UNSC Resolution 1540 and its implementation (paras. 22-23);

- calling for sharing of best security practices (para. 24);

- calling for states to minimise use of HEU and to convert research reactors to LEU (para. 25);

- calling for states to improve capabilities to prevent illicit trafficking in nuclear materials (para. 26);

- urging states to prevent financing of proliferation and to strengthen export controls (para. 27);

- declaration of the intention to monitor situations involving proliferation, including to or by non-state actors (para. 28).

C. Emerging norms of nuclear non-proliferation and security

As stated, the recent examples of Security Council "legislative" actions make it possible to identify some emerging legal norms affecting nuclear non-proliferation and security. These norms are not fully developed and reflect the character of much of international nuclear law, namely that they are framed in general terms, lack concrete compliance measures and rely on the actions of states for effective implementation. It is important to note that in adopting such legally significant measures (typically under its Chapter VII authority to adopt binding decisions), the Council is acting in the context of other international law-making processes. For example, the Council's resolutions often reference – explicitly or implicitly – the provisions of the several relevant legal instruments (conventions, treaties, agreements etc.).[21] Also, these resolutions routinely support the activities of other international institutions (the IAEA being the most relevant in the nuclear field). Since the Charter gives the Council special (and binding) authority in addressing threats to international peace and security, it is submitted that the various resolutions and actions discussed above are evidence of the emergence of important new norms in the field of international nuclear law.

Readers should refer to my other article in this Volume for a complete discussion of the ten norms/elements, including references to applicable Security Council resolutions and other instruments and documents. The following only identifies some possible emerging norms by a short title:

1. Denial of support to nuclear terrorism
2. Legislative framework
3. Regulatory body
4. Physical protection
5. Combating illicit trafficking
6. Criminalisation of offenses against nuclear security
7. Offenders to be prosecuted or extradited
8. Co-operation and assistance
9. Sharing information and best practices
10. Protection of sensitive information

21. In particular, several of the resolutions seek universal adherence to the most relevant international instruments, including the CPPNM and its 2005 Amendment, the Nuclear Terrorism Convention, the Comprehensive Nuclear-Test-Ban Treaty; as well as calling for negotiation of further arms control measures, including a Fissile Material Cut-Off Treaty.

Outlook

Whether the Security Council will seek to expand its legislative role in addressing nuclear proliferation and terrorism is uncertain. Given the Charter's Chapter VII limitation of mandatory action to threats to international peace and security, it is unlikely that the Council will move significantly beyond the precedents already established. However, the term "international peace and security" is sufficiently general (some might say "vague") to permit a reasonably broad interpretation. This could lead the Council to develop additional resolutions and even institutional arrangements to address perceived threats. Perhaps a more relevant question is not whether the Council will seek to articulate new legal norms on its own, but whether it will continue to actively support law-making activities in other fora (especially the IAEA). This could include pressing for broader adherence to the various universal legal instruments addressing nuclear proliferation and terrorism as well as updating or amending existing instruments to reflect new developments and threats.

International System of Radiological Protection

*by Edward Nicholas Lazo**

The international system of radiological protection is made up of an intricate matrix of interacting elements, including international standards, national regulations, guiding principles, scientific understanding, operational actions and experience exchange. These elements "communicate" and interact continually through both case-specific and general issues that provoke policy interpretations, standard and regulation applications, scientific interpretations and operational adaptations. Many different circumstances, from specific situations to general concerns, can induce pressures within this structure that may result in modifications, additions, deletions or new applications. While this is a structured and somewhat rigid system, it has nonetheless adapted itself to emerging circumstances.

The radiological protection system does not exist on its own; it is rather supported and developed by a host of international and national organisations, each providing relevant input from the context of its particular mandate. While the underlying framework of the international system of radiological protection has been rather stable throughout its history, the interactions of its elements and of the organisations supporting those elements has evolved considerably, in particular over the past 20 years. This paper presents how these elements and

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interactions currently operate, presented through the optic of the organisations involved.

A. Background, objective and definitions

Since the realisation, at the beginning of the 1900s, that exposure to ionizing radiation could cause detrimental health effects, experts in the field have worked together to establish a scientific basis for describing radiation-related risks, to recommend practical principles for protection against radiation-related risks and to develop international standards and national regulations in this area.

In broad terms, the primary aim of radiological protection is to contribute to an appropriate level of protection for people and the environment against the detrimental effects of radiation exposure without unduly limiting the desirable human actions that may be associated with such exposure.[1]

The general principles of radiological protection are broadly applicable to all nuclear related activities and to all facilities at which ionizing radiation is produced; radiological protection norms have been characterised as a "chapeau" or envelope for all nuclear legislation.[2]

A brief glossary of legal and technical terms is provided to facilitate the understanding of the legal instruments.

> ***Dose and dose limits:*** dose is a measure of the energy deposited by radiation in a target while dose limit is the value of the effective dose or the equivalent dose to individuals from controlled practices that shall not be exceeded.[3]
>
> ***Natural background radiation:*** the doses, dose rates or activity concentrations associated with natural sources […] in the environment that are not amenable to control.[4]

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1. Lazo, E., "The International Systems of Radiological Protection: Key Structures and Current Challenges", *Nuclear Law Bulletin* No. 80, pp. 49-63.

2. Stoiber, C., Baer, A., Pelzer, N., Tonhauser, W., Handbook on Nuclear Law, IAEA, 2003, page 47.

3. IAEA Safety Glossary, Terminology Used in Nuclear Safety and Radiation Protection, 2007 Edition.

4. *Ibid.*

Principle of justification: any decision that alters the radiation exposure situation should do more good than harm.[5]

Principle of optimisation of protection: the likelihood of incurring exposures, the number of people exposed and the magnitude of their individual doses should all be kept as low as reasonably achievable, taking into account economic and societal factors.[6]

Principle of exposure limitation: the total dose to any individual from regulated sources in planned exposure situations other than medical exposure of patients should not exceed the appropriate limits.[7]

B. Key institutions

Several international organisations contribute significantly to the establishment of a scientific and legal framework in the field of radiological protection. Although there is no "process" formally defined, the organisations work in the following fashion:

- The **United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR)** collects and assesses scientific literature regarding exposure to ionizing radiation, assessing world-wide exposure trends.

- The **International Commission on Radiological Protection (ICRP)** uses the scientific data from UNSCEAR to develop pragmatic policy and application recommendations that can be used as a basis for the development of standards and regulations.

- The **International Atomic Energy Agency (IAEA)** develops international, broadly non-binding standards that may be adopted by its member states and must be adopted by any state accepting the agency's assistance. These standards are based on the recommendations of the ICRP.

- The **European Atomic Energy Community (EAEC)** develops binding directives that must be transposed into national law by its

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5. Lazo, E., *op. cit.*, page 49.

6. *Ibid.*

7. *Ibid.*

member states. These are based on the recommendations of the ICRP.

- The **OECD Nuclear Energy Agency (NEA)** explores new and emerging issues and challenges in the field of radiological protection in order to share experience and develop approaches to addressing these issues. In particular, the NEA has worked in collaboration with the ICRP to "road-test" draft recommendations as to their implications for policy, regulation and application.

C. Key instruments in radiological protection

The following body of radiological protection *aquis* shall serve as a summary:

- The 2007 Recommendations of the International Commission for Radiological Protection, ICRP Publication 103.
- International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, IAEA, 1996.
- Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation.
- Council Directive 97/43/Euratom of 30 June 1997 on health protection of individuals against the dangers of ionizing radiation in relation to medical exposure.
- Council Decision 87/600/Euratom of 14 December 1987 on Community arrangements for the early exchange of information in the event of a radiological emergency.
- Council Directive 89/618/Euratom of 27 November 1989 on informing the general public about health protection measures to be applied and steps to be taken in the event of a radiological emergency.
- Council Directive 90/641/Euratom of 4 December 1990 on the operational protection of outside workers exposed to the risk of ionizing radiation during their activities in controlled areas.

D. The international system of radiological protection

The international system of radiological protection was born of the need to protect medical researchers from the hazardous effects of ionizing radiation. The current international system of radiological protection is developed and supported by the small multitude of organisations mentioned above. A brief history of each will help to fully understand the complexity of the current system and its framework.

1. ICRU and ICRP

The two earliest pillars of the system were created only a few decades after the discovery of radiation. At its first meeting in 1925, the International Congress of Radiology conceived the International X-Ray Unit Committee, which was created at its 2nd meeting in 1928. This body, which was to become the International Committee on Radiological Units and Measurements (ICRU), was charged with proposing an internationally agreed upon unit for measurement of radiation as applied to medicine. In 1950, the ICRU expanded its role to wider aspects of radiation metrology.

In addition to the question of ionizing radiation metrology, the 1928 meeting of the International Congress of Radiology recognised the need to actively address the health hazards of ionizing radiation, and also created the International X-Ray and Radium Protection Committee to develop recommendations with regard to protection against the deleterious effects of ionizing radiation. In 1950, this Committee was renamed as the International Commission on Radiological Protection (ICRP) and widened its focus beyond the medical profession and other radiation researchers and workers to address public protection issues. The ICRP has produced a series of general recommendations, providing the key elements and philosophy for the international system of radiological protection for the public and workers, always basing its work on the quantities and units developed and periodically updated by the ICRU. Key ICRP reports include Publication 1 (1959), Publication 6 (1964), Publication 9 (1966), Publication 26 (1987), Publication 60 (1990) and Publication 103 (2007).

These two bodies continue to provide concrete and scientifically based recommendations with regard to protection against ionizing radiation, and now address these aspects for protection of the public, workers and the environment. Their work and meetings were somewhat interrupted by the second world war, but national efforts to develop atomic weapons lead to further research and thinking regarding radiological protection. In 1950, when the roles and mandates of both the ICRP and the ICRU were renewed, there was also a new focus on the hazardous effects of nuclear weapons and the beginnings of thinking with respect to protection in the context of civilian nuclear power.

2. UNSCEAR

In 1955, purportedly with the intention to deflect a proposal calling for an immediate end to all nuclear explosions, it was proposed to the General Assembly of the United Nations to establish a committee to collect and evaluate information on the levels and effects of ionizing radiation. Subsequently, on 3 December 1955, the General Assembly unanimously approved a resolution[8] which established the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), which began with nominated experts from 15 countries. The United Nations General Assembly has since expanded membership to 21 countries. Since its creation, the UNSCEAR has issued authoritative reports presenting comprehensive evaluations of both the state of knowledge about the levels of ionizing radiation to which human beings are exposed and of the possible effects of such exposures. The evaluation of exposure to non-human species has also been addressed in the most recent UNSCEAR reports. These evaluations form a substantial part of the scientific basis on which the international system of radiological protection rests.

3. IAEA

Science and policy with respect to radiological protection was at that point more firmly in the hands of international expert bodies. Thus, the need for guiding standards and common approaches for implementing radiological protection more strongly emerged which led to the creation of several organisations in the 1950s.

The IAEA was created in 1957 in response to the deep fears and expectations resulting from the discovery of nuclear energy. In the context of the international system of radiological protection, the IAEA has been charged by the United Nations General Assembly to establish international standards in, *inter alia*, radiological protection. Since its inception, the IAEA has issued many standards, however the International Basic Safety Standards is among those having had the most impact. The International Basic Safety Standards were initially published in 1962 and were subsequently updated and republished in 1967, 1982, and 1996. These updates were intended to implement the latest recommendations of the ICRP to assure that radiological protection standards were in line with radiation protection philosophy. Partially as a result of the latest ICRP general recommendations (Publication 103), a new revision of the BSS is currently underway and is expected to be completed in 2011.

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8. Resolution 913(X), dated 3 December 1955, the founding resolution.

4. EURATOM

In addition to the creation of United Nations bodies addressing radiation protection standards, the 1950s also saw the creation of bodies with more limited or regional membership with responsibilities for, including radiation protection. The European Atomic Energy Community (EAEC) and the OECD Nuclear Energy Agency are the two most prominent examples.

To tackle the general shortage of "conventional" energy in the 1950s, six states (Belgium, France, Germany, Italy, Luxembourg and the Netherlands) looked to nuclear energy as a means of achieving energy independence. Since the costs of investing in nuclear energy could not be met by individual states, these 6 founders joined together to form the EAEC. The Treaty establishing the European Atomic Energy Community (Euratom Treaty) came into force in January 1958. The treaty guarantees high safety standards for the public and prevents nuclear materials intended principally for civilian use from being diverted to military use. Detailed requirements for radiation protection are laid down in Title II, Chapter 3 "Health and Safety", Articles 30 to 39 of the Euratom Treaty. Pursuant to the treaty, a comprehensive set of directives, regulations, recommendations and decisions has been elaborated and adopted (see above).

In particular, the EAEC has established its own Basic Safety Standards Directive for the protection of the health of workers and the general public against the dangers arising from ionizing radiation, known as the European BSS Directive.[9] A directive is a legislative act addressed to the member states of the EAEC which must implement it in their national legislation. In order to take scientific and technical developments into account the basic safety standards, which were originally established in 1959, were revised on several occasions, i.e. in 1962, 1966, 1976, 1980 and 1996. The main scientific basis for the basic safety standards are the ICRP recommendations which is part of the reason that a directive is being revised at the moment (in 2010) to reflect the latest ICRP Publication.

5. NEA

The Organisation for European Economic Co-operation (OEEC) was created in April 1948 to implement the Marshal Plan to reconstruct Europe. Nuclear energy was seen as an important aspect of this rebuilding, and as such in

9. Council Directive 96/29/EURATOM of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation.

February 1956 the OEEC Council established the Steering Committee for Nuclear Energy, which in 1958 became the European Nuclear Energy Agency and subsequently the Nuclear Energy Agency (NEA). In March 1957, the Working Party on Public Health and Safety was created to develop a programme of work in this area and to establish a mechanism to implement the proposed programme of work. Since 1973, this working party is the Committee on Radiation Protection and Public Health (CRPPH).[10] There are currently 28 member countries of the NEA who nominate radiation protection experts, generally from governmental regulatory or technical specialist organisations, to the CRPPH.

The NEA produced general radiation protection norms for its members in 1959, 1963 and 1968 as well as specific norms covering consumer products, tritium light sources, pacemakers and smoke detectors. However, this practice was stopped in the 1970s, leaving the development of such norms to the ICRP, the IAEA and the EC. Although the CRPPH no longer develops binding standards, it has continued to provide its members with a high-level, visible forum for exchange and discussion in order to seek common understanding of identified issues, to advance the state of the art in radiological protection theory, regulation and practice, to advance policies that bring the system of radiological protection more in line with modern societal needs and to promote international co-operative projects. With regard to the development of the system of radiological protection, the CRPPH has co-sponsored the International BSS, has actively interacted with the ICRP over the eight years of development of Publication 103 and has continued its forward-looking study of emerging scientific and decision-making issues in radiological protection.

6. Other significant organisations

While it is fair to say that the organisations most actively involved in the development and evolution of the system of radiological protection are UNSCEAR, the ICRP, the ICRU, the IAEA, the EC and the NEA, many other organisations have within their mandates significant aspects addressing radiation protection and the international system. These include several United Nations organisations, i.e. the World Health Organization (WHO), the International Labour Organization (ILO), the Pan American Health Organization (PAHO), the Food and Agriculture Organization (FAO) and the United Nations Environment Programme (UNEP). In addition, two significant

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10. In February 1958, the working party became the Health and Safety Sub-committee which in turn became the Radiation Protection Committee and finally in 1973 the CRPPH.

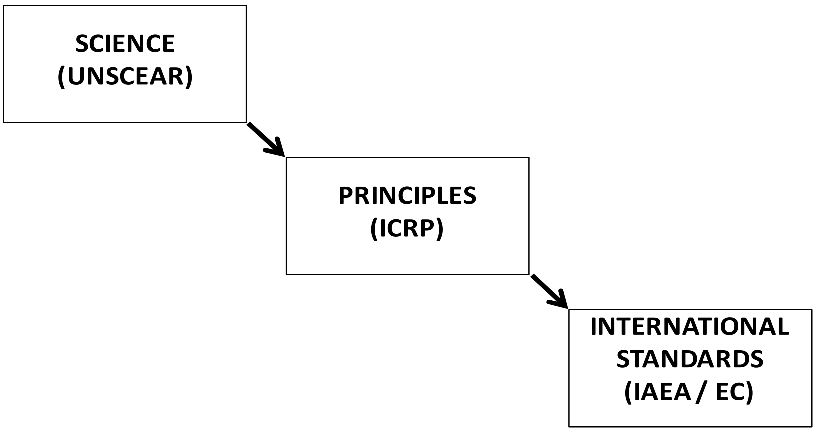
technical standard-setting organisations address radiation protection issues: the International Electrotechnical Commission (IEC) and the International Standards Organisation (ISO).

In addition to these organisations, several others that continue to influence the evolution of the international system of radiological protection include the U.S. National Council on Radiation Protection and Measurements (NCRP) which has developed norms and standards for the United States for some time. The International Agency for Research on Cancer (IARC) continues to perform fundamental scientific studies and broad epidemiological studies in support of the system's scientific basis.

E. Development and evolution of the system of radiological protection

The pathway of the system of radiological protection was, for much of its early existence, rather linear. This is to say, *radiation protection science* formed the basis of understanding in the field and was summarised by the UNSCEAR. Based on this understanding, the *philosophy and objectives* of radiological protection were developed and published as recommendations by the ICRP. Based on these recommendations, international *standards* were developed by the IAEA and as a binding instrument by the EAEC. Finally, *national legislation and regulations* were developed on the basis of previously developed documents. This system was at least in part a result of the fact that those involved at each step had the legitimacy to discuss relevant issues within their relevant group and mandate, to take decisions and to pass them on to the next organisation in the development line. Decisions were generally not questioned, broadly because those who had made the decisions were seen as "the experts" in the field and their views were trusted. This process is shown schematically in the following figure.

Figure 1
Development of International Radiological Protection Standards (Pre-1999)



However, this process has evolved and changed in the context of tarnishing or loss of social trust in "science" and in "technical bureaucrats", and there has been an increased recognition of the inherent complexity of radiation exposure situations.[11]

F. Stakeholder involvement in the evolution of radiological protection

Beginning with the social upheavals of the 1960s, the barriers that once surrounded risk assessment and management decisions and decision-making processes have been increasingly disappearing. The days when well-meaning public officials and technical experts could, to the best of their judgement, make public-protection decisions in isolation are over. Today, many groups and individuals in different countries are interested in being involved, at various levels of participatory democracy, in discussions and decisions affecting public health and environmental protection issues. Individual members of the public subject to particular risks, local and national groups, associations, NGOs and even federal, state and local level government offices that are not directly responsible for decisions often feel that their views should be taken into account during any decision-making process and that their concerns need to be addressed. These individuals and groups as well as the responsible regulatory authorities and, if applicable, the operator have come to be known collectively as stakeholders. Stakeholder involvement in decision-framing and decision-making processes is increasingly common in today's world. Stakeholders

11. These factors are expressed in: *Radiation Protection in Today's World: Towards Sustainability*, NEA, 2007.

question the role of science and authorities in decision making and demand accountability in decisions regarding the management of risks.

"Moreover, the social dimension of radiation protection decisions, both in managing work force and in coping with the impact of large scale nuclear operations, including possible accidents, is now more fully recognised. It requires the development of better mechanisms for the involvement of social parties and the public in the decision processes and the search for a closer integration of the management of radiation risks with that of other hazardous substances or situations".[12]

The growing importance of stakeholder involvement in decision making has affected (i) the way that the principles of justification, optimisation and limitation are viewed, (ii) the way the role of the radiation protection profession in risk assessment and management is viewed and (iii) the relative importance of case-specific circumstances in relation to harmonised internationally accepted criteria. While the central importance of stakeholder involvement in addressing many risk situations is now widely accepted, the next step will be to optimise structures and processes to facilitate such participation.

The growing interest in decisions related to risks reflects many different aspects of social and scientific evolution. For example, the internet and the media have made information on risks much more available to everyone. At the same time, the technological promises of post World War II have often not lived up to initial claims, breeding some scepticism of science and public institutions. With this has come the increasing realisation that science is only part of "the truth" with respect to judgemental decisions affecting such things as "safety", "security" and "the protection of health and the environment". Increasingly, social values emerge as being as influential as scientific facts with respect to decisions.

Along with these changes, which broadly reflect the individual's evolving place and role in society, the world has become much more of a "global entity", thus requiring global, social harmonisation in a broad sense. The notions of sustainability and intergenerational awareness have introduced a much longer view in any planning discussions.

Yet, as these global issues become more widely recognised, there is also a trend that local contexts are increasingly important to decisions regarding

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12. This was already recognised as an emerging challenge in the 1994 CRPPH Collective Opinion.

radiological risks which has several implications. It is clear that there is no single “risk rationale” to dealing with risks, and there is no inherent social contradiction if the management of risk is not approached everywhere in a comparable or “equal” fashion, particularly in terms of stakeholder concerns and resource allocations. At the same time, aspects important at the international level can be subsidiary to those at the national level which can in turn be subsidiary to local aspects. Thus, for example, local issues and concerns play a significant role in the siting of new installations or in discussion of operational emissions from existing facilities etc.

Further, environmentalism has continued to grow to the point where increasingly, and at many levels, there is a link between good public health and a healthy environment. Much of the public demand for a clean environment is thus formulated on the basis of “quality of life” and “well being”. These notions, both as social values and as scientific facts, are central to many of today’s decisions and decision-making processes.

Finally, there is a growing view that radiological protection has for some time been somewhat independent, but should rather be viewed within the broader sphere of public health. In this context, the assessment and management of radiological risks are reformulated as being viewed together with many other risks and issues to be addressed to achieve good public health in a balanced fashion.

This roughly presented social evolution has to a great extent recast the approaches taken to any decisions concerning the evolution of the system of radiological protection. As the organisations described above were established in the 1950s, 1960s and 1970s, they fit broadly into the linear model of the times as previously mentioned. However, during the 1990s, stakeholders in the member countries of these organisations increasingly questioned governmental decisions and governmental decision makers themselves. Governmental expert-body staffs also increasingly questioned the “how and why” with respect to new decisions. In particular, questions regarding the system in ICRP Publication 60 presented a number of issues with regard to the management of Naturally Occurring Radioactive Materials (NORM), with regard to the exemption and exclusion of radioactive materials and with respect to the implementation of protective actions, particularly following nuclear accidents. At least in part in response to pressures to discuss these issues and to find new solutions addressing the needs of various stakeholders, the ICRP Main Commission decided to open a broad discussion of where the system of radiological protection should go next and how the system should evolve to better address the needs and concerns of stakeholders.[13]

While previous ICRP recommendations had been developed in an "in-house" fashion, the current system of radiological protection, as recommended in ICRP Publication 103, issued in December 2007, was the result of broad discussions among the radiation protection profession, governments, regulatory organisations, industry, NGOs and any other relevant stakeholders.[14] Although still not entirely clear or fixed, this development process can be characterised as being one of broad stakeholder involvement. This is not to say that discussions have penetrated to the level of members of the public, but rather to suggest that many organisations and institutions not previously involved have had the opportunity to actively participate, and to have their voices heard.

G. Non-linear decision making in radiological protection

The inter-related elements of this "new" approach to decision making can be broadly characterised as science, principles, standards and implementation:

- Radiological protection **science** will clearly influence the development of radiological protection principles; however, this philosophy will also influence the focus areas of scientific research. For example, the linear non threshold (LNT)[15] model that guides

13. This began in 1999 with an article by Roger Clarke, (then the Chair of ICRP), "Control of low-level radiation exposure: time for a change?", in *Journal of Radiological Protection*.

14. The Nuclear Energy Agency, through its Committee on Radiation Protection and Public Health, participated very actively in these discussions, including the organisation of seven international conferences to discuss the evolution of the system, two direct discussions between the CRPPH membership and the ICRP Chair, a series of expert groups and meetings resulting in 13 NEA publications, and three detailed and constructive assessments of various draft ICRP recommendations. This work by the NEA mobilised over 100 experts from 17 countries, coming from 25 national governmental organisations, national nuclear industries and international organisations. The NEA publication entitled "The NEA Contribution to the Evolution of the International System of Radiological Protection" summarises the evolution that took place over this period, both within the ICRP and within the broader radiological protection community as compromise and agreement were slowly reached.

15. Linear-non-threshold (LNT) model: A dose-response model which is based on the assumption that, in the low dose range, radiation doses greater than zero will increase the risk of excess cancer and/or heritable disease in a simple proportionate manner.

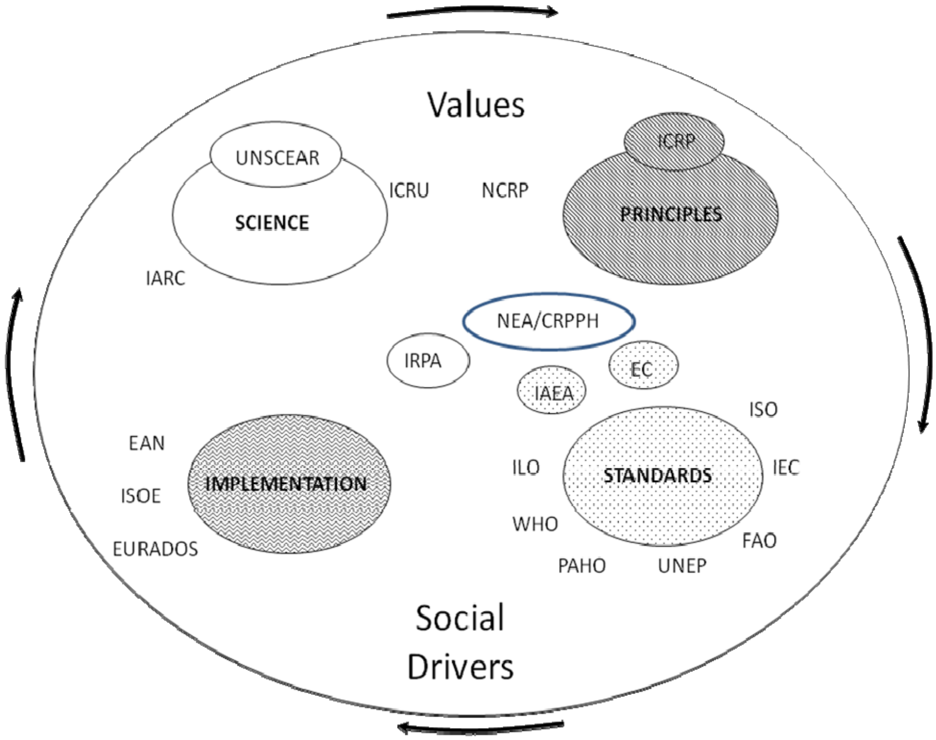
radiological protection principles has significantly influenced the focus of scientific research into low-dose effects of ionizing radiation.

- Subsequently in the development process, **principles** will clearly guide the development of standards, and yet standards will reflect on the elements of developing principles that are needed and also on the focus areas of scientific research. For example, the ICRP considered eliminating the concept of justification from its standards as being broadly not a radiation protection decision, however this was strongly rejected because the concept of justification was seen as central to the standards and to national legislation and regulation.

- **Standards** will then clearly affect, generally through national regulations, how radiological protection is implemented through protective actions. Here again, however, **implementation** experience will reflect on standards, principles and science. For example, the existence of naturally occurring radioactive materials (NORM), radium in pipe scale in the oil industry or uranium and/or thorium in phoso-gypsum in phosphoric acid and fertiliser industries, has driven the need for standards, principles and science to address these risk situations for workers and the public. Expanded use of ionizing radiation in medical imaging and significantly increasing patient doses have also provoked the need for the revisiting of protection standards, principles and science in this important area.

Hence, these key elements of the system of radiological protection are all broadly linked together in a non-linear fashion and can be characterised as being part of a rather circular development process. At the same time, all these elements cannot exist alone but are rather supported and fed by inputs and interactions with various organisations. Some organisations interact with one of these elements, others with more than one. Figure 2 is an attempt to illustrate the dynamic interdependence of the elements and organisations that make up and drive the evolution of the international system of radiological protection.

Figure 2
Development of International Radiological Protection Standards (Post-1999)



As a result of these shifts, there is a much broader interest in these various development steps and at the same time, a willingness to open discussions up to broader groups of stakeholders. In this context, the process of simplistic linear development has become far less linear and much more complex. However, the results are more likely to address stakeholder needs and concerns, more likely to be broadly understood, more likely to be accepted, and finally more likely to be sustainable.

Conclusions

The inputs and roles of the various organisations have led to a broad and rather complex system (vaguely captured in Figure 2) which is no more that an imperfect representation of the international system of radiological protection. The figure shows the dynamic and increasingly transparent structural elements that have evolved and continue to evolve.

It should be noted that the development of ICRP Publication 103, the latest set of recommendations describing the international system of radiological protection, is only one part of the overall evolution that is continually taking place. The International Basic Safety Standards of the IAEA translate the ICRP recommendations into regulatory language, and the EURATOM Basic Safety Standards Directive provide a binding regulatory framework which all EU member states must implement in their national regulations. Both instruments have also been evolving in no small measure as a result of the new ICRP recommendations.

The “end” of the system, that is the implementation of radiological protection standards and regulations in practice, is and will follow the final revision of the basic safety standards. This will be extremely complex, broadly driven by the framework of the standards and strongly influenced by local circumstances. The experience from this process is also worthy of capture and sharing to further enhance our understanding of the system of radiological protection, and how and why it does or does not reflect our needs, concerns and circumstances.

Environmental Protection under Nuclear Law: Still a Long Way to Go

*by Sam Emmerechts**

The explosion at the nuclear reactor in Chernobyl, on 26 April 1986, resulted in an unprecedented release of radiation and unpredicted adverse consequences for both the public and the environment. More than 200 000 km^2 of Europe was contaminated with radiocaesium. Since the accident, surface contamination has decreased and levels of radiation measured in the air are now the same as before the accident in most of these areas. Contamination of crops, meat and milk with short-lived radioactive iodine was a major concern in the early months after the accident. Now and for decades to come, contamination with longer-lived radioactive caesium is the main concern in some rural areas. Forest food products such as berries, mushrooms and game contain particularly high levels of long-lived radioactive caesium and this contamination is expected to remain high for several decades. As a result of the accident, rivers, surface waters and fish became contaminated with radioactive materials. The contamination soon decreased as a result of dilution and decay but some of the materials remained trapped in the soils around contaminated rivers and lakes. Today, most water bodies and fish have low radioactivity levels although the levels in some closed lakes with no outflowing streams remain high. The accident immediately affected many plants and animals living within 30 km of the site. There was an increase in mortality and a decrease in reproduction and some genetic anomalies in plants and animals are still reported. Over the years, as the radioactivity levels decreased, the biological

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populations started to recover and the area has become a unique sanctuary for biodiversity.

Chernobyl undoubtedly had a significant impact on the attention given by nuclear lawyers to the protection of the environment. Ever since this accident, the world has become increasingly mindful of the potential impact of nuclear facilities on the environment, and many governments recognised the need to better protect the environment against the risks of nuclear activities. Environmental law was the right instrument to help them achieve that goal. This article deals with the interrelationship between nuclear law and environmental law.

Nuclear law was developed in the 1960s to guide and regulate the development of nuclear activities for civil use. Initially it focused on radiation protection and third party liability for damage caused by nuclear activities. In the 1970s, concerns about the spread of nuclear weapons and the malevolent use of nuclear material led to the adoption of international conventions on non-proliferation and the physical protection of nuclear material. The nuclear accidents in Chernobyl and at Three Mile Island turned the attention of the international community towards risk management in the 1980s and 1990s. An enhanced prevention and protection culture developed which resulted in the adoption of important nuclear safety conventions and the second generation of nuclear third party liability conventions. The terrorist acts in the United States of 11 September 2001 further influenced nuclear law leading to the amendment of the Convention on the Physical Protection of Nuclear Material and to the adoption of the International Convention for the Suppression of Acts of Nuclear Terrorism.

Environmental law is a body of law that is even younger than nuclear law. Although some elements of modern international environmental law can be traced back to the second half of the nineteenth century, the main set of environmental treaties have all been adopted at an impressive pace in the course of the last three decades. Bilateral fishery treaties were adopted in the nineteenth century because people and states believed that the process of industrialisation and development required limitations on the exploitation of certain natural resources. In the early 1970s, the United Nations adopted an important declaration recognising the need to protect the environment. Several legal instruments followed, addressing oil pollution, wetlands, the marine environment and the dumping of waste at sea. At a later stage, environmental concerns started to integrate into a broad variety of national and international policies with international courts contributing to both the definition and application of the subject.

Environmental law applies to the nuclear field in a direct and an indirect way: it does so *directly* by making nuclear activities subject to international environmental law which will be addressed under Chapter 1. It does so *indirectly* by introducing environmental law principles and the concept of environmental protection into international nuclear law which will be the subject of Chapter 2. In both chapters selective topics will be addressed which will prove that environmental law is in evidence in the nuclear field. These topics are transparency and access to nuclear information, public participation in nuclear decision making and prevention and compensation of environmental damage caused by nuclear incidents.

In Chapter 3, the question is raised as to whether the influence of environmental law has succeeded in ensuring that the environment is now effectively protected by international nuclear law. The dominance of the traditional anthropocentric approach of nuclear law, which focuses on protecting people and property instead of the environment, illustrates that this is not yet the case. However, there are signs that nuclear law progresses towards better protecting the environment. The position of the author is therefore that the importance of environmental law for nuclear activities is increasing and may lead to a growing symbiosis with nuclear law. In this regard, environmental law and nuclear law share the same objectives: protection against, mitigation of and compensation for damage, including damage to the environment.

1. Environmental law governing the nuclear field

1.1 Introduction

In the second half of the 20th century, public awareness of the harmful effects of certain industrial activities led to an increasing concern about protecting the environment which had an impact on the nuclear field as well. Catastrophes caused by the chemical industry and asbestos cases in the 1970s made people and governments aware of the potential dangers of industrial activities, and by the late 1980s environmental threats were on the agenda of the international community as a result of the potential consequences of ozone depletion and climate change. In 1996, in a case concerning nuclear weapons, the International Court of Justice (ICJ) recognised for the first time that there existed rules of general international environmental law.[1]

The 1972 Stockholm Declaration of the United Nations Conference on the Human Environment is often quoted as one of the first international

1. (1996) ICJ Reports 226 at 242.

instruments on environmental protection.[2] The declaration contains twenty-six principles and is considered to be the first document in international law to explicitly recognise the right to a healthy environment. The declaration acknowledges dangerous levels of pollution in water, air, earth and living beings, major and undesirable disturbances to the ecological balance of the biosphere, destruction and depletion of irreplaceable resources and gross deficiencies harmful to the physical, mental and social health of man, in the man-made environment particularly in the living and working environment.

The Stockholm Declaration contains a set of common principles to inspire and guide the peoples of the world in the preservation and the enhancement of the human environment. From a legal perspective, Principle 21 is one of the most relevant as it remains the cornerstone of international environmental law. It holds that states have the sovereign right to exploit their own resources pursuant to their own environmental policies and in accordance with the United Nations Charter and international law. Principle 21 confirms that states have sovereignty to decide over their natural resources and hence whether or not to exploit oil, gas, coal, wind or uranium resources located on their territory within limits established by international law. However, the second part of Principle 21 imposes a restriction on states by requiring them to ensure that activities within their jurisdiction or control do not cause environmental damage to other states or areas beyond the limits of national jurisdiction. Hence, mining uranium or operating nuclear power plants should not cause environmental damage to other states or areas beyond the limits of national jurisdiction.

According to Principle 22 of the Stockholm Declaration states shall co-operate to develop international law regarding liability and compensation for victims of pollution and other environmental damage caused by activities within the jurisdiction or control of such states to areas beyond their jurisdiction. Principle 26 of the declaration is the only one with explicit reference to nuclear. It states that “[m]an and his environment must be spared the effects of nuclear weapons and all other means of mass destruction”. Nuclear activities are thus confronted with the protection of the environment in that the declaration urges states to ban and destroy nuclear weapons and all other means of mass destruction.

Twenty years after Stockholm, another declaration was adopted at a conference organised by the 1992 United Nations in Rio de Janeiro, the

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2. Report of the UN Conference on the Human Environment, Stockholm, 5-16 June 1972, UN Doc. A/CONF.48/14/Rev.1.

Declaration on Environment and Development.[3] The Rio Declaration sets out the basis upon which states and people are to co-operate and further develop international law in the field of sustainable development. The twenty-seven principles of the Rio Declaration are to a large extent similar to the Stockholm Declaration but they are more specific and reach further by supporting the development of procedural techniques to protect the environment and the implementation of environmental standards. For example, it urges states to enact effective environmental legislation, to conduct environmental impact assessments for proposed activities that are likely to have a significant adverse impact on the environment and that are subject to a decision of a competent national authority, to exchange information concerning the environment with citizens and consult with citizens when making decisions affecting the environment. The Rio Declaration also embraces two principles that are at the heart of environmental protection, i.e. the polluter pays principle and the precaution principle.[4]

Neither the Stockholm nor the Rio Declaration contains legally binding obligations. Some of their principles provide guidance as to future legal developments, yet others had already been established in treaties and other international acts or reflect rules of customary law which, according to the ICJ, are prime sources of international law. The fact that Principle 21 of the Stockholm Declaration, whose content is repeated in Principle 22 of the Rio Declaration, reflects customary law is confirmed by the ICJ's 1996 Advisory Opinion on the Legality of the Threat or Use of Nuclear Weapons.[5]

The main impact of the Stockholm and Rio Declarations concerns their role as drivers for the development of international law to protect the environment. The number of treaties relating to the environment has increased dramatically ever since. Environmental legislation naturally tends to cover all activities that may cause environmental damage, and there is no doubt that nuclear activities may cause such damage. Several environmental law conventions therefore apply *directly* to nuclear activities, albeit not very consistently, while others do not.

The 1972 London Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter is an example of an international

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3. Report of the UN Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992, UN Doc. A/CONF.151/26/Rev.1.

4. Principles 15 and 16 of the Rio Declaration on Environment and Development.

5. Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, I.C.J. Reports 1996, p. 226.

environmental law convention that applies to nuclear activities. The convention has a global character and contributes to the international control and prevention of marine pollution. It prohibits the dumping of certain hazardous materials, including high-level radioactive waste, requires a prior special permit for the dumping of a number of other identified materials and a prior general permit for other wastes. In 1996, a Protocol to the London Convention was adopted prohibiting the dumping of all radioactive wastes into the sea.

The 1982 United Nations Convention on the Law of the Sea (UNCLOS) urges its signatories to minimise to the fullest possible extent the release of toxic, harmful or noxious substances, especially those which are persistent. The convention lays down a comprehensive regime of law and order in the world's oceans and seas establishing rules governing all uses of the oceans and their resources. It enshrines the notion that all problems of ocean space are closely interrelated and need to be addressed as a whole. Today, it constitutes the globally recognised regime dealing with all matters relating to the law of the sea. UNCLOS contains specific rules on the right of innocent passage for ships carrying nuclear or other inherently dangerous or noxious substances.[6]

Other examples of international environmental law conventions that apply to the nuclear field include the 1974 Convention for the Prevention of Marine Pollution from Land-Based Sources which was adopted to address marine pollution by discharges of pollutants from land-based sources, watercourses or pipelines. It obliges contracting parties to adopt measures to forestall and eliminate pollution of the maritime area by radioactive substances from land-based sources.[7] Among the other environmental law conventions applying to the nuclear field figures also the 1991 Convention on Environmental Impact Assessment in a Transboundary Context ("Espoo Convention") which sets out the obligations of contracting parties to assess the environmental impact of certain activities, including nuclear projects, at an early stage of planning. It lays down the general obligation of states to notify and consult each other on all major projects under consideration that are likely to have a significant adverse environmental impact across boundaries. The 1998 Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters ("Aarhus Convention") is a new type of environmental instrument which links environmental rights and human rights, acknowledges that we have obligations *vis-à-vis* future generations,

6. Article 22 and 23 of UNCLOS.

7. The 1974 Convention for the Prevention of Marine Pollution from Land-Based Sources was later replaced by the 1992 OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic.

relates government accountability to environmental protection and focuses on interactions between the public and public authorities in a democratic context. The Aarhus Convention also applies to nuclear activities.

However, some international or regional environmental law instruments exclude nuclear activities from their application because such activities are already effectively governed by specific legislation or by other international conventions. The EU Environmental Liability Directive (2004)[8] illustrates this point. The directive is based on the polluter pays principle and holds operators liable for damage to land, water and biodiversity. Liability may either be strict or fault/negligence-based depending upon the type of activities that are conducted by the operator. Operators are required to take measures to prevent environmental damage and must bear the costs of measures to prevent and remediate the environment. The directive does not apply to environmental damage or to any imminent threat of such damage arising from a nuclear incident in respect of which liability or compensation falls within the scope of any of the international nuclear liability conventions, including any future amendments thereof, which is in force in the member state concerned.[9] However, the directive states explicitly that the European Commission shall publish a report before 30 April 2014 on the experience gained in its application, including a review of the application of the exclusion of nuclear damage. The European Commission will therefore pay close attention to the extent to which the new and revised nuclear liability conventions are effective mechanisms for compensating environmental damage. If they are not satisfied that adequate coverage is provided or that the conventions have not yet entered into force by 2014, the Commission may initiate action to remove this exclusion.

Other examples of environmental agreements that do not apply to nuclear activities include the 1996 International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea ("HNS Convention"), whose objectives are to adopt uniform international rules and procedures for determining questions of liability

8. Directive 2004/35/EC of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage (O.J. L 143, 30 April 2004, p. 56).

9. The Environmental Liability Directive does provide however that this exclusion may be amended on a proposal from the European Commission to the European Parliament and the Council of Ministers before 30 April 2014 on the basis of a review of the coverage by the international nuclear liability conventions (see Article 18).

and compensation in respect of damage caused by incidents in connection with the carriage by sea of hazardous and noxious substances. The HNS Convention introduces strict liability for the ship owner and a system of compulsory insurance and insurance certificates. Other conventions excluding nuclear activities are the 1989 Convention on Civil Liability for Damage Caused during Carriage of Dangerous Goods by Road, Rail and Inland Navigation Vessels ("CRTD Convention") which establishes liability and compensation rules for damage caused during carriage of dangerous substances by road, rail and inland navigation vessels but also the 1993 Lugano Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment[10] whereby contracting parties undertake to ensure that operators conducting a dangerous activity on their territory be required to participate in a financial security scheme or to have and maintain a financial guarantee to cover the 1iability under the convention. The Lugano Convention also provides a right of access to information relating to the environment held by public authorities or by bodies with public responsibilities for the environment.

The Kyoto Protocol is another example of an international environmental convention that excludes nuclear, much to the frustration of those supporting nuclear energy as an instrument to reduce carbon dioxide emissions. Climate change resulting from an increase in greenhouse gas (GHG) concentrations in the atmosphere is a major global concern and a major global issue on the agenda of policy makers. The energy sector, from primary energy extraction to end use, is one of the main sources of GHG emissions, in particular carbon dioxide (CO_2). Now, energy demand is expected to increase dramatically in the 21st century, especially in developing countries, where population growth is fastest. Therefore a key policy-making objective is the implementation of measures aiming towards reducing GHG emissions from the energy sector in the medium and long term.

At the third meeting of the conference of the parties to the United Nations Framework Convention on Climate Change (UNFCCC), held in December 1997 in Kyoto, decision makers agreed on provisions for reducing GHG emissions. The Kyoto Protocol to the UNFCCC was opened for signature on 16 March 1998 and entered into force on 16 February 2005. As of April 2010, there are 191 parties to the Protocol. The Protocol contains legally binding

10. The Lugano Convention has not yet entered into force.

emissions targets for so-called Annex I Parties,[11] requiring them to reduce their collective emissions of six key greenhouse gases in the period 2008-2012, with the emissions being calculated as an average over the 5-year period.

Many believe that an "energy revolution" is needed to decarbonise energy supply which is heavily reliant on fossil fuels. One way to low carbon electricity could be via a major expansion of nuclear power. Indeed, nuclear power is a non-fossil energy source. However, that important option is not specifically mentioned in the Kyoto Protocol which actually incorporates conditions that effectively exclude nuclear energy as an option for implementation under two of the three "flexibility mechanisms" that can be used, in addition to domestic action, by Annex I Parties to the UNFCCC to meet their commitments.[12]

Originally the plan for the 2009 Copenhagen climate conference was to deliver a comprehensive, legally-binding international deal to tackle climate change considering that the Kyoto Protocol will expire at the end of 2012. However the negotiations ended without a fair, ambitious or legally binding treaty to reduce greenhouse gas emissions.

1.2 The need for transparency: public access to nuclear information

Laws providing for the public's right of access to information and participation in decision-making processes were almost non-existent in the early days of nuclear energy development and production. Most governments did not see the need to inform the public of its potential risks or invite public participation in nuclear policy or project decisions.[13] The concepts of transparency and stakeholder involvement entered the field of nuclear energy through environmental legislation which had a large edge on these matters compared to

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11. Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Czech Republic, Denmark, European Union, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom. and United States of America.

12. The three mechanisms are: projects implemented jointly (Article 6), the clean development mechanism (Article 12) and trading of emission reduction units (Article 17).

13. In some states, legal provisions on public participation in nuclear decision-making *did* exist at an early stage. See, for example, the National Environmental Policy Act of 1969 ("NEPA") in the United States.

nuclear law. In fact, environmental law supported and accelerated a general breakthrough in public information and participation rights in many fields of law, including nuclear law.[14]

At the international level, the Stockholm and Rio Declarations stimulated the adoption of international and national legal instruments on access to environmental information and public participation in decision making.

Principle 19 of the Stockholm Declaration holds:

> "Education in environmental matters, for the younger generation as well as adults, giving due consideration to the underprivileged, is essential in order to broaden the basis for an enlightened opinion and responsible conduct by individuals, enterprises and communities in protecting and improving the environment in its full human dimension".

Principle 10 of the Rio Declaration stipulates:

> "Environmental issues are best handled with participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities […] and the opportunity to participate in decision-making processes".

Citizens must have access to information that may impact the environment and be entitled to participate in environmental decision making in order to be in a position to protect it. Legal instruments were seen as the appropriate means of guaranteeing debate on proposed projects by all stakeholders, thereby aiming to ensure that potentially adverse environmental consequences were either prevented or acceptably mitigated.

The Aarhus Convention is probably the most important international environmental law instrument that stresses the value of access to environmental information. The convention recognises that the public must have access to environmental information in order to assert its right to protect the environment for present and future generations. Hence there is a duty on public authorities to make such information available to the public on request and without an interest

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14. Prof. Macrory, R. (ed.), "Reflections on 30 Years of EU Environmental Law", *Europa Law Publishing*, 2005, p. 64. See also Eberson, J., "The Notion of Public Participation in International Environmental Law", *Yearbook of International Environmental Law*, 1997, Vol. 8, p. 51.

having to be stated ("reactive approach").[15] Requests for environmental information may only be refused on the basis of reasons that are listed explicitly in the convention and must be interpreted restrictively.[16] For example, public authorities may withhold information if the request is manifestly unreasonable or if it concerns material in the course of completion where such an exemption is provided for in national law or if disclosure would adversely affect public security or the confidentiality of personal data or the confidentiality of the proceedings of the public authorities where such confidentiality is provided for under national law. Finding the right balance between the desire for transparency and the need to protect confidentiality may be particularly difficult in the nuclear sector because of the security and non-proliferation risks.

The Aarhus Convention also requires public authorities to possess and update environmental information relevant to their functions, to ensure an adequate flow of information to public authorities about proposed and existing activities that may significantly affect the environment and to disseminate immediately and without delay all information that could enable the public to take preventive or mitigating measures in the event of an imminent threat to human health or the environment ("active approach").[17] It may seem relatively easy to organise the relevant information at the level of one public department or agency. However, this task may appear much more complex in cases where the competency for environmental matters and the environmental data, including nuclear data, are not "in the hands" of one authority but involve several departments and agencies at different levels, such as urban planning authorities, environmental agency authorities, nuclear safety authorities etc. To complicate things further, it may even be that the nuclear data are partly in the hands of public or private operators.

According to the Aarhus Convention, transparency is the key to protecting the environment. The more people are able to consult environmental information, the better the environment will be protected. Therefore the *public* is defined in a broad fashion covering natural and legal persons, and, in accordance with national legislation or practice, their associations, organisations or groups.[18] Access rights are not limited to citizens of the state party; they apply equally to non-citizens and non-residents.

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15. Article 4(1) of the Aarhus Convention.

16. Articles 4(3) and 4(4) of the Aarhus Convention.

17. Article 5 of the Aarhus Convention.

18. Article 2(4) of the Aarhus Convention.

The definition of environmental information under the Aarhus Convention covers information on the state of the environment, factors that may affect the elements of the environment and the state of human health and safety.[19] Requests for information on the environmental impact of nuclear projects are often covered by the Aarhus Convention simply because such information may be classified as "environmental". For example, public authorities will be under an obligation to inform the public of radiation levels on its territory in case of an incident or in case of a rumoured incident that occurred on or outside its territory and should not keep this information confidential. The convention specifically provides that in the event of an imminent threat to human health or the environment, all information which could enable the public to take measures to prevent or mitigate harm arising from the threat and that is held by public authority must be disseminated without delay. It should not take a rumoured incident to obtain access to nuclear information, a simple inquiry on radiation levels in the neighbourhood of a nuclear power plant or a demand for detailed information on the safety features of a new radioactive waste storage or disposal facility also need to be honoured.

1.3 Public participation in nuclear decision making

In most industrialised countries consultation with the public is considered to be a critical step whenever decisions are taken on nuclear energy projects requiring permits or licences such as the construction of a radioactive waste management facility or the decommissioning of a nuclear reactor. Participation by the public and local communities helps considerably to build public trust and confidence in the decision-making process which in turn reduces the risk of "decision deadlock" on the basis of "not-in-my-backyard" (NIMBY) syndromes. Participating in nuclear decision making may range from attending public

19. The Aarhus Convention defines "environmental information" as any information in written, visual, oral, electronic or any other material form on: (a) The state of elements of the environment, such as air and atmosphere, water, soil, land, landscape and natural sites, biological diversity and its components, including genetically modified organisms, and the interaction among these elements; (b) Factors, such as substances, energy, noise and radiation, and activities or measures, including administrative measures, environmental agreements, policies, legislation, plans and programmes, affecting or likely to affect the elements of the environment within the scope of subparagraph (a) above, and cost-benefit and other economic analyses and assumptions used in environmental decision-making; (c) The state of human health and safety, conditions of human life, cultural sites and built structures, inasmuch as they are or may be affected by the state of the elements of the environment or, through these elements, by the factors, activities or measures referred to in subparagraph (b) above.

hearings to participating in preliminary studies on nuclear energy projects.[20] The *public* is to be interpreted largely meaning the general public but also environmental experts or environmental interest groups.

The Espoo Convention is the primary international environmental law instrument addressing public participation. Contracting parties must ensure that environmental impact assessments (EIA)[21] are undertaken with public participation before authorising proposed activities that are likely to cause a significant adverse transboundary impact. An EIA is a procedure that ensures that the environmental implications of decisions are taken into account before the decisions are made. The process involves an analysis of the likely effects on the environment of a project, recording those effects in a report, undertaking a public consultation exercise on the report, taking due account of the comments and the report when taking the final decision and informing the public about that decision afterwards.[22]

The Espoo Convention applies to projects in a wide range of sectors including, *inter alia*, oil refining, electricity generation, iron and steel smelting, waste disposal, pulp and paper manufacturing and mining. The Chernobyl disaster in 1986 left no doubt that nuclear accidents can have a major transboundary impact and it is not surprising, therefore, that the Espoo Convention applies to all major nuclear facilities and activities: nuclear power stations and other nuclear reactors[23] and installations solely designed for the production or enrichment of nuclear fuel, for the reprocessing of irradiated

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20. For an overview of different forms of public participation in the nuclear field in Canada, see Berger, S., "Environmental Law Developments in Nuclear Energy", *Nuclear Law Bulletin* No. 81 (2008/1), p. 59. For an overview of the various meanings given to "public participation" by national legislatures, see the Topical Report of the Working Group on Radioactive Waste Management in *Proceedings of the Nuclear Inter Jura Congress Brussels*, 2007. For an overview of different forms of public participation in licensing procedures in a few European countries, see Pelzer, N. and Bischof, W., "Comparative Review of Public Participation in Nuclear Licensing Procedures in Certain European Countries", *Nuclear Law Bulletin* No. 19 (1977/1), p. 53.

21. United States: environmental impact statement (EIS).

22. The Espoo Convention provides no guidance on what is meant by "taking due account of the comments of the public", an omission which could lead to conflicts in its future implementation.

23. Except research installations for the production and conversion of fissionable and fertile materials, whose maximum power does not exceed 1 kilowatt continuous thermal load.

nuclear fuel or for the storage, disposal and processing of radioactive waste. EIAs are used increasingly as the primary tool for stakeholder involvement in the nuclear energy field and they have become an essential instrument in preventing undesirable environmental effects that could arise from the implementation of a nuclear project.

In principle, an EIA will focus mostly on physical impacts on the environment, but it is also used as a vehicle for identifying and addressing societal concerns such as the safety of nuclear installations. Each contracting party to the Espoo Convention likely to be affected by a proposed project must be notified of it and is entitled to enter into consultations with the party of origin concerning, *inter alia*, the potential adverse transboundary environmental impact of the proposed activity and measures to reduce or eliminate that impact.[24] Members of the public in the areas likely to be affected by the proposed project must also be given the opportunity to participate in relevant EIA procedures that is equivalent to that provided to the public of the party of origin.[25]

Unlike the Espoo Convention, the Aarhus Convention does not specifically address transboundary impacts of nuclear activities. Apart from access to information provisions, it specifically obliges public authorities to give the public the right to participate in decisions on activities that may have a significant effect on the environment and that are subject to a permit.[26] Public participation procedures shall include reasonable time frames allowing sufficient time for informing the public about such elements, such as the site and the physical and technical characteristics of the proposed activity, its potential effects on the environment, a description of the measures envisaged to prevent or mitigate its effects and an outline of the main alternatives for the activity that would have a less adverse effect on the environment. The public shall have reasonable time to prepare and participate effectively during the environmental decision making; and in the decisions due account shall be taken of the outcome of the public participation.[27]

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24. Articles 3-6 of the Espoo Convention. "Party of origin" means the contracting party or parties to the Espoo Convention under whose jurisdiction a proposed activity is envisaged to take place (Article 1 of the Espoo Convention).

25. Article 2(6) of the Espoo Convention.

26. Article 6 of the Aarhus Convention.

27. Article 6(3) and 6(8) of the Aarhus Convention.

The right to participate in environmental decision making under the Aarhus Convention applies to permits for a wide range of activities, both nuclear and non-nuclear, including the construction, operation and decommissioning of nuclear power plants, reprocessing facilities, enrichment facilities, radioactive waste storage and final disposal facilities. It also applies to any change of the operating conditions of the facility, such as the refurbishment of reactors. Contrary to the right of access to environmental information that may be invoked without an interest having to be stated, the right to participate in environmental decision making under the Aarhus Convention is only open to the public "concerned" meaning the public affected or likely to be affected by, or having an interest in, the environmental decision making. Non-governmental organisations promoting environmental protection and meeting national law requirements are deemed to have such an interest.[28]

Legislation on public participation in environmental decision making tends to focus on the project level. However, in many countries there is now a tendency to involve the public at an even earlier stage in the decision-making process. This is true, in particular, in the development of new policies, laws and regulations, as illustrated in the nuclear field when Greenpeace obtained a High Court ruling against the British government's consultation process regarding its nuclear power policy. A 2003 Energy White Paper issued by the government had noted that before any decision was taken to build more nuclear power stations there would be the fullest public consultation. In 2006, the government decided in a report that "nuclear has a role to play in the future UK generating mix". Greenpeace argued in court that the government had failed to live up to its promise and denied their legitimate expectation that there would be such proper consultation before making its decision to support new nuclear build. The High Court agreed and granted an order quashing the government's decision.[29]

The Kiev Protocol is a good example of countries' concerns with an "early consultation" procedure. In 2003, the Espoo Convention was supplemented by the Protocol on Strategic Environmental Assessment ("Kiev Protocol" or "SEA Protocol") which will, once it enters into force, require its state parties to evaluate the consequences of their "plans and programmes" that

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28. Articles 2(5) and 6 of the Aarhus Convention.

29. For a description of the case, see Salter, I., "The Queen on the application of Greenpeace Ltd. *v* Secretary of State of Trade and Industry" in *Proceedings of the Nuclear Inter Jura Congress Brussels*, 2007.

are likely to have significant environmental effects in a broad range of sectors, including nuclear.[30]

Strategic environmental assessments (SEA) occur at an earlier stage of the decision-making process than EIA's but the distinction with the latter is not always very clear. The basic idea is that a SEA shall be carried out for plans and programmes which set the framework for future development consent for specific projects subject to EIA's and that may have an impact on the environment. By way of example, a SEA will apply to a national radioactive waste management plan and would probably have to cover all strategies that may impact the environment: reprocessing or not, release *versus* containment, direct disposal or extended storage and transmutation, reversible or final geologic storage etc. An EIA will apply to each specific radioactive waste management project that is launched on the basis of the national plan.[31]

Under the Kiev Protocol, parties planning to develop a nuclear programme shall ensure that all relevant stakeholders are consulted, that means consulting the public, national, regional and local environmental and health authorities, and other contracting parties likely to be affected by the transboundary impacts of the plan. The Kiev Protocol requires public participation at a very early stage in the decision-making process as this is when all options are still open.[32] Governments must therefore make draft plans or programmes and accompanying strategic environmental assessment reports available to the public in order to give the latter an opportunity to express its views within a reasonable time, take those views duly into account and inform the public of the decision and of the reasons therefore.

2. Nuclear law protecting the environment

2.1 Principles of environmental law

As set out in the introduction of this article, environmental law made its appearance in the nuclear field both directly and indirectly. It did so by making

30. According to Article 2(5) of the SEA Protocol, the plans and programmes must be required by legislative, regulatory or administrative provisions and subject to preparation and/or adoption by an authority or prepared by an authority for adoption, through a formal procedure, by a parliament or a government.

31. For a more detailed analysis of the impact of EIAs and SEAs on the nuclear field, see the Topical Report of the Working Group on Radioactive Waste Management in *Proceedings of the Nuclear Inter Jura Congress Brussels*, 2007.

32. See Article 8 of the Kiev Protocol.

nuclear activities *directly* subject to international and national legal instruments aimed at protecting the environment. This was addressed under Chapter 1. But it also did so *indirectly* by introducing the concept of environmental protection into nuclear law which will be addressed in the current chapter.

Several principles that form the basis of environmental law have inspired nuclear law. To copy the words of Article 15 of the Rio Declaration, the precautionary principle means that 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. The fundamental purpose of any regulatory regime is to balance social risks and benefits. Where the risks associated with an activity outweigh the benefits, priority must be given to protecting public health, safety, security and the environment.[33] If a balance cannot be achieved, the rules of law including those of nuclear law should require action favouring protection. The precautionary approach is at the origin of environmental impact assessments and strategic environmental assessments. Both serve as a planning tool for nuclear decision makers and the public to ensure that the impact on the environment of nuclear projects and plans is properly assessed and mitigating factors are considered. A precautionary approach is also reflected in the application of the ALARA principle ("as low as reasonably achievable") which is an important concept in exposure to radiation and other occupational health risks. This compromise is well illustrated in radiology. The application of radiation can help the patient by providing doctors with a medical diagnosis, but the exposure should be reasonably low enough to keep the statistical probability of cancers (stochastic effects) below an acceptable level and to eliminate deterministic effects (e.g. skin reddening).

Closely related to the precaution principle is the principle of preventive action which requires operators and states to prevent environmental damage or at least to limit or control activities that may cause environmental damage. The preventive principle was not a new concept for nuclear lawyers. The principle was at the origin of nuclear law because its primary objective is to promote the exercise of caution so as to prevent all kinds of damage that might be caused by the use of nuclear technology and to minimise adverse effects resulting from nuclear incidents. However, until the development of environmental law, the preventive principle in nuclear law focused on avoiding personal injury and property damage rather than environmental damage.

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33. Stoiber, C., Baer, A., Pelzer, N., Tonhauser, W., Handbook on Nuclear Law, 2003, IAEA, p. 6.

The polluter pays principle establishes the requirement that the costs of pollution should be borne by the person, operator or government causing the pollution. The principle is not new to nuclear lawyers either. The international nuclear liability conventions that were developed in the 1960s have all been built on the desire to channel liability for third party damage to the operator of the nuclear installation that caused the damage. What is new is that the second generation of nuclear liability conventions that have been adopted in the 90s and in the beginning of the 21st century and that have been influenced by environmental law now also explicitly take into account an operator's liability for damage related to the environment.

The principle of co-operation or good-neighbourliness requires states to co-operate, exchange information and consult each other in matters affecting the environment because the environment is not restricted to man-made national boundaries. The nuclear community is fully aware of the international dimension of nuclear energy and of the potential transboundary effects of its activities. Governments of countries with nuclear programmes therefore decided to collaborate extensively with each other, either on a bilateral basis or in the framework of activities co-ordinated by the International Atomic Energy Agency or the OECD Nuclear Energy Agency to enhance the safety of their nuclear activities. Indeed, lessons learned in one state can be highly relevant to improving the nuclear safety in another one. Already in the early 1960s international conventions have been adopted regarding nuclear third party damage to ensure compensation of such damage on national territory as well as on foreign territory. Actually, one of the remarkable features of the development of nuclear liability law is that it not only accompanied, but in fact, preceded the inception of a civilian nuclear industry. Parallel to the preventive principle, it is under the strong influence of environmental law and of the Chernobyl disaster that states started to open their eyes to the harmful effects which nuclear activities may have to the environment, both on national and foreign territory, and agreed to provide for its enhanced protection under nuclear law.

The principle of sustainable development is another one that is found expressly or implicitly in many environmental treaties. As defined in the Brundtland report, it refers to the development that meets the needs of the present without compromising the ability of future generations to meet their own needs.[34] Applied to the nuclear field, it implies the need to preserve

34. The Brundtland Report is often considered to be its source for becoming a broad global policy objective, report published by the World Commission on Environment and Development in 1987, www.un-documents.net/wced-ocf.htm.

uranium resources as well as all other natural resources that may be affected by radioactive emissions for the benefit of future generations ("intergenerational equity"). It also involves the aim of exploiting uranium in a manner which is deemed sustainable or prudent or appropriate. It relates to the equitable use of uranium meaning that use by one state must take account of the needs of other states ("intragenerational equity"), as well as to the need to ensure that environmental considerations are integrated into economic and policy plans and programmes for developing nuclear. The sustainable development principle is particularly at stake in discussions regarding the management and final disposal of radioactive waste, in particular long-lived, high-level radioactive waste.

2.2 Prevention of environmental damage caused by nuclear incidents

Today, the primary objective of nuclear law is "to provide a legal framework for conducting activities related to nuclear energy and ionizing radiation in a manner which adequately protects individuals, property and the environment".[35] Nuclear law thus aims to prevent the occurrence of damage as a result of nuclear activities. However, for a long time states took the position that *nuclear damage* only meant personal injury and property damage. It was not until after the 1986 Chernobyl accident that they agreed to formally extend this narrow definition to cover the harmful effects of ionizing radiation on the environment as well.

The first line of defence against environmental damage is, of course, the prevention of nuclear accidents by continual reinforcement of nuclear safety programmes. The 1994 Convention on Nuclear Safety turned the protection of the environment into one of its principal objectives.[36] The aim of the convention is to legally commit participating states operating land-based nuclear power plants to maintain a high level of safety by setting international benchmarks to which states would subscribe. The convention is an incentive instrument. It is not designed to ensure fulfilment of obligations by contracting parties through control and sanction but is based on their common interest to achieve higher levels of safety which will be developed and promoted through regular meetings of the parties.

The 1997 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management recalls the Rio Declaration

35. Stoiber, C., Baer, A., Pelzer, N. and Tonhauser, W., *op. cit.*, p. 5.

36. Article 1 of the Convention on Nuclear Safety.

and also turns environmental protection into one of its goals.[37] The Joint Convention largely copies the principles of the Nuclear Safety Convention but has a different scope. It applies to spent fuel and radioactive waste resulting from civilian nuclear reactors and applications and to spent fuel and radioactive waste from military or defence programmes if and when such materials are transferred permanently to and managed within exclusively civilian programmes, or when declared as spent fuel or radioactive waste for the purpose of the convention by the contracting party.

The 2003 Code of Conduct on the Safety and Security of Radioactive Sources as well as the 2004 Code of Conduct on the Safety of Research Reactors, which establishes best practice guidelines for the licensing, construction and operation of nuclear research reactors, are both non-binding instruments. Both recognise the need to protect individuals, society as well as the environment from the harmful effects of possible accidents and malicious acts involving radioactive sources.

The second line of defence against environmental damage is effective damage mitigation through continual improvement of emergency response performance. The 1986 Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency was a ground breaker in that it was the first international nuclear law convention to provide in its opening provision that contracting parties shall protect life, property *and* the environment from the effects of radioactive releases.[38] The convention sets out an international framework for co-operation among contracting parties and with the IAEA to facilitate prompt assistance and support in the event of nuclear accidents or radiological emergencies. It requires states to notify the IAEA of their available experts, equipment and other materials for providing assistance.

Holding nuclear operators liable for the costs of measures to prevent or reduce environmental damage may be considered the third line of defence. International nuclear third party liability legislation has considerably evolved towards protecting the environmental as a result of the Chernobyl accident. In many legal systems the amount of compensation awarded for damage resulting from a tort will be reduced if the claimant has failed to take reasonable measures to avoid or mitigate that damage. It therefore seemed appropriate to

37. Article 1 but also Articles 4, 7, 8, 11, 13-15, 17 and 24 of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

38. Article 1 of the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency.

the negotiators of the revised and new international nuclear liability conventions that those instruments contain provisions requiring that compensation be paid for the costs of preventive measures such as, for example, costs incurred by a government to remove nuclear substances from a ship that has sunk along its coastline, in order to prevent environmental damage, where the ship owner fails to do so itself.

This second generation of nuclear liability conventions provide four guiding principles to define the extent to which the costs of preventive measures shall be compensated.[39] First, only measures that aim to prevent significant environmental damage come into play and the competent court will decide whether the damage is significant or not.[40] Secondly, preventive measures must be reasonable, again according to the decision of the competent court; this means that the measures must be appropriate and proportionate having regard to all circumstances, for example the nature and extent of the risk of environmental damage, the extent to which preventive measures are likely to be effective at the time they are taken and relevant scientific and technical expertise. The test of *reasonableness* is designed to discourage speculative claims. The preventive measures must also have been taken after a nuclear incident or after an event creating a grave and imminent threat of nuclear damage has occurred. The burden of proof that a nuclear incident has occurred or at least that there was an event creating a grave and imminent threat of environmental damage will be on the person seeking compensation for the cost of taking the preventive measures. Thirdly, if the measures preventing environmental damage are taken by private persons, they must have been approved by the competent authorities in the state in which the measures have been taken if such approval is required under the law of that state. Finally, such measures will only be compensated to the extent determined by the law of the competent national court.[41]

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39. See Article I(1) of the 1997 Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage; Article I of the Convention on Supplementary Compensation for Nuclear Damage and Article 1(a) of the 2004 Protocol to Amend the Paris Convention on Third Party Liability in the Field of Nuclear Energy.

40. According to the conventions the competent court is the court of the contracting state in whose territory the nuclear incident occurred.

41. This means that the extent of compensation for measures to prevent environmental damage is left to the competent court to determine. It does not mean that such compensation is optional.

2.3 *Compensation of environmental damage caused by nuclear incidents*

If the three lines of defence to prevent environmental damage are unsuccessful, then compensation for "nuclear damage" suffered will be the next step. International nuclear law has developed over the last 50 years and during most of its history its main focus has been on compensating damage to people and property. Protection of the environment has only made an occasional appearance, and the international conventions on nuclear third party liability amply illustrate this point. Under the 1960 Paris Convention on Third Party Liability in the Field of Nuclear Energy and the 1963 Vienna Convention on Civil Liability for Nuclear Damage, the notion of nuclear damage is understood to cover personal injury and property damage causally related to a nuclear incident. The conventions do not refer to environmental damage at all.

However, that does not necessarily mean that such damage is not compensable under the conventions. Both instruments leave it to the competent national court to decide upon what constitutes *property damage*. This is done intentionally, given the wide divergence of tort law principles and jurisprudence in the countries parties to these conventions. Some countries have adopted a sufficiently broad interpretation of *property damage* so as to include environmental damage while others have not. The Vienna Convention even envisages a second possibility for covering environmental damage under the heading "any other loss or damage so arising or resulting if and to the extent that the law of the competent court so provides".[42] Damage to the environment may thus be compensated under the Vienna Convention if the applicable national law so provides.

Most of the impetus for expanding the concept of nuclear damage under the international nuclear liability conventions came from the stark realisation that a major nuclear accident could have both severe and far-reaching consequences, a realisation that resulted from the 1986 Chernobyl accident. That accident surprised the world by the magnitude of its effects and focused attention on several heads of damage additional to the more conventional categories of illness, death and property damage. One of the most important of these new heads was damage to the environment. The 1997 Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage, the 1997 Convention on Supplementary Compensation for Nuclear Damage ("CSC") and the 2004 Protocol to Amend the Paris Convention on Nuclear Third Party Liability ("the second generation of nuclear liability conventions") now all hold nuclear operators liable for the cost of measures of reinstating a significantly

42. Article I(1)(k) of the Vienna Convention on Civil Liability for Nuclear Damage.

impaired environment or for economic loss arising from an economic interest in the use or enjoyment of the environment that has been significantly impaired due to a nuclear incident.[43]

2.3.1 Environmental damage

The second generation of nuclear liability conventions renders nuclear operators liable for certain costs of measures to reinstate an impaired environment. Unlike for example the EU Environmental Liability Directive (2004),[44] the conventions do not give a definition of environmental damage or impaired environment. Of course the notion is a controversial one. First of all, it is very difficult to determine such impairment because the extent of damage cannot be assessed in money. Fresh air, clean water and healthy birds have no market value. This idea is clearly confirmed by the insurance sector. Insurers argue that almost all forms of environmental liability are currently uninsurable mainly due to a lack of financial quantification and evaluation. They are not willing to cover that risk because of the absence of information on crucial elements, such as the time to remedy environmental damage, the standard and quality of any remedy of damage, the pre-existing standard of the damaged environment and future

43. See the definitions of nuclear damage in Article 1 of the 1997 Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage, the Convention on Supplementary Compensation for Nuclear Damage and the 2004 Protocol to Amend the Paris Convention on Third Party Liability in the Field of Nuclear Energy.

44. Under the EU Environmental Liability Directive *environmental damage* means (a) damage to protected species and natural habitats, which is any damage that has significant adverse effects on reaching or maintaining the favourable conservation status of such habitats or species. The significance of such effects is to be assessed with reference to the baseline condition, taking account of the criteria set out in Annex I. Damage to protected species and natural habitats does not include previously identified adverse effects which result from an act by an operator which was expressly authorised by the relevant authorities in accordance with provisions implementing Article 6(3) and (4) or Article 16 of Directive 92/43/EEC or Article 9 of Directive 79/409/EEC or, in the case of habitats and species not covered by Community law, in accordance with equivalent provisions of national law on nature conservation; (b) water damage, which is any damage that significantly adversely affects the ecological, chemical and/or quantitative status and/or ecological potential, as defined in Directive 2000/60/EC, of the waters concerned, with the exception of adverse effects where Article 4(7) of that Directive applies; (c) land damage, which is any land contamination that creates a significant risk of human health being adversely affected as a result of the direct or indirect introduction, in, on or under land, of substances, preparations, organisms or micro-organisms.

regulatory requirements. To date, nuclear operators in most countries are therefore unable to obtain the financial security required to cover their liability for such damage.

The competent court is called upon by the nuclear liability conventions to help solve this problem. If the impaired environment cannot be reinstated, it is not clear how environmental damage will be compensated. However, if the impaired environment can be reinstated, such measures of re-instatement will cost money. The court may use this monetary assessment as guidance and the compensation will be limited to the costs of measures of reinstatement.

The amount of these costs will indeed depend upon the extent to which the environment is to be reinstated. Imagine that several species of birds in the Bay of Somme, the *Walhalla* of French ornithologists, are contaminated after an incident in a nuclear fuel reprocessing plant in the Normandy, France. Different options exist to reinstate the fauna, each of them at a different cost: for example, all birds in the nature reserve could be replaced by new birds of the same type; alternatively, only certain protected species of birds that have been contaminated to such an extent that their survival is in danger could be replaced, while the others would remain in the nature reserve; another option would be to acquire an alternative non-contaminated site with the same types of birds as the ones that have been contaminated.[45]

The second generation of nuclear liability conventions leave it to the competent court to determine to what extent a damaged environment should be reinstated after a nuclear incident, and hence what will be the costs to be borne by the nuclear operator. However, the contracting parties were concerned about opening the doors to a wide range of claims for environmental damage coming from an equally wide variety of claimants. Therefore, they decided to give guidance to judges by requiring that measures to reinstate the environment must comply with several conditions in order to be compensable. These guiding principles help define this new head of damage and intend to make it operable.

45. The following example does not relate to a nuclear incident but illustrates the idea of purchasing an alternative ecosystem. In order to compensate the "loss" of the ecological characteristics on the 180 ha site at Cadarache, the French public authorities obliged the project company of the international ITER project on nuclear fusion to purchase and manage 480 ha of land with similar characteristics elsewhere in France.

First, the costs for reinstating the environment should be compensated to the extent that they have not already been compensated as "property damage".[46] For example, measures taken by a farmer whose land has been contaminated will be included, in most cases, in the concept of property damage but measures taken in respect of areas owned by the general public may be covered. Secondly, reinstatement measures must fall within the definition of "reasonable" measures.[47] Such measures are defined as those which, according to the law of the competent court, are appropriate and proportionate to the nuclear damage suffered or the risk of such damage, to their likely degree of success and to relevant scientific and technical expertise. It is again upon the competent court to determine whether the reinstatement measures fall into this definition of reasonable measures. Another condition is that the measures must have been approved by the authorities of the state where they have been taken.[48]

Finally, nuclear operators will only be liable for the costs of measures to reinstate an environment that is "significantly" impaired, leaving it to the competent court to determine whether the impairment is significant.[49]

The nuclear liability conventions oblige nuclear operators to pay the costs of measures to reinstate an impaired environment. "Reinstating the environment" is defined as reinstating or restoring damaged or destroyed components of the environment or introducing, where reasonable, the equivalent of these components in the environment.[50] However, the conventions

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46. Article 1(a)(vii) of the 2004 Protocol amending the Paris Convention, Article I(1)(k) of the 1997 Vienna Convention on Civil Liability for Nuclear Damage and Article I(f) of the 1997 Convention on Supplementary Compensation for Nuclear Damage.

47. Article 1(a)(viii) and (x) of the 2004 Protocol amending the Paris Convention, Article I(1)(m) and (o) of the 1997 Vienna Convention on Civil Liability for Nuclear Damage and Article I(g) and (l) of the 1997 Convention on Supplementary Compensation for Nuclear Damage.

48. Article 1(a)(viii) of the Protocol amending the Paris Convention, Article I(1)(m) of the Vienna Convention on Civil Liability for Nuclear Damage and Article I(g) of the Convention on Supplementary Compensation for Nuclear Damage.

49. Article 1(a)(vii) of the Protocol amending the Paris Convention, Article I(1)(k) of the Vienna Convention on Civil Liability for Nuclear Damage and Article I(f) of the Convention on Supplementary Compensation for Nuclear Damage.

50. Article I(g) of the Convention on Supplementary Compensation for Nuclear Damage, Article 1(viii) of the Protocol Amending the Paris Convention on Nuclear Third Party Liability and Article I(1)(m) of the Vienna Convention on Civil Liability for Nuclear Damage.

fall short of explaining what is meant by "restoring components of the environment" or by "introducing the equivalent of these components in the environment" and again leave it up to the competent court to determine it.[51] So which one of the three options is to be considered for reinstating the fauna that was impaired as a result of our hypothetical accident in the Normandy? In other words, what will be the costs of reinstating the environment? Perhaps the approach reflected in other legal instruments, such as the EU Environmental Liability Directive or those comprising the civil liability regime for oil pollution might provide help to the competent court in this regard.

The EU Environmental Liability Directive establishes a framework whereby biodiversity damage, water damage and land damage are prevented and remedied through a system of operator's liability.[52] The directive distinguishes between damage to water or biodiversity and damage to land.[53] Remediation of damage to water or biodiversity is achieved through the restoration of the environment "to its baseline condition", meaning the condition at the time of the damage of the natural resources and services that would have existed had the environmental damage not occurred, estimated on the basis of the best information available. Remediation of land damage means, at the very minimum, that relevant contaminants are removed, controlled, contained or diminished in such a way that the contaminated land, taking into account its current use or approved future use at the time of the damage, "no longer poses any significant risk of adversely affecting human health". The approach of the EU Environmental Liability Directive derives from the general attitude of a legislature on how an unimpaired environment should be re-established.

51. See for example the Explanatory Texts to the Vienna Convention and the 1997 Convention on Supplementary Compensation; Pelzer, N., "Learning the Hard Way: Did the Lessons Taught by the Chernobyl Nuclear Accident Contribute to Improving Nuclear Law", in *International Nuclear Law in the Post-Chernobyl Period*, Joint NEA-IAEA Report, p. 105; Wagstaff, F., "The Concept of Nuclear Damage under the revised Paris Convention", in Pelzer (ed.) *Internationalisierung des Atomrechts*, Tagungsbericht der AIDN/INLA *Regionaltagung 2004 in Celle*, Baden-Baden 2005, p. 197 *et seq.*; Soljan, V., "The New Definition of Nuclear Damage in the 1997 Protocol to Amend the 1963 Vienna Convention on Civil Liability for Nuclear Damage", in *Reform of Civil Nuclear Liability, Budapest Symposium 1999*, p. 59 *et seq*.

52. The EU Directive introduces a stricter regime than that covered by the international nuclear liability conventions but it is not applicable to environmental damage caused by a nuclear incident in respect of which liability or compensation falls within the scope of these conventions.

53. See Annex II to the directive.

On the other hand, the civil liability regime for oil pollution set forth in the 1969 International Convention on Civil Liability for Oil Pollution Damage stipulates that compensation for impairment of the environment, other than loss of profit from such impairment, shall be limited to the costs of reasonable measures of reinstatement actually undertaken or to be undertaken.[54] The convention does not explain what is meant by "reinstating" the environment, but the IOPC Funds have, over the years, been involved in the settlement of claims arising out of numerous incidents and have developed certain principles as to the interpretation of that definition.[55] The main principles are reproduced in the IOPC Fund 2008 Claims Manual. It appears from the manual that what is deemed possible under the EU Environmental Liability Directive, at least for damage to water and biodiversity, would not be possible for oil pollution. The manual acknowledges that it is virtually impossible to bring a damaged site back to the same ecological state that would have existed had the oil spill not occurred and that therefore the aim of any reasonable measures of reinstatement should be to re-establish a biological community in which the organisms characteristic of that community at the time of the incident "are present and are functioning normally".[56]

Judges may find inspiration in both legal instruments. They might choose to adopt either one of the two interpretations provided by the EU Environmental Liability Directive and the oil pollution regime, depending on what component of the environment is being reconsidered, or perhaps they will select some other approach altogether. According to Dr. Soljan, bringing the environment back to its condition prior to the nuclear accident is certainly not an option since "the desire to restore the environment to its condition prior to the nuclear incident shall be subject to the rule of reason".[57]

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54. See Article 1 of the International Convention on Civil Liability for Oil Pollution Damage.

55. The IOPC Funds are intergovernmental organisations which provide compensation for oil pollution damage resulting from spills of persistent oil from tankers. For more information, see Jacobsson, M., "The Concept of Pollution Damage in the Maritime Conventions Governing Liability and Compensation for Oil Spills" in *Reform of Civil Nuclear Liability, Budapest Symposium* 1999, p. 37.

56. 2008 International Oil Pollution Compensation Fund Claims Manual, p. 35.

57. Soljan, V., "The New Definition of Nuclear Damage in the 1997 Protocol to Amend the 1963 Vienna Convention on Civil Liability for Nuclear Damage", in *Reform of Civil Nuclear Liability, Budapest Symposium*, 1999, p. 77.

2.3.2 Loss of income deriving from an economic interest in the environment

The second generation of nuclear liability conventions also holds nuclear operators liable for the loss of income arising from an economic interest in an environment which has been significantly impaired and the loss of which is not related to loss of or damage to property. This category of economic loss is sometimes labelled as "pure economic loss" because it is not related to any property damage suffered by a person. For example, tourists may stay away from a particular holiday resort because the public beach used by the resort is contaminated by radiation. Since the owner of the resort is not the owner of the beach, the fact that the beach is contaminated does not constitute a loss of or damage to the resort owner's property. Yet it will almost certainly result in a loss of income to the resort owner who will be entitled to compensation if he can show a sufficient economic interest in the use or enjoyment of the damaged environment. Another example is the economic loss suffered by fishermen as a result of the contamination by radiation of the fish in the sea. The sea does not belong to the fisherman but he has an economic interest in the sea that would be affected because of the radiation contamination of the fish.

Parallel to compensation of costs to reinstate an impaired environment, the second generation of nuclear liability conventions introduces restrictions on the compensation for this new head of damage. First, loss of income arising from an economic interest in any use or enjoyment of the environment must only be compensated to the extent determined by the law of the competent court.[58] Therefore, the extent of compensation may differ from one country to another depending upon what is provided for under national law. For example, it may be interpreted narrowly in one country, to include only recognised legal rights in any use of the environment, and extensively in another country, to include all claims where a certain form of economic interest may be established. Secondly, it will only be taken into account if incurred as a result of a significant impairment of the environment and only insofar as not included as property damage.

Unlike the revised Vienna Convention and the CSC, the revised Paris Convention requires the economic interest to be "direct".[59] This qualification is intended to ensure that compensation will not be awarded for nuclear damage

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58. Article 1(a)(vii) of the 2004 Protocol amending the Paris Convention, Article I(1)(k) of the 1997 Vienna Convention on Civil Liability for Nuclear Damage and Article I(f) of the 1997 Convention on Supplementary Compensation for Nuclear Damage.

59. Article 1(a)(vii)(5) of the 2004 Protocol amending the Paris Convention.

that is too remote. The fishermen in the example cited above may be compensated for their loss of income, but a retailer who normally sells the catch of those fishermen and who loses business will receive no compensation for his loss because it is too remote in the chain of causation. Of course, the question on where to draw the line between recoverable claims and those which should be dismissed for reasons of remoteness of what might be called economic proximity will be a hard nut to crack, but the courts will be guided by national law in this endeavour.

The revised Vienna Convention stipulates that where, in respect of claims brought against the nuclear operator, the total damage to be compensated exceeds, or is likely to exceed the maximum financial liability amounts of the conventions, priority in the distribution of the compensation shall be given to claims in respect of loss of life or personal injury.[60] The revised Paris Convention is less explicit about priority of compensation. It maintains the provision of "equitable distribution" that is contained in its original version and leaves this matter up to national law to decide.

3. Does nuclear law really protect the environment?

According to the *Handbook on Nuclear Law*, the primary goal of nuclear law is to provide a legal framework for conducting activities related to nuclear energy and ionizing radiation in a manner which adequately protects not only individuals and property but also the environment.[61] Several of the international nuclear law conventions that we have mentioned under Chapter 2 also claim the protection of the environment to be one of their main objectives. Surprisingly neither the Handbook nor any of these conventions defines the environment or explains what protecting the environment actually means. It is therefore worth examining whether nuclear law indeed protects the environment?

The impact of radiation on the environment is a complex concept that is still subject to a lot of questions. With regard to certain components of the environment, mammals in particular, scientific knowledge of radiation effects does exist, since the stochastic effects on humans have not only been evaluated from human epidemiological studies, but also from animal experiments. However, the effects of radiation on other species and on flora are currently not as well known due to the lack of definitive studies. The main reason for this absence of definitive studies may well be culturally related. Protecting the

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60. Article VIII(2) of the 1997 Vienna Convention on Civil Liability for Nuclear Damage.

61. C. Stoiber, A. Baer, N. Pelzer and W. Tonhauser, *op. cit.*, p. 5.

environment is a rather recent concern of governments in industrialised countries. Traditionally, the Western world, including the nuclear community, has adopted a very anthropocentric approach when dealing with the risks of industrial activities, as illustrated by the positions of the International Commission on Radiological Protection.

The International Commission on Radiological Protection (ICRP) is an international advisory body providing recommendations and opinions on all aspects of protection against ionizing radiation. Its guidance is widely recognised and is implemented into national nuclear legislation throughout the world. The ICRP has addressed the radiological protection of the environment in several of its recommendations. ICRP Publication 26, issued in 1977, states in paragraph 14:

> "[T]he level of safety required for the protection of all human individual is thought likely to be adequate to protect other species, although not necessarily individual members of those species. The Commission therefore believes that if man is adequately protected then other living things are also likely to be sufficiently protected."

In its Publication 60 (ICRP 1991), issued in 1990, it stipulates in paragraph 16:

> "The Commission believes that the standard of environmental control needed to protect man to the degree currently thought desirable will ensure that other species are not put at risk. Occasionally, individual members of non-human species might be harmed, but not to the extent of endangering whole species or creating imbalance between species. At the present time, the Commission concerns itself with mankind's environment only with regard to the transfer of radionuclides through the environment, since this directly affects the radiological protection of man".

Both statements are indicative of the very anthropocentric approach adopted by the radiation protection community towards protecting the environment. The basic attitude of the ICRP has been that measures which adequately protect human beings adequately protect the environment by definition (*"protéger l'homme, c'est protéger l'environnement"*). Although many specialists still believe that this assessment is valid, events in the non-nuclear field of human activities show that protecting man does not automatically imply protection of the environment. The ozone stratospheric depletion as a result of human use of chlorofluorocarbons (CFCs), which are non-toxic chemicals for humans but have caused significant damage to our natural environment, serves to illustrate this.

Two other examples also reflect the anthropocentric approach of nuclear law, the IAEA Safety Standards and more particularly the International Basic Safety Standards on the one hand and the IAEA Safety Glossary on the other hand.

The Safety Standards of the IAEA are rules that are applicable throughout the entire lifetime of nuclear facilities and activities utilised for peaceful purposes and to protective actions to reduce existing radiation risks. They have been published by the IAEA for over 50 years and reflect an international consensus on what constitutes a high level of safety for protecting people and the environment. The standards are binding on the IAEA in relation to its own operations; international conventions contain similar requirements to those in the standards, thereby making them binding on contracting parties. In hierarchical order, the IAEA's safety standards first comprise *safety fundamentals* establishing fundamental safety objectives and principles of protection and safety, then *safety requirements* establishing the requirements that must be fulfilled to ensure safety for particular activities or applications and finally *safety guides* providing recommendations and guidance on how to comply with the requirements. The International Basic Safety Standards (BSS) establish basic requirements for the protection against the risks associated with the exposure to ionizing radiation and for the safety of radiation sources and were published for the first time in 1962. The preamble of the current edition, the 1996 BSS, leaves no doubt as to its perspective:

> "The scope of the Standards is limited to the protection of human beings only; it is considered that standards of protection that are adequate for this purpose will also ensure that no other species is threatened as a population, even if individuals of the species may be harmed".

The second example is provided by the IAEA Safety Glossary. The IAEA Safety Glossary encompasses terminology used in nuclear safety and radiation protection. It defines and explains technical terms used in IAEA safety standards and other safety related IAEA publications and provides information on their usage. The glossary was published for the first time in 2000. Its 2007 edition defines "radiation protection" as the protection of people from the effects of exposure to ionizing radiation and the means for achieving this. The definition makes no reference to protecting the environment at all.

This traditional anthropocentric approach of nuclear law has impacted the drafting of international conventions and has limited an effective and full breakthrough in nuclear law of the principles that are at the heart of environmental law. Transparency of information and public participation in decision making are critical elements of environmental governance since the public is considered to be the best guardian of the interests of the environment. But provisions relating to access to environmental information and public participation in environmental decision making have only been incorporated hesitantly in nuclear law. Already in 1972 the United Nations Stockholm Declaration and later, in 1992, the Rio Declaration served as driving forces for the adoption of international and national legal instruments on access to environmental information and public participation in decision making. However, it was only 25 years later that a binding international legal instrument addressing the public's right to access information and to participate in decision making was adopted specifically for the nuclear field.[62]

A quick glance at the provisions on stakeholder involvement in international nuclear law conventions also highlights a few striking differences with the approach adopted under environmental law conventions. Article 17 of the Nuclear Safety Convention addresses stakeholder involvement, and a similar obligation is contained in Article 6 of the Joint Convention.

Article 17 of the Nuclear Safety Convention holds that:

> "Each contracting party shall take the appropriate steps to ensure that appropriate procedures are established and implemented for consulting contracting parties in the vicinity of a proposed nuclear installation, insofar as they are likely to be affected by that installation and, upon request providing the necessary information to such contracting parties, in order to enable them to evaluate and make their own assessment of the likely safety impact on their own territory of the nuclear installation".

The obligation for stakeholder involvement under both international nuclear law conventions only benefits other contracting parties in the vicinity of a proposed installation insofar as they are likely to be affected by it. Consultation with the public is entirely left to the discretion of the affected contracting parties. Also despite their containing an obligation to carry out an environmental assessment appropriate to the hazard presented by the nuclear facility, neither the Nuclear Safety Convention nor the Joint Convention

62. The Joint Convention makes informing the public about the safety of spent nuclear fuel and radioactive waste management facilities mandatory. It is surprising to note that the Nuclear Safety Convention which was adopted only a few years earlier does not stipulate that information regarding the safety of nuclear facilities must be made available to the public.

mentions any public involvement in that assessment.[63] Finally, hardly any guidance or rules are given on procedures or documents to be exchanged for stakeholder involvement to be successful.

This approach differs significantly from the one under the international environmental law conventions, not only in terms of the type of stakeholders that need to be consulted but also in terms of the procedure that needs to be respected and the level of detail on the information to be exchanged with stakeholders, as illustrated by some of the articles of the Espoo Convention:

> "The party of origin shall provide […] an opportunity to *the public* in the areas likely to be affected to participate in relevant environmental impact assessment procedures regarding proposed activities and shall ensure that the opportunity provided to the public of the affected party is equivalent to that provided to the public of the party of origin".[64]

> "For a proposed activity […] that is likely to cause a significant adverse transboundary effect, the party of origin shall […] notify any party which it considers may be an affected party as early as possible *and no later than* when informing its own public about that proposed activity".[65]

> "The notification *shall contain*, *inter alia*: (i) information on the proposed activity, including any available information on its possible transboundary impact, (ii) the nature of the possible decision, and (iii) an indication of a reasonable time within which a response […] is required, taking into account the nature of the proposed activity".[66]

> "The parties shall ensure that, in the final decision on the proposed activity, *due account is taken* of the outcome of the environmental impact assessment, including the environmental impact assessment documentation, *as well as* the comments thereon received pursuant to […] and the outcome of the consultations".[67]

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63. Article 17 of the Nuclear Safety Convention and Articles 6, 8, 13 and 15 of the Joint Convention.

64. Article 2(6) of the Espoo Convention, emphasis added.

65. Article 3(1) of the Espoo Convention, emphasis added.

66. Article 3(2) of the Espoo Convention, emphasis added.

67. Article 6(1) of the Espoo Convention, emphasis added.

> "The party of origin shall provide to the affected party the final decision on the proposed activity along with *the reasons and considerations on which it was based*".[68]
>
> "Information to be included in the environmental impact assessment documentation shall, as a minimum, contain, …: (a)…, (b) …, (c) …, (d) …, (e) …, (f) …, (g) ..., (h) …, (i) …".[69]

Another element that allows highlighting the weaker stakeholder involvement provisions under nuclear law is the conduct of environmental impact assessments. The Nuclear Safety Convention and the Joint Convention both oblige to organise environmental impact assessments.[70] While the former one is silent about the point in time when such assessments need to be conducted, the latter stipulates that the environmental assessment must be carried out "before construction" of a radioactive waste management facility or spent nuclear fuel management facility.[71] The international environmental law conventions appear to be much stricter on the timing of environmental impact assessments compared to their nuclear law counterparts. Both the Espoo Convention and the Aarhus Convention require that such assessment take place much earlier in the decision-making process, "prior to the decision" of the competent public authority permitting the activity to take place.[72]

4. Outlook

The nuclear community in industrialised countries has traditionally adopted a rather anthropocentric approach when dealing with the risks of nuclear activities. This is reflected by the focus of nuclear law on protecting people and property. Public awareness of the harmful effects of certain industrial activities in particular following the 1986 Chernobyl accident has led to a growing tendency for environmental regulation to also cover the nuclear field. The principles of environmental law entered the nuclear field both directly by making nuclear activities subject to international environmental law but also indirectly by introducing the concept of environmental protection in

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68. Article 6(2) of the Espoo Convention, emphasis added.

69. Appendix II of the Espoo Convention, emphasis added.

70. Article 17 of the Nuclear Safety Convention and Articles 6, 8, 13 and 15 of the Joint Convention.

71. Articles 8(i) and 15(i) of the Joint Convention.

72. Articles 1(v) and 2.3 of the Espoo Convention and Articles 6(1), 6(2), 6(3) and 6(4) of the Aarhus Convention.

international nuclear law. Recent international law developments relating to transparency of nuclear information, public participation in nuclear decision making and prevention of and compensation for environmental damage caused by nuclear incidents are proof that environmental law is now in evidence in the nuclear field.

The influence of environmental law has not yet succeeded in ensuring that the environment is effectively protected by international nuclear law. However, its significance is increasing steadily. This evolution may be noticed in the changing attitude of the radiation protection community. The authors of the Safety Fundamentals, published in 2006 under Safety Standards Series No. SF-1, clearly question the traditional anthropocentric approach of nuclear law by recognising in Principle 7 that:

> "Whereas the effects of radiation exposure on human health are relatively well understood, albeit with uncertainties, the effects of radiation on the environment have been less thoroughly investigated. The present system of radiation protection generally provides appropriate protection of ecosystems in the human environment against harmful effects of radiation exposure. The general intent of the measures taken for the purposes of environmental protection has been to protect ecosystems against radiation exposure that would have adverse consequences for populations of a species (as distinct from individual organisms)".[73]

Another indication that nuclear law is undergoing a reform that aims no longer at protecting only human beings and property but also the natural environment is given by the 2007 edition of the ICRP Recommendations (ICRP 103). The new version of the recommendations now contains a specific chapter on the protection of the environment acknowledging that the commission is aware of the growing need for policy advice and guidance on the protection of the environment.[74] The commission subscribes to the global needs and efforts required to maintain biological diversity, to ensure the conservation of species, and to protect the health and status of natural habitats and communities but acknowledges that, in contrast to human radiological protection, the objectives of environmental protection are both complex and difficult to articulate. The ICRP also indicates its intentions to develop a clearer framework in order to assess the relationships between exposure and dose, between dose and effect

73. IAEA Safety Fundamentals No. 1, jointly sponsored by Euratom, FAO, IAEA, ILO, IMO, OECD/NEA, PAHO, UNEP and WHO, Vienna, 2006, www-pub.iaea.org/MTCD/publications/PDF/Pub1273_web.pdf.

74. Chapter 8, ICRP Recommendations 103, 2007.

and the consequences of such effects for non-human species on a common scientific basis. It was also decided to set up a specific committee (ICRP Committee 5) to address radiological protection of the environment.[75]

Bearing in mind the words of the French writer Victor Hugo that "progress is nothing more than a friendly revolution",[76] it is important that nuclear law experts help guide the further development of environmental law and its impact on nuclear activities in order to encourage a growing symbiosis between nuclear and environmental law. In an effort to increase public acceptance for nuclear activities, a better account of environmental protection and stronger public involvement in nuclear decision making may prove essential to reconcile nuclear energy with its users in the 21st century.[77]

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75. The initial ideas of the committee have been published in ICRP Publication 108, Environmental Protection: the Concept and Use of Reference Animals and Plants. The report is often referred to as the RAP report.

76. Speech by Victor Hugo, July 1876.

77. In this regard, see Reyners, P., "Le droit nucléaire confronté au droit de l'environnement: autonomie ou complémentarité?", *Revue québécoise de droit international*, p. 149-186, 2007; Léger, M., "Perspectives du droit nucléaire", *Proceedings of the Colloquium on the Past, Present and Future of the Nuclear Law Committee*, 2007.

The International Legal Framework on Nuclear Safety: Developments, Challenges and Opportunities

*by Wolfram Tonhauser and Anthony Wetherall**

Since the establishment of the International School of Nuclear Law ("ISNL") in 2001, much has been done by the international nuclear community, in particular, under the auspices of the International Atomic Energy Agency ("IAEA"), to strengthen the international legal framework on nuclear safety.[1]

However, in more recent years the international nuclear community has experienced a period of dynamic change. A significant number of countries – many for the first time and mostly from the developing world – are seeking to

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1. Noteworthy in this connection is the award to the IAEA and its IAEA Director General, Dr. Mohamed ElBaradei, of the Nobel Peace Prize for 2005 by the Norwegian Nobel Committee for "their efforts to prevent nuclear energy from being used for military purposes and to ensure that nuclear energy for peaceful purposes *is used in the safest possible way*." Press Release, The Nobel Peace Prize for 2005, Oslo, 7 October 2005 (emphasis added).

pursue civil nuclear power programmes in their efforts to find sustainable and secure energy solutions.

Introducing such a programme is clearly a complex matter requiring even closer international co-operation to ensure that this is done properly. Also, establishing the needed national safety infrastructure is a lengthy process including the development of a comprehensive and adequate national nuclear legislative framework and building the competencies of the nuclear stake-holders.

In this 10th anniversary publication of the ISNL, the first part of this paper describes some new developments since 2001 aimed at adapting the international legal framework on nuclear safety to a changing environment.

The second part of this paper identifies certain challenges that the renewed interest in nuclear energy and the global nature of today's nuclear activities pose. But it also submits that these challenges provide an opportunity to further strengthen and enhance the international nuclear safety framework.

Part 1 New developments

During recent years, nuclear safety has improved significantly, as shown by a wide range of national and international safety indicators. Yet, the need for continuous improvement and new thinking in response to the challenges posed today, clearly reinforces the understanding that nuclear safety should always be considered as a work in progress.

The key elements of the present international legal framework on nuclear safety are its legally binding and non-binding international instruments. To date, there are four international legally binding instruments in this area: the Convention on Early Notification of a Nuclear Accident, the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, the Convention on Nuclear Safety, and the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. However, since the adoption of these instruments the international legal framework on nuclear safety has been broadened through an alternative approach to the normative control of nuclear risks by the adoption of two non-legally binding codes of conduct, namely the Code of Conduct on the Safety and Security of Radioactive Sources and the Code of Conduct on the Safety of Research Reactors. Also, efforts have been underway to increase transparency and international co-operation and co-ordination on nuclear safety amongst states and with the IAEA and other relevant international organisations, as well as to strengthen the effective implementation of the key legal instruments.

Further, increased emphasis on the synergies of nuclear safety and security in recent years has lead to the vision of a so called consolidated *global nuclear safety and security regime*.[2] This vision is being helped by a number of IAEA General Conference resolutions which continue to acknowledge the inter-relationship between safety and security and the effect that a well-developed regulatory safety system in a given country has on ensuring the security of radioactive material.[3] Similarly, a number of IAEA documents have also acknowledged the need to take account of the synergies between safety, security and safeguards when integrating relevant features of national legal and regulatory systems.[4]

While all of the above reflect general trends within the nuclear community to enhance nuclear safety worldwide, following are some concrete and new developments to enhance the scope and effectiveness of the international legal framework on nuclear safety which have taken place since 2001. Admittedly, looking at these new developments in isolation, they appear not to be significant but taken together, they reflect a much more proactive approach by the nuclear community than before to react to a changing nuclear safety world.

1. Expansion of the practical operation of the international emergency preparedness and response system

The ability to adequately respond to a nuclear or radiological emergency continues to remain a central element of the international legal framework on nuclear safety. Participation in an international system of emergency preparedness and response provides the practical means by which this can be achieved. The legal foundations of the system, first and foremost, derive from the Convention on Early Notification of a Nuclear Accident and the Convention

2. A key example of the recognised inter-relationship and synergies of safety and security is the Code of Conduct on the Safety and Security of Radioactive Sources, this being the first international legal instrument to specifically address in a combined manner safety and security. The IAEA continues to explore opportunities for synergies and inter-relationships between safety and security, such as the joint session of the Commission on Safety Standards and the Advisory Group on Nuclear Security.

3. For example GC(53)/RES/10 (2009) and GC(52)/RES/9 (2008).

4. See for example the Nuclear Security Plan 2010-2013 (GOV/2009/54-GC(53)/18). The synergies of safety and security are also being considered in a separate INSAG report, entitled, “Safety and Security Interface in Nuclear Installations”, IAEA, Vienna (in preparation).

on Assistance in the Case of a Nuclear Accident or Radiological Emergency (the "Early Notification and Assistance Conventions").[5]

These two conventions, adopted over twenty years ago, continue to successfully serve as the basis for the system to function. However, the scope of the Early Notification Convention is limited to the obligation to notify other states parties (and the IAEA) of "nuclear accidents" as foreseen therein. Today's realities, such as the rise in terrorism and the increased threat of malicious acts involving radioactive material or devices or attacks against nuclear facilities, require greater co-operation and transparency and an enhanced legal basis. Consequently, in accordance with relevant decisions and resolutions of the IAEA policy-making organs (i.e. the Board of Governors and the General Conference), the scope of the practical operation of the system and the role of the IAEA Incident and Emergency Centre has been expanded. Moreover, supporting the implementation of the Early Notification and Assistance Conventions, a number of other relevant documents, plans, mechanisms and practical arrangements have been developed. Their establishment and subsequent revision serve to facilitate not only the implementation of the legal obligations within the scope of the conventions but, reflecting the aforementioned developments and concerns, also to go further and beyond their scope.

In fact, the IAEA's Incident and Emergency System, although only by way of non-binding supporting documents, now covers not only "nuclear accidents" as provided for in the Early Notification Convention but also timely notification and response in the event of nuclear or radiological emergencies resulting from "criminal or intentional unauthorised acts" from which a release of radioactive material occurs or is likely to occur and that could be of radiological safety significance for another state.

2. Increasing transparency and openness in peer reviewing the safety of nuclear power plants and the safety of radioactive waste management and spent fuel management

a. Convention on Nuclear Safety

The Convention on Nuclear Safety (the "CNS") is commonly recognised as constituting the cornerstone of the international legal framework on nuclear

5. For the texts of the Early Notification and Assistance Conventions see INFCIRC/335 and INFCIRC/336, respectively.

safety.[6] Its aim is to legally commit participating states to maintain a high level of safety by setting international benchmarks for the operation of land-based nuclear power plants.

Further to the four review meetings of the contracting parties to the CNS since its entry into force,[7] it is apparent that the "peer review" mechanism is functioning well and in fact the CNS through its review meetings has now become a forum for increasingly substantive discussions on safety issues. The CNS is no longer just a triennial exercise but instead is an ongoing process that looks to continually promote the advancement of nuclear safety. Improvements to this "peer review" process include provisions for continuity between review meetings and new initiatives aimed at increasing the openness and transparency by which the CNS is implemented, such as changes to the rules and guidelines allowing for all parties to be able to attain and retain the insights and knowledge from the meetings without reservation. The public outreach activities that have been pursued through the posting of National Reports on public websites and through communications with the media likewise demonstrate the commitment to openness and transparency of the contracting parties to the CNS.

b. Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

The adoption of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (the "Joint Convention") was another important step towards establishing a comprehensive international legal framework on nuclear safety.[8] It is the first and only international legally

6. The CNS was opened for signature on 20 September 1994 and entered into force on 24 October 1996. See IAEA document INFCIRC/449. For further analysis of the negotiations of the CNS and its substantive provisions see Stoiber, C., "International Convention on Nuclear Safety: National Reporting as the Key to Effective Implementation", in Nathalie Horbach, Contemporary Developments in Nuclear Energy Law: Harmonising Legislation in CEES/NIS (1999).

7. The first review meeting was held 12-23 April 1999, the second review meeting was held 15-26 April 2002, the third 11-22 April 2005 and the fourth 14-25 April 2008. The fifth review meeting is scheduled to be held 4-14 April 2011.

8. See INFCIRC/546. The Joint Convention was adopted on 5 September 1997, opened for signature on 29 September 1997 and entered into force on 18 June 2001. For further analysis see Tonhauser, W. and Jankowitsch, O., "The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management", *Nuclear Law Bulletin* No. 60 (1997/2); and Linsley, G. and Tonhauser, W., "An Expanding International Legal Regime.

binding treaty in the area of spent fuel and radioactive waste management. The same as for its "sister" convention, the CNS, which formed the basis for its structure, the Joint Convention is also a binding commitment by states to achieve and maintain a high level of safety worldwide.

Following the entry into force of the Joint Convention in September 2001, three review meetings of contracting parties have been held.[9] As for the CNS, the "peer review" mechanism under the Joint Convention is maturing, with more constructive exchanges and knowledge sharing taking place during the third review meeting held in 2009. Also much has been done in recent years to enhance the transparency, efficiency and effectiveness of the review process of the Joint Convention. National reports are not only to a large extent made public, but the review process is now also managed through a specific website for the Joint Convention as a well established tool for communication, with questions and answers being exchanged electronically among contracting parties.

3. Broadening the scope of the framework through alternative legal approaches: codes of conduct

Although the international community has so far not adopted a new convention specifically addressing nuclear safety in a comprehensive manner, it has taken an alternative approach to the normative control of the safety of nuclear risks through the adoption of two codes of conduct and the further establishment of mechanisms aimed at strengthening their application. These codes are instruments of a legally non-binding nature prepared at the international level to offer guidance for the development and harmonisation of national policies, laws, and regulations and set forth the desirable attributes for the management of safety.

a. Radioactive sources

A key development in the context of radioactive sources was the approval by the IAEA Board of Governors and the endorsement by the IAEA General Conference in September 2003, of the revised Code of Conduct on the Safety and Security of Radioactive Sources. A basic principle of the code is that every

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Environmental Protection and Radioactive Waste Management", *IAEA Bulletin* 42, No. 3 (2000).

9. The first review meeting was held from 3-14 November 2003; the second from 15-24 May 2006; and the third from 11-20 May 2009. The fourth review meeting will be held from 7-16 May 2012.

state should have in place an effective national legislative and regulatory system of control over the management and protection of radioactive sources.

The code was revised to reflect the change in the international community's perception of threats in light of the tragic events of 11 September 2001 by including strengthened provisions relating to the security of radioactive sources and additional components concerning national registries of such sources. Further to ongoing concerns regarding the import and export of radioactive sources, a supplementary Guidance on the Import and Export of Radioactive Sources was subsequently developed and approved and endorsed in 2004 by the IAEA Board of Governors and General Conference, respectively (the "supplementary guidance").[10]

An increasing number of countries now recognise that the code provides the international (non-binding) legal foundation for radioactive source safety and security. As a counterbalance to its legally non-binding nature, states have an opportunity for political support for the implementation of the code,[11] which it received within a relatively short period of time. To date, 99 states have expressed a "political commitment" to the code and 59 states to the supplementary guidance.[12] In addition to the widespread acceptance at the national level, these instruments are also supported by several groups of countries such as the Asia-Pacific Economic Cooperation, the EU, the G8 and the Organization for Security and Co-operation in Europe.

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10. See INFCIRC/663 for the texts of the Code and Supplementary Guidance.

11. More particularly, member states were urged "to write to the Director General that [they] fully support and endorse the IAEA's efforts to enhance the safety and security of radioactive sources, [that they are] working toward following the guidance contained in the [Sources Code], and encourage[d] other countries to do the same", see operative paragraph 6 of General Conference resolution GC(47)/RES/7.B. Similarly, the 2004 General Conference encouraged states with respect to the supplementary guidance, "to act in accordance with the Guidance on a harmonized basis and to notify the Director General of their intention to do so as supplementary information to the Sources Code", see operative paragraph 8 of General Conference resolution GC(48)/RES/10.

12. The supplementary guidance also encourages states to nominate a point of contact for the purpose of facilitating the export and/or import of radioactive sources and to provide the IAEA with the details of these points of contact. To date 86 states have done this. Also, in order to facilitate the timely review of export requests, states are requested to make available to the IAEA their responses to a (confidential) self assessment questionnaire (see Annex 1). To date 47 states have completed this questionnaire.

In the same way that efforts are focused on enhancing the transparency, efficiency and effectiveness of the discussions of the review processes of the CNS and the Joint Convention, much has been achieved regarding discussions at the international level concerning the implementation of the code and supplementary guidance. There is now a formalised process for a voluntary periodic exchange of information and lessons learned and for the evaluation of progress made by states towards implementing the provisions of the code.[13]

Although the code and the Joint Convention have their own legally distinct scope, they both cover the management of disused sources and orphan sources once they are designated as radioactive waste. It was for this reason that during the most recent international meeting held in May 2010, agreement was reached that it would assist participants' preparation for future meetings on the code, if contracting parties to the Joint Convention which attend the meetings of the code, provided relevant parts of their national reports prepared for the preceding review meeting under the Joint Convention. The aim being to allow the wider group of states participating in the meeting of the code to be aware of issues faced under the Joint Convention. In the same vein, participants in the meeting of the code also felt that efforts should be made to harmonise the application of the export/import criteria under the supplementary guidance document.

b. Research reactors

The adoption of the Code of Conduct on the Safety of Research Reactors in September 2004 marks an important step towards an international nuclear safety regime for research reactors that may be considered as being comparable to that for nuclear power plants under the CNS.[14] The objective of the code is to achieve and maintain a high level of safety in civilian research reactors worldwide through the enhancement of national measures and international co-operation including, where appropriate, safety related technical co-operation.

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13. Following a request of the IAEA General Conference in 2005 [GC(49)/RES/9/A9], this process was elaborated in June 2006 and subsequently endorsed by the IAEA Board of Governors. The first international meeting on voluntary sharing information about states' implementation of the Sources Code and Supplementary Guidance was held in June 2007. An international meeting on lessons learned from states' implementation of the supplementary guidance was held in May 2008. See the respective reports of the Chairman of the meetings.

14. For the text of the Code of Conduct see General Conference document GC(48)7 of 2005.

Unlike the Code of Conduct on the Safety and Security of Radioactive Sources and its Supplementary Guidance, there is no process foreseen by which states can make "political commitments" to apply the guidance in the code.[15] Nonetheless, developments since its adoption have been aimed at strengthening its effectiveness. For example, the provisions and guidance in the code have been integrated into appropriate IAEA safety review services, technical co-operation projects and extra-budgetary programmes. Also, application of the code is being accomplished through implementation of national safety regulations.

Significantly, there was also the agreement in December 2005 to organise periodic meetings to discuss topics related to the application of the code, to exchange experience and lessons learned, to identify good practices in applying it and to discuss future plans related to its use. Similar to the process for the Code of Conduct on the Safety and Security of Radioactive Sources, a number of international meetings to discuss its application have therefore been held, most recently in October 2008.[16] In addition to exchanging information and good practices, country reports including states' self-assessments on their application were presented at the meeting. Recommendations to further enhance application include the organisation of periodic regional meetings and triennial international meetings, at a time shortly after the review meetings of the CNS, and with a similar review process. In response to recommendations, activities are therefore being implemented to improve networking between regulatory bodies and operating organisations, develop technical and safety infrastructures needed for research reactor new builds, and to address common safety issues identified from the self-assessments.

Part 2 Nuclear new build: challenges and opportunities

1. Spelling out the challenges and opportunities

Since the establishment of the ISNL in 2001, 28 reactors started commercial operation: in Romania, China, the Czech Republic, France, India, Japan, the

15. See the General Conference resolution GC(48)/RES/10/A.8 of September 2004 which welcomed the adoption of the Code by the Board of Governors in March 2004 and encouraged states to apply the guidance in the Code to the management of research reactors.

16. The IAEA Meeting of 2-5 June 2009, on the safety of research reactors under IAEA Project and Supply Agreements, recommended that member states with research reactors under such agreements should join the IAEA's follow-up system for these reactors, in particular to apply the Research Reactor Code.

Russian Federation, South Korea and Ukraine. There are now 438 nuclear power reactors in operation in 30 countries worldwide. There are also 58 reactors under construction throughout the world, the largest number since 1992. Also, notwithstanding the recent financial crisis, there generally remain ambitious plans for expansions such as those foreseen in China, Japan, India, the Republic of Korea and the Russian Federation. The recent trends of power uprates and renewed or extended licences for many operating nuclear power reactors also continued in 2009.

These developments present a significant challenge to the international nuclear community and the international safety framework. An ever growing number of IAEA member states – mostly from the developing world – are for the first time considering or have expressed to the IAEA Secretariat an interest in launching a nuclear power programme in their efforts to seek sustainable and secure energy solutions.

At the same time, there have also been other important developments: the nuclear environment is extremely dynamic and changing. The world of today is significantly different from that of when many countries acquired their first nuclear power plant. Nuclear businesses and their activities are increasingly multinational and global in nature. They are no longer confined to the borders of one country. Investors increasingly need to be able to quantify risks, including regulatory and licensing risk, before making their investment. The principal vendors seeking to market specific reactor types or designs around the world are international enterprises. Some operating organisations are multinational corporations carrying out operations in several countries. And, of course, all nuclear actors (including countries and industry) are linked to each other because the performance of each has implications for all; a serious accident, for example, can have global repercussions.

At the same time, these developments must also be seen in the light of an increasing number and complexity of international legal instruments adopted in the areas of safety, security, safeguards, non-proliferation and liability for nuclear damage.

However, the challenges that come with today's renewed interest in nuclear power as described above also present opportunities for the international nuclear community to strengthen and enhance the effectiveness of the international nuclear legal framework, including that on nuclear safety.

2. Most of the potential recipient countries are so called "nuclear new comers"

A significant challenge facing the international nuclear community is that the nuclear power option is being considered by more and more countries with currently limited or no nuclear power experience. Significantly, not all of them are able alone to provide the national infrastructure or the human resources expertise and experience required for a highly sophisticated technology like nuclear power reactors. These countries are also at various levels of capability and in some cases plans for nuclear programme development appear to be moving faster than the establishment of the required infrastructure and capacity.

But this also provides an opportunity for these countries to transform political intentions into real projects paired with adequate resources to help improve the predominantly existing weak legal frameworks and human capacity. More specifically in the area of nuclear law, the IAEA Office of Legal Affairs (OLA) implements a legislative assistance programme which includes a combination of national and regional training courses and seminars; bilateral assistance in drafting national laws, training of individuals; and the development of reference material including on the assessment and drafting of comprehensive national nuclear legislation. So far under this programme, more than 100 member states have received assistance in drafting national legislation.[17] In 2009 alone, eight international and regional workshops and seminars were organised. Further, country-specific bilateral legislative assistance by means of written comments and advice in drafting national nuclear legislation was provided to 24 member states. Finally, by mid-2010 two international and regional workshops and seminars have already been organised and country-specific bilateral legislative assistance was provided to 12 member states. As a result of these efforts more and more countries in the world have in the meantime comprehensive nuclear laws in place covering nuclear safety, security and safeguards as well as nuclear liability, thus turning what appears to be a challenge into an opportunity.

17. The IAEA General Conference also continues to "[r]equest the Director General to continue the current programme to assist Member States in developing and improving their national infrastructure, including legislative and regulatory frameworks, for nuclear, radiation, transport and waste safety", GC(53)/RES/10 (2009).

3. Nuclear businesses and their activities are increasingly multinational and global in nature

As described above, the nuclear industry is going through a period of unprecedented change.[18] For industry and investors alike, this renewed interest can be viewed through a financial and economic prism; a significant dynamic being the need to encourage investment by reducing regulatory and licensing risks.

Tackling this challenge, however, also provides an opportunity to establish a common international understanding of the key roles and responsibilities of vendor countries and industry (and potential recipient countries) with respect to nuclear safety and to subscribe to and implement relevant international instruments. Particularly, adherence to the CNS and the Joint Convention will ensure that countries implement a comprehensive regime that maintains a high level of safety according to international benchmarks and that all nuclear-related installations are operated in a safe manner. Also, such actions will be viewed as an important "confidence building measure" to potential vendor countries and industry and will serve on the national, regional and international levels as a positive assurance to the public, neighbouring countries and the international nuclear community of the intention of a potential recipient country concerning its nuclear power programme.

4. An increasing number and complexity of international legal instruments

Finally, a further challenge facing the international nuclear community is the continuing increase in the number and complexity of international legal instruments adopted not only in the area of nuclear safety but also in the areas of nuclear security, safeguards, non-proliferation and liability for nuclear damage. Peer pressure is increasing for countries to adhere to these instruments and to implement the obligations contained therein. To facilitate this, OLA under its legislative assistance programme recognised that a new comprehensive approach was required which emphasised the inter-relationships between safety, security and safeguards, as well as nuclear liability and consequently developed – the so called "3S" approach to nuclear law. This approach not only recognises the complex technical and legal inter-relationships as well as the areas of co-existence and diversity of these international legal instruments but also provides for their practical implementation – so that they may be given effect in a

18. See also Managing Change in the Nuclear Industry: The Effects on Safety, INSAG-18, IAEA, Vienna (2003).

national legislative framework. In fact, the much-awaited Volume II of the *Handbook on Nuclear Law*[19] provides for the first time comprehensive model text covering, in one document, all areas of nuclear law for use by member states.

Further to the need for national implementing legislation to address and bring together the different branches of nuclear law and with a view to streamlining current legislative assistance efforts and consolidating the different sources of funding of the current legislative assistance programme, OLA will also establish as of 2011 a "Nuclear Law Institute" for professionals from IAEA member states. This Institute will offer a comprehensive two-week course on nuclear law to help them in developing and maintaining their national nuclear legislation. And again what appears to be a challenge is at the same time a welcome opportunity for the global nuclear safety community to improve.

Conclusion

In conclusion, developments since the establishment of the ISNL in 2001, collectively reflect a much more cognizant and proactive approach of the international nuclear community to adapt the international legal framework on nuclear safety to a changing environment.

At the same time, however, the renewed interest in nuclear power programmes, at a fast pace, poses certain challenges being mostly driven by countries with currently limited or no nuclear power experience. However, these challenges also offer opportunities in that more and more countries are bound to adhere to the relevant international legal instruments and adopt them into their national legislation through comprehensive nuclear laws covering not only nuclear safety but also nuclear security, safeguards and non-proliferation and liability for nuclear damage.

19. Expected to be available online at www.ola.iaea.org as of July 2010.

Three International Atomic Energy Agency Codes

*by Patrick Reyners**

The word code comes from the Latin Codex. It literally means the tablet on which texts are written and is particularly found in pharmacopoeia. It is a classic example of a polysemic term that can mean the symbols used to convey a message, a data encryption system, a specific behavioural standard as well as our genetic code.

In this particular instance, however, it is its first meaning as a collection of regulatory provisions which naturally concerns us. The term was used under the Roman Empire, in the famed Justinian Code, although it can be traced back to the 17th Century B.C. and the Babylonian Code of Hammurabi, a compilation of judicial decisions that can be admired by visitors to the Louvre museum in Paris. In more recent times, we are all familiar with the Napoleonic Code or even the sinister *Code Noir* which regulated the trade of negroes. Today, the term code remains in everyday use in many countries, whether compiling legislative and statutory texts on the same subject (*Code de la Santé* in France) or classifying them in a coherent manner (U.S. Code of Federal Regulations).

The second meaning of the term code, namely a set of precepts laying down the law in the area of morality and taste (thus Voltaire speaks of maxims

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that should be mankind's code) is also of interest to us because it reflects an approach that has become common in contemporary society with the increasing number of ethical charters. Lawyers are not the last to have drawn inspiration from this and particular mention can be made of the Code of Professional Responsibility of the American Bar Association. Similarly, and shifting the focus back to the nuclear industry, there is the example of the Code of Conduct relating to the Prevention of Accidents in Nuclear Facilities and other Industrial Activities, laid down by the Nuclear and Industrial Safety Agency (NISA) in Japan in 2001.

Along the same lines, but without the term code being used, is the adoption in 2000 within the World Association of Nuclear Operators (WANO) of a good practice programme designed to promote tried and tested techniques and procedures to improve their safety performances. Similarly, in 2004 the Institute of Nuclear Power Operations (INPO) in the United States of America developed Principles for a Strong Nuclear Safety Culture, which is also akin to an ethical approach. Lastly, let us remind ourselves for the record that, in the 1990s, the French Section of the International Nuclear Law Association (INLA), spurred on by Pierre Strohl, had considered drawing up a code of good practice for companies in the nuclear industry but this project was ultimately shelved.

It is interesting to note, incidentally, that the term code of good conduct or practice (both terms are used with apparently no substantial difference in meaning) tends to maintain a certain ambiguity between its ethical role (subjectively right) or legal role (objectively right).

Returning to the regulatory field of the nuclear industry, and before addressing the work of specialised organisations, it should be noted that the codes technique has been used on several occasions by other international organisations. Hence there is the Code of Practice: Radiation Protection of Workers (Ionizing Radiations) adopted by the International Labour Organization (ILO) in 1987, supplementing C 115 Radiation Protection Convention and R 114 Radiation Protection Recommendation in 1960, the Code of Safety for Nuclear Merchant Ships drawn up by the International Maritime Organization (IMO) in 1981 and also the broader International Maritime Dangerous Goods Code (radioactive materials are Class 7). Lastly, within the framework of the Codex Alimentarius of the Food and Agriculture Organization of the United Nations (FAO), there are the 1989 Codex Alimentarius Commission Guidelines Levels for Radionuclides in Foods following Accidental Nuclear Contamination for Use in International Trade, associated with the consequences of the Chernobyl accident.

Use of codes of conduct within the specialist nuclear organisations

A brief overview of the regulatory framework specific to Euratom and the NEA is given below before turning to address the real subject of this study, which is the IAEA.

European Atomic Energy Community (Euratom)

The provisions establishing the framework for regulatory action by the European Atomic Energy Community with regard to health protection are set out in Chapter 3 of the Euratom Treaty and aim to "establish uniform safety standards to protect the health of workers and of the general public and ensure that they are applied".

As we know, secondary Community law[1] comprises regulations which have general application and are directly applicable, directives which are themselves legally binding as to the results to be achieved while leaving member states the choice of the methods used to transpose them into national law, decisions which are binding themselves but on an *ad hoc* basis and recommendations or opinions which have no binding force. The Commission does not appear to have used the format of codes of conduct or good practice in this range of regulatory actions.

OECD Nuclear Energy Agency (NEA)

The relevant provision of the OECD/NEA Statute is Article 8(b)(i) under which the Steering Committee may "submit to the participating countries recommendations or common rules to serve as a basis for harmonizing national laws and regulations". In practice, and leaving aside the case of the nuclear third party liability rules where the NEA Steering Committee has specific powers under the Paris Convention, the Agency has chosen to co-sponsor publication of certain standards in the field of radiation protection and safety with the other competent international organisations rather than adopting its own specific rules and promotes action within its expert committees to harmonise the regulatory policy of its member countries. It does not seem to have used the codes of conduct method either.

1. Previously based on Article 161 of the Euratom Treaty, now amended by the Treaty of Lisbon, see Article 106a of the Euratom Treaty in connection with Articles 288, 296 of the Treaty on the Functioning of the European Union.

International Atomic Energy Agency (IAEA)

Article III.A.6 of its Statute gives the IAEA the power to establish – and in some cases apply – "standards of safety for protection of health and minimization of danger to life and property (including such standards for labour conditions)…". On the basis of this relatively narrowly defined mandate, the Vienna Agency has gradually built up a considerable body of normative instruments in the field of radiation protection and safety as well as transport and nuclear safety. To that end, it has developed a system of classifying these norms, distinguishing:

- Safety Fundamentals which, as their name suggests, set out the basic principles to be complied with for the safe development of nuclear energy (approval by the IAEA Board of Governors);

- Safety Requirements laying down the conditions for applying the objectives and principles contained in the Safety Fundamentals (also approved by the Board of Governors);

- Safety Guides recommending actions or procedures for complying with the Safety Requirements (published under the authority of the IAEA Director General).

Irrespective of the terminology, these various types of norms share the common feature of not being binding on the member states, who are simply asked to use them within the framework of their domestic regulations. Under the Nuclear Safety Standards (NUSS) Programme,[2] which was the initial phase of the IAEA's normative activity from 1974 through to the late 1990s, the IAEA did use the term code for some texts similar in content to the guides category that give practical advice on how to implement the technical standards

2. See on this subject: Rautenbach, J., Tonhauser, W. and Wetherall, A., "Overview of the International Legal Framework governing the Safe and Peaceful Uses of Nuclear Energy in International Nuclear Law in the Post-Chernobyl Period", OECD/NEA (2006), p. 13, note No. 20.

issued by the Agency,[3] but they cannot be considered as standing entirely alone for that reason.[4]

In contrast, this article will focus on a distinct category of IAEA codes, examining the circumstances of their adoption, their content and objectives as well as the question of their legal status. Before so doing, the author would like to pay tribute to the extremely comprehensive and informative study of these codes of conduct by Anthony Wetherall, Legal Officer at the IAEA. This study has drawn widely on that work, particularly with regard to the strictly legal aspects.[5]

Such IAEA Codes will be reviewed in their chronological order of publication:

- Code of Practice on the International Transboundary Movement of Radioactive Waste, adopted by the IAEA General Conference on 21 September 1990 (INFCIRC/386).

- Code of Conduct on the Safety and Security of Radioactive Sources, adopted by the IAEA General Conference on 9 September 2003 (replacing a previous version of the code dating back to 2001) (INFCIRC/663).

- Code of Conduct on the Safety of Research Reactors, adopted by the General Conference in March 2004 (GOV/2004/4, published by the IAEA in 2006).

Code of Practice on the International Transboundary Movement of Radioactive Waste

This code is unlike the other two codes in that it does not concern nuclear safety. As its name indicates, it addresses a specific aspect of radioactive waste management, namely the conditions under which radioactive waste should be

3. See on this subject the comments of Szasz, P., in his seminal work on the IAEA: "The Law and Practices of the International Atomic Energy Agency", *IAEA Legal Series* No. 7, Vienna (1970), pp. 660 *et seq.*

4. As a relatively recent example: "Nuclear Safety Standards for Land-Based Stationary Nuclear Power Plants with Thermal Nuclear Reactors: Code of Practice and Safety Practice" (1988).

5. Wetherall A., "Normative Rule Making at the IAEA: Codes of Conduct", *Nuclear Law Bulletin* No. 75 (2005/1), OECD/NEA, pp. 71 *et seq*.

moved from one country to another. The circumstances of its development also reveal another motive.

Development

On 22 March 1989, the Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, known as the Basel Convention, was opened for signature. During the negotiation process, a difference of opinion emerged between those countries which thought that international law did not ensure adequate surveillance of radioactive waste movements[6] and those that were reluctant for the convention to legislate in the nuclear field. This confrontation was to result in Article 1(3) which excludes from the scope of the convention "wastes which, as a result of being radioactive, are subject to other international control systems, including international instruments, applying specifically to radioactive materials". The issue raised by this compromise is in fact that no such instrument existed at the time of adoption of the Basel Convention.[7] Development of the Code of Practice does therefore go some way to filling that gap, but not far because it is merely a recommendation. It was at a later stage (1997) that the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management would, in Article 27 on transboundary movements, convert the principles set out in the code into positive law.

As is the IAEA's usual practice, development of the code was entrusted to a group of experts appointed by the interested governments (twenty in this case) and also including representatives from the competent international organisations. In its resolution approving the code, the General Conference asked the IAEA Director General to take all necessary steps to ensure its wide dissemination. However, this request appears not to have been followed by practical initiatives encouraging member states to integrate the content of the

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6. At this time, illegal disposal of hazardous waste (including radioactive waste) was being alleged in certain third world countries, particularly West Africa, and the stir caused by these allegations led to the banning of such activities under the 1989 Lomé Convention and the 1991 Bamako Convention. See on this subject, Reyners, P., "*Le droit nucléaire confronté au droit de l'environnement: Autonomie ou complémentarité*", in *Revue québecoise de droit international,* special issue (2007).

7. It should be noted, however, that the Safety Principles and Technical Criteria for the Underground Disposal of High-Level Radioactive Waste, *IAEA Safety Series 99* (1989), state that there should be no discrimination with regard to safety standards in respect of the populations of neighbouring countries in the event of releases of radioactive substances.

code into their domestic policies and regulations but, here too, this objective was subsequently achieved through the Joint Convention.

Content

States should base themselves on the guidelines contained in the code which the group of experts "decides" (rather odd wording coming from a mere group of experts and also given the expressly consultative nature of these standards). They have generally been reproduced in the Joint Convention and thus only a basic overview of their main provisions will be given here.

Every state involved in the international transboundary movement of radioactive waste should ensure that:

- This movement is undertaken in accordance with international safety rules and that an appropriate regulatory framework exists beforehand.

- This movement takes place only with the prior notification and consent of the receiving or transit state (and the sending state).

- No receiving state should permit such a movement unless it has the regulatory and technical capacity to manage and dispose of the waste transferred in accordance with international safety standards and that the sending state should satisfy itself that this requirement is met.

- The sending state is asked to make provision in its domestic regulations permitting re-admission of waste into its territory when the above requirements cannot be met.

- Lastly, all the states concerned are asked to co-operate at the bilateral, regional or international level for the purpose of preventing any movements that are not in conformity with the requirements of the code.

Every state retains the right to prohibit the movement of radioactive waste on its territory. There is, however, a footnote stating that the code should not be interpreted as imposing any restriction on maritime or air navigation freedom, in accordance with international law.

To conclude on this subject, the IAEA's role is conventionally that of collecting and disseminating the necessary information in the field of radioactive waste management, particularly on the basis of the requirements of the developing countries, and reviewing the code in the light of technological progress.[8]

Code of Conduct on the Safety and Security of Radioactive Sources

Until fairly recently, the IAEA was preoccupied by the safety of nuclear installations and had paid relatively little attention to the issue of the safety – and even less the security – of radioactive sources, despite publication in 1996 of a text in the Safety Fundamentals Series (Radiation Protection and the Safety of Radiation Sources). The conference held in Dijon (France) in September 1998 on the safety of radiation sources and security of radioactive materials[9] marked a turning point in this respect. The reports submitted to the conference highlighted the inadequacy in many countries of the institutional and legal framework necessary to manage these sources. In the wake of that meeting, a resolution of the IAEA General Conference [GC(42)/RES/12] asked the Secretariat to submit a report on how national systems could be improved in this area and on the feasibility of formulating international undertakings to that effect. The question of the legal status of any instrument governing the management of radioactive sources was thus raised right at the outset. As pointed out by Katia Boustany in an article on the draft code, the choice of such an instrument "raises the question of what such a tool could add to the normative setting"[10] of the IAEA.

Development

The Code of Conduct was developed in two stages. A first version of the code was approved in September 2000. Then, in accordance with the IAEA Action Plan for the Safety and Security of Radioactive Sources, revised in September 2001, a group of legal and technical experts conducted a review of the code, in particular to verify its effectiveness and also to take account of the increased concern about the problem of the safety of radioactive sources in light of the events of 11 September 2001 in New York. This work was to culminate in the current text of the code, adopted in September 2003.

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8. See on the subject of the code a note by Reyners, P., in *Yearbook of International Environmental Law*, Vol. 1 (1990), Part II, pp. 139-144.

9. Safety of Radiation Sources and Security of Radioactive Materials, Proceedings of Conference, IAEA (1999).

10. "A Code of Conduct on the Safety of Radioactive Sources and the Security of Radioactive Materials: A New Approach to the Normative Control of a Nuclear Risk?", *Nuclear Law Bulletin* No. 65 (2000/1), OECD/NEA, p. 7.

The third stage was approval of the Guidance on the Import and Export of Radioactive Sources by the General Conference in September 2004 and its subsequent publication (IAEA/CODEOC/IMP-EXP/2005). This guidance aims to give interested countries highly systematic and practical supplementary information on the best means of controlling international movements of Category 1 and 2 sources. Appended to the guidance is an optional self-assessment questionnaire designed to facilitate the review of practices which the interested states are requested to make available to the IAEA.

Content

The code is original in that it integrates both the safety and security aspects of the sources (defined as being radioactive material that is permanently sealed in a capsule for direct use). This supplements the international normative framework, since the radioactive materials covered by the Convention on the Physical Protection of Nuclear Material (as amended in 2005) are not, with the exception of sources incorporating plutonium-239, those to which the code applies. The sources are listed in Annex 1 of the code in three categories of decreasing order of dangerousness.

The purpose of the code is stated in Part II (scope and objectives) as i) to promote a high level of safety and security in the management of sources, ii) to prevent any unauthorised access or possession, and theft, loss etc. of such sources so as to reduce the likelihood of accidental harmful exposure to radiation or malicious use causing harm to individuals, society or the environment and iii) to mitigate the radiological consequences of such events.

Part III of the code (basic principles) sets out in detail the arrangements which the states must make to ensure the safety and security of sources: general principles; putting in place a legislative and regulatory system; establishing a national register of radioactive sources; creation, competencies and responsibilities of the body responsible for regulation, authorisation and control of the use of sources (regulatory body). In addition to this there are specific requirements relating to the import and export of sources, broadly based on the corresponding provisions of the 1997 Joint Convention (Article 27). Similarly, Article 28 of the Joint Convention concerning disused sealed sources has its equivalent in the code. Information on the role of the IAEA completes the code. These are the normal measures relating to dissemination of the code and collection of information on its application. However, it should be noted that there is no mention of the special arrangements decided by the General Conference which will be set out at a later date.

The provisions of the code, particularly with regard to the role of the regulatory body and the management of sources, are too detailed to undertake a systematic analysis of them in this brief article. In fact, the code is a manual of sorts but addressed almost exclusively to member states and their public bodies and not to the many direct users of radioactive sources, even though the code does place the "prime responsibility" for the management of sources on the persons granted the authorisations and recommends that states inform them on the measures to be taken to ensure the safety and security of the sources. This is a point which was criticised by Katia Boustany in the article mentioned above in note 10.

Such a criticism can be specifically aimed at the provisions on import and export because contractual type agreements between suppliers (most often foreign), buyers and users of sources are involved in this particular case (the same applies to the "guidance").

A special feature of the code already mentioned is the inclusion of security measures to reduce the likelihood of malicious acts. Each state is thus asked to define the "domestic threat" and assess its vulnerability with respect to this threat for the variety of sources used within its territory.

From a legal standpoint, the Code of Conduct is a collection of simple recommendations. Its emerging as a simple code during a post-Chernobyl period of reinforcement of the international safety regime, given effect by the adoption of the Convention on Nuclear Safety in 1994 and the Joint Convention in 1997, may seem a retrograde step in this instance, a point made by Messrs. Rautenbach, Tonhauser and Wetherall in their joint paper mentioned above.[11] In his paper on normative rule making at the IAEA, Anthony Wetherall, for his part, notes that "by its very nature, a code is an instrument of soft law – and thus is not legally binding *per se*. Yet, such a code does represent efforts by governments to formulate certain expectations and induce certain behaviour".[12]

This tension between the desire to harmonise the practice of states and their reluctance to be legally bound by texts which are both complex and ambitious may explain the choice of process adopted by the General Conference in September 2003 (GC47/RES/7.B). It asked each member state to write to the Director General undertaking to support the IAEA's efforts to enhance the safety and security of radioactive sources and to comply with the requirements of the code (this procedure does not refer to the "guidance"). The Director

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11. *Op. cit.*, p. 32, see note 2.

12. *Op. cit.*, p. 72, see note 5.

General is then responsible for publishing a list of the states that have agreed to make this "political commitment". Perhaps worried by the boldness of this approach, the General Conference did feel it necessary to specify in its resolution that this procedure would remain "exceptional", with no legal force and could not constitute a precedent for other codes of conduct (and it has in fact remained unique to date). At present, a hundred or so member states have agreed to write to the Director General giving their commitment.

In addition, a three-yearly mechanism for information exchange and assessment of the code between interested countries was introduced by the IAEA General Conference in 2006 [GC(49)/RES/9]. The first meeting was held in 2007[13] and ever since this practise is conducted with success, the last conference having taken place in May 2010.

Code of Conduct on the Safety of Research Reactors

Development

The adoption of this code by the Board of Governors in March 2004 and its endorsement by the IAEA General Conference in September of that same year [GC(48)7] was the culmination of several years of work.

First, it will be remembered that the negotiators of the 1994 Convention on Nuclear Safety (CNS) had chosen to limit the scope of this convention to power reactors only, thus excluding the category of research reactors, which exist in considerable numbers and variety, including in many countries with no nuclear programme. In the absence of any formal international agreement, the question of developing a normative instrument to handle this family of nuclear installations was raised.

Back in 1998, the International Nuclear Safety Group (INSAG) had raised its concerns on the safety of research reactors with the IAEA Director General and, in 2000, it had suggested that the Vienna Agency develop a protocol (to the CNS) or another equivalent legal instrument to address this problem.

The IAEA's response was to implement an international research reactor safety enhancement plan. A key part of this plan was the preparation of a code

13. McIntosh, S., "Implementation of the Code of Conduct on the Safety and Security of Radioactive Sources: The June 2007 Information Exchange Meeting", Proceedings of the 2007 INLA Congress, Bruylant, Brussels (2008).

of conduct. An open-ended working group of legal and technical experts got to work and its meetings culminated in the final version of the code in 2004.

Content

Since the code of conduct is in a sense a substitute for the CNS, it is structured very similarly to the convention, but with one major difference: the code addresses not only the role of states and national regulatory bodies but also the responsibilities of the operators of research reactor. On the other hand, unlike the CNS and the Joint Convention, there is no peer review mechanism.

The code's foreword states that it should serve as guidance to states for the development and harmonisation of policies, laws and regulations on the safety of research reactors. Research reactors are defined as reactors used mainly for the generation of neutron flux for research purposes, including the associated facilities. This definition includes critical assemblies. States are encouraged to make appropriate use of IAEA Safety Standards relevant to research reactors and those relating to the legal and governmental infrastructure for nuclear radiation, radioactive waste and transport safety (GS-R-1, 2000). Given that there are many very different research reactor designs, a factor that justified to not including them in the CNS, it is recommended that a gradual approach should be adopted to the application of the code commensurate with the hazard potential while maintaining a strong nuclear safety culture.

The section on the role of the state contains provisions comparable to those in the CNS and is founded on the same basic principles. However, there are some additional specific recommendations echoing the concerns of the international community with regard to the safety of research reactors in certain countries that deemed "vulnerable": the importance of taking the appropriate steps to ensure extended shutdown and decommissioning and the need to ensure the safety of the installations in the event of extended shutdown, particularly should the organisation responsible for their operation default or disappear. Inspired by a principle contained in the CNS, a reference can be found in the code to the necessary information to be provided to neighbouring states likely to be affected by an incident occurring in a research reactor.

The role of the regulatory body does not warrant full explanations as the recommendations on the subject such as siting, quality assurance, human factors etc. are broadly based on the corresponding provisions of the CNS with specific mention being again made of extended shutdown and decommissioning.

However, the code does differ from the CNS in the space given to the role of the operating organisation. The code emphasises that the prime responsibility for safety lies with the operating organisation and asks it to establish its own policies that give safety matters the highest priority and to promote a strong safety culture in its installations. The specific recommendations are based on those applicable to the regulatory body, with certain changes (from the assessment of safety to maintenance operations and emergency plans, via human and financial resources, radiation protection etc.). In addition to these general norms, there are more specific requirements covering the various stages in the life of research reactors, including once again their extended shutdown and decommissioning. Lastly, the code contains the usual provisions concerning the role of the IAEA. A point to note, however, is the emphasis on states being able to call on the Vienna Agency to assist them if they are having problems applying the code. Hence assistance services were introduced by the IAEA, such as the Integrated Safety Assessment of Research Reactors (INSARR), an Incident Reporting System for Research Reactors (IRSRR) and a database on this type of installation.[14]

Moreover, it had been envisaged when the code was being developed to ask the states concerned to submit national reports to the IAEA on its implementation, but that idea was rejected and there is also no mechanism comparable to the one introduced for the code of conduct on radioactive sources. However, at the third CNS review meeting in 2005, a separate meeting was also held in Vienna to discuss the "effective" application of the code. Short of introducing a formal peer review mechanism – which certain delegates would have liked – this meeting achieved a consensus on the expediency of holding regular international meetings to discuss questions relating to the implementation of the code, thus following the example of the meetings on application of the code on radioactive sources which are now themselves regularly held.

We are thus seeing the emergence of voluntary mechanisms for monitoring application of these codes by the interested countries, based increasingly on the sort of peer review mechanism originally introduced by the CNS.

Conclusion

Having completed this rapid review of these three codes, I am tempted myself to concur with Anthony Wetherall's generally positive judgement on this normative technique and quote an extract from his conclusions:

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14. See on this subject the above-mentioned article, p. 21, note 2.

"The variety of soft law developments in the IAEA reveals that there are effective ways of enacting international law other through the conventional treaty process. It has been demonstrated that the content of the norm, the legitimacy of the process by which it is adopted, the international context, and especially the institutional follow-up, seem to impact on state decisions to comply or not to comply with specific norms. However, the considerable recourse to and compliance with non-binding norms appears to represent a maturing of the international system for nuclear energy".[15]

As Anthony Wetherall also states, the use of codes of conduct by the IAEA is largely the result of "a lack of political will on the part of its Member States to allow more meaningful and binding international interventions for nuclear safety".[16] With reference to the sources of international law set out in Article 38 of the Statute of the International Court of Justice, namely treaties, international custom and the general principles of law, it is perhaps custom that could be said to be closest to the IAEA codes of conduct. While the states concerned might not agree on the adoption of legally binding texts, it can be seen that they can mutually consent to promote norms of (good) behaviour enjoying a certain degree of political commitment, as is particularly the case for the code on radioactive sources. There is also the possibility that these norms might be transposed into an international convention at a later point, as in the example of the code on the transboundary movement of radioactive waste. Finally, as far as the code on research reactors is concerned, the gradual shift towards mechanisms designed to actively involve countries in complying with these norms is owed more to the drive for international co-operation spearheaded by the Vienna Agency. The accompanying measures for the code on radioactive sources and the code on research reactors ultimately reflect an effort to legally harden what was originally only soft law. Taking this a step further, it is possible to agree with Katia Boustany that the problem of legal form becomes a false problem and that "legal formalism is not necessarily relevant … when it comes to accessing the effectiveness of a normative tool and of a norm vis-à-vis the behaviour it is supposed to be triggering".[17]

Furthermore, it can be seen that by renouncing any mandatory character (systematically mentioned in the foreword to the codes or in the associated resolutions), not only could a consensus be reached prior to their adoption, but

15. *Op. cit.*, note 5, at p. 92.

16. *Op. cit.*, note 5, at p. 73.

17. "The IAEA Code of Conduct on the Safety or Radiation Sources and the Security or Radioactive Materials: A Step Forwards or Backwards?", *Nuclear Law Bulletin* No. 67 (2007/1), p. 18.

the end result – and this is especially true for the radioactive sources – was achieving provisions that are more prescriptive and detailed than would doubtless otherwise have been possible with a traditional international agreement. The pragmatic conclusion, therefore, has to be that what counts the most is the effectiveness of the codes as an instrument for improving and harmonising national practices. Given both the high number of commitments entered into in respect of the code on radioactive sources and the now regular meetings organised at which the countries concerned voluntarily and informally compare their performances in implementing the two most recent codes, the conclusion has to be prudently optimistic.

The International Law of Transport of Nuclear and Radioactive Material

*by Odette Jankowitsch-Prevor**

The international law of nuclear transport[1] is a composite and multifaceted subject. Rather than a single corpus of law it is a heterogeneous system, a complex international regime. While the safety of nuclear transport is regulated by one international technical norm, only applying to nuclear and radioactive material and all modes of transport – the IAEA Regulations for the Safe Transport of Radioactive Material[2] – the physical protection is regulated for defined nuclear material by the Convention on the Physical Protection of Nuclear Material ("CPPNM").[3] All other aspects of nuclear transport are governed by different international instruments of nuclear law and general international law, notably by the binding international mode-specific transport norms. The organising principle of the regime discussed in this paper is a simultaneous and co-ordinated application of non-legally binding technical norms, relevant nuclear law and general international law.

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1. The term "nuclear transport" as used in this paper includes transport of both radioactive and nuclear material. The IAEA Regulations refer to "radioactive material", see footnote 2.

2. IAEA Safety Standards Series, Safety Requirements, 1996 Edition as amended (2005), No. TS-R-1.

3. 1980 Convention on the Physical Protection of Nuclear Material (CPPNM); status: 143 parties (10 May 2010).

The norms[4] applicable to nuclear transport can be categorised according to different criteria based on (a) the definition of the material, (b) the mode of transport and (c) the legal nature and scope of application of the norm. With the exception of the Convention on Nuclear Safety, most, if not all, international binding instruments of nuclear law apply directly or indirectly to nuclear transport.[5]

This wide array of bilateral and multilateral treaties and conventions, international safety standards, guides and recommendations, national laws and regulations together amount to a stringent and binding international regulatory regime.

International law of nuclear transport evolved in the public domain, in the realm of the peaceful uses of nuclear energy, as a fundamental necessity of production and trade of nuclear and radioactive material, as a component element of the fuel cycle. Since the early stages of the nuclear industry, it was evident that nuclear material had to be transported. Such transport required the establishment of specific rules in a somewhat similar manner to the specific norms of civil liability for nuclear damage that had been developed as *lex specialis* to cover the "new" nuclear activities and their risks. For nuclear transport however, the approach was not to establish a comprehensive international nuclear transport law, but to develop nuclear specific norms that would interact with the long established rules of international and national law of transport of goods. Consigners and consignees of nuclear transports needed access to the existing body of law regulating international transport of goods.

International, mostly customary, law of transport of goods long predated the nuclear specific norms. Nuclear material could not simply be added to any routinely shipped good by land or sea. At the same time, it was essential that transporting nuclear material would benefit from the principle of "freedom of navigation" in its broadest sense.

Elements of a new international law to cover nuclear transport soon followed the first mining and milling of uranium for export, the processing and production of nuclear and radioactive material. Norms and rules to allow for routine transport became a basic necessity for the nascent nuclear industry in

4. The term "norms" is used here to include non-binding technical standards and binding international and national law.

5. The 1994 Convention on Nuclear Safety applies to the "safety of nuclear installations", Article 3. Installation is defined as "land-based civil nuclear power plant", Article 2 paragraph (i).

Europe and the world. In fact, the establishment of rules for transport in general and the transport of dangerous goods in particular was among the early initiatives launched by the United Nations to facilitate and promote a rapid recovery of international trade in the post World War II era.

In 1953, the Economic and Social Council of the United Nations (ECOSOC) in the framework of its Transport and Communication Commission began to develop a system of classification of goods in international transport that, as a common denominator, were considered "dangerous goods" on the basis of the character of hazards presented by these goods during transport.[6] Some form of generic grouping by physical and chemical properties was needed for the purpose of identification, packaging, documentation and labelling. In this context, the newly established International Atomic Energy Agency (hereinafter the "Agency" or "IAEA") was entrusted with the drafting of the recommendations to apply specifically to the transport of radioactive material,[7] "Class 7", in the ECOSOC classification. The Statute of the IAEA provided the legal basis required for the Agency to contribute to this international standard setting activity.[8]

The IAEA Regulations for the Safe Transport of Radioactive Material were first published in 1961,[9] the first edition of the UN Recommendations[10] on the Transport of Dangerous Goods Model Regulations covering all 9 classes of dangerous goods had already been published 1957 as the UN "Orange Book".

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6. Classification is based on the specific character of the risk: Class 1: explosives, Class 2: gases, Class 3: flammable liquids, Class 4: flammable solids, Class 5: oxidizing substances; Class 6: toxic and infectious substances, Class 7: radioactive material, Class 8: corrosive substances, Class 9: miscellaneous dangerous substances and articles.

7. By Resolution 724 (XXVIII) of 17 July 1959, the Economic and Social Council informed the IAEA of its desire that the Agency be entrusted with the drafting of recommendations on the transport of radioactive substances.

8. See Article III.A.1 and 6 of the IAEA Statute.

9. Safety Standards Series No. TS-R-1 as revised, 2005, applies to national and international transport of radioactive material by all modes of transport.

   The terminology has not been harmonised for all IAEA documents as regards the meaning of the term "safety": IAEA Document No. TS-R-1 is entitled "IAEA Safety Standards, Regulations for the Safe Transport of Radioactive Material, Safety Requirements", 2005 Edition.

10. Here referred to as IAEA Transport Regulations.

The Transport Regulations were not drafted with the objective to be adopted as binding norms of international law. The purpose of the regulations was rather to serve as an advisory document with precise technical contents, a "norm" more akin to international industry norms. It was evident that technical regulations would have to be amenable to regular amendment processes and adjust to technical and scientific progress. The intention was however that these regulations could and should become binding for all international transport operations by entering into international transport modal law as well as into the domestic law and regulations of states.

The law of nuclear transport has evolved as a consequence of technological progress, globalisation and international political developments. Many factors have contributed to expand and facilitate nuclear transport. Others, notably the major international conflicts and threats, have created obstacles and challenges. Over the last decade, the perception of new risks and threats dramatically added new internationally shared security concerns calling for new norms to complement those well established and applied to safety and physical protection. This led notably to the adoption of the Amendment of the CPPNM, the amendment of the International Maritime Organization (IMO) conventions applying to the security at sea (SUA), international binding decisions taken by the UN Security Council targeting the proliferation and security threats, criminal offences involving nuclear material committed by non-state actors and finally the codification by the UN General Assembly of international instruments addressing the threat of terrorist acts that involve nuclear material, notably during international transport.

Overview of applicable norms

Taking into account the complexity of the subject, the international legal regime governing nuclear transport is reviewed in this paper in terms of three sets of questions which determine the law applicable to an individual nuclear transport operation: (i) what nuclear material is transported and in what quantities? (ii) By what mode of transport? Through national or international territory or waters? (iii) What has been agreed by the parties to the transport operation? What is the scope for agreement of the parties?

Responding to these questions, the norms applicable[11] to any given international nuclear transport can be determined by three cross-cutting axes

11. A different technical categorisation which is not included in this paper although it does have legal implications is based on the nuclear fuel cycle and designated as "front end" or "back-end" transport.

based on the respective scope of application of the different existing international instruments as follows:

Technical norms and international nuclear law instruments

The scope of application is based primarily on the nature, quantity and technical properties of the radioactive material to be shipped:[12]

(i) Invariably to all radioactive material:

IAEA Regulations for the Safe Transport of Radioactive Material.

(ii) In case of accident:

1986 Convention on Early Notification of a Nuclear Accident

1986 Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency.

(iii) Physical protection of defined nuclear material in international transport:

1980 Convention on the Physical Protection of Nuclear Material[13] and 2005 Amendment (also in domestic transport). Provisions of the CPPNM apply specifically to transit.[14]

(iv) Only with regard to radioactive waste and spent fuel, when imported into, exported from or in transit through an EU member state:

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12. The term "radioactive material" is used here in the comprehensive meaning of the IAEA Safety Standards. The distinction between nuclear materials, fissile material and radioactive material as defined in other documents and instruments is noted in the respective context. See also footnote 1.

13. Article 2 paragraph 1 of the CPPNM: "The Convention shall apply to nuclear material used for peaceful purposes while in international nuclear transport". Article 1(a) and (b) and (c) define "nuclear material", "uranium enriched in the isotope 235 or 233" and (c) "international nuclear transport". Also Annex II "Categorization of Nuclear material".

14. Article 4(3) of the CPPNM.

Directive 2006/117 EURATOM of 20 November 2006 on the supervision and control of shipments of radioactive waste and spent fuel.

(v) Transboundary movement of radioactive waste and spent fuel:

1997 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (specific provision only)[15]

1990 Code of Practice on the Transboundary Movement of Radioactive Waste[16]

(vi) Civil liability for nuclear damage applicable to the states parties to relevant conventions:[17]

Vienna Convention on Civil Liability for Nuclear Damage applies to "nuclear material", as defined in Article I(l)(h)

Paris Convention on Third Party Liability in the Field of Nuclear Energy applies to nuclear "substances", as defined in Article 1(a)(v)

(vii) Radioactive sources:

2004 Code of Conduct on the Safety and Security of Radioactive Sources[18]

(viii) Criminal acts related to nuclear or radioactive material committed during transport:

2005 International Convention for the Suppression of Acts of Nuclear Terrorism

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15. See Article 27.

16. The Code of Practice on the International Transboundary Movement of Radioactive Waste, IAEA INFCIRC/386, 1990, has kept its validity. Its main relevant provisions have also been absorbed by the Joint Convention, notably Article 27.

17. Liability for nuclear damage during transport is not covered in this paper.

18. Code of Conduct on the Safety and Security of Radioactive Sources, IAEA, 2004.

1997 International Convention for the Suppression of Terrorist Bombing

General international law

The scope of application of general international law depends on the mode of transport. Regional and international norms apply to transport and transit through land or sea and cover all radioactive material:[19]

(i) International regimes of modal transport (by sea, air, land, river).

(ii) Transit through straits, coastal waters etc. United Nations Convention on the Law of the Sea (UNCLOS) and special navigation regimes. Transit through the territory of the European Union.[20]

Agreement by the parties

The law applicable to a given transport[21] is determined to a limited extent only by agreement between the parties to that transport operation.[22]

Parties to a nuclear transport may agree on (i) the nature and quantity of the material to be shipped (ii) the point of origin and the point of destination of the transport operation (iii) the carrier (iv) the point of transfer of title and liability for the shipment (v) a specific geographical route, as far as practicable

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19. Radioactive material as covered by the IAEA Transport Regulations is also covered by the modal transport regimes, see below. Council Directive 2006/117/EURATOM, Official Journal of the European Union L 337/21, 5 November 2006, Article 1(2)(a) applies to "transboundary shipments of radioactive waste or spent fuel" if country of origin, of destination or of transit is a member state of the European Union. The directive does not apply to radioactive sources, disused sources, reprocessed materials, naturally occurring radioactive material not arising from practices.

20. See Directive 2006/117/EURATOM, *supra* footnote 19.

21. This paper does not address civil liability in the field of transport of nuclear material. Civil liability instruments do not apply *ipso facto* to a transport; it depends on the civil liability regime to which one or all parties to a transport adhere.

22. Transport of nuclear material is not "trade" of nuclear material. Specific norms apply to import and export of *nuclear* material, not *radioactive* material, notably Nuclear Suppliers Guidelines in INFCIRC/254/Part I.

and (vi) a given mode of transport, as far as practicable. Parties are, however, bound by the technical norms relating to the material shipped and by the provisions of the applicable modal regime(s). The relevant international norms are implemented through the domestic laws and regulations[23] of the country of origin (and are also contained in the domestic laws of states of transit and of destination) and apply to the sender (operator). The operator has to obtain the necessary prior authorisations, licences for transport, export etc. from the national regulatory authority and other competent government bodies, e.g. ministries of trade and transport, finance, customs, rail and road authorities.

Applicable norms in detail

International technical norms

The scope of application of these norms is based on the nature and technical characteristics of the nuclear or radioactive material transported,[24] covering its safety, security and physical protection.[25]

IAEA Transport Regulations for the Safe Transport of Radioactive Material[26]

The IAEA Transport Regulations[27] constitute in historical terms, and as regards universality of their application, the first "normative" axis of the legal regime applicable to any transport of radioactive material. The regulations cover

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23. The domestic laws and regulations that apply to transport operations are not covered in detail in this paper, see below for security of transport.

24. Transport is not "transboundary movement", a term defined in the Joint Convention on the Safe Management of Radioactive Waste and Spent Fuel, Article 27. The term "movement" is also used in the EU Directive.

25. The application of IAEA Safeguards in the context of transport of nuclear material is not covered in this paper.

26. IAEA Safety Standards: Regulations for the Safe Transport of Radioactive Material, Safety Requirements No. TS-R-1 (as revised).

27. IAEA Transport Regulations: Transport comprises all operations and conditions associated with and involved in the movement of radioactive material: including packaging, consigning, loading, carriage, unloading and the receipt at the final destination, see Article 2(a) and (b).

(a) radioactive material comprehensively defined[28] in technical terms as applied specifically to a consignment (b) all transport modes on land, water or air, including transport which is incidental to the use of radioactive material, (c) invariably, regardless of the route selected and not open to agreement of the parties to a transport.

The objective of the regulations is "to protect persons, property and the environment from the effects of radiation during the transport of *radioactive material*"[29] and, equally, to protect the material by way of appropriate packaging from damage it may suffer in the course of transport. Established as safety standards, i.e. non-legally binding on states, the regulations set forth detailed "requirements" to be applied for transport, packaging, approval and administrative measures etc., the regulations can however be considered as *de facto* binding norms. Under international law the application of the regulations constitutes practice that has been applied unchallenged by a large number of states for an extended period of time, i.e. over 50 years. A formal legally binding character attaches to the regulations by their incorporation into international modal law instruments and the domestic laws of states.

Convention on Early Notification of a Nuclear Accident, 1986

The Early Notification Convention obligates states parties to notify an accident and to provide specific information about the accident "in the event of any

28. Definitions are not harmonised: For the purpose of the regulations "radioactive material shall mean any material containing radionuclides where both the activity concentration and the total activity in the *consignment* exceeds the value specified in paras. 401-406", see para. 236 of the Regulations TS-R-1, 2005 Edition. The regulations also cover "fissile material" (shall mean uranium-233, uranium-235, plutonium-239, plutonium-241 or any combination of these radio nuclides). Excepted from this definition is: (a) natural uranium or depleted uranium which is unirradiated and (b) natural uranium or depleted uranium which has been irradiated in thermal rectors only.

    The IAEA Statute defines under Article XX the term "special fissionable material" which means plutonium-239, uranium-233, uranium enriched in the isotope 235 or 233 but does not include source material.

    The Convention on the Physical Protection of Nuclear Material also defines "nuclear material" (see below footnote 35). Other definitions are provided by the UN Convention for the Suppression of Acts of Nuclear Terrorism, (see footnote 77) and the 1963 Vienna Convention on Civil Liability for Nuclear Damage.

29. IAEA Regulations, para. 104.

accident involving facilities or activities of a State Party […] 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". The scope of application of the convention has been drafted in the most comprehensive manner so as to include any conceivable source of accident, including transport. The term facilities and activities are defined to cover "the transport and storage of nuclear fuels or radioactive wastes".[30]

Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, 1986

The Assistance Convention does not define "nuclear accident or radiological emergency",[31] but it covers specific procedures and measures to be taken by the IAEA, the assisting and the recipient state in order to facilitate the provision of assistance in case such accident or emergency occurs. The convention applies to national and international events and does not restrict the type of activity or facility that may be involved.

Convention on the Physical Protection of Nuclear Material, 1980

The protection of nuclear material during international transport was an early concern in international nuclear law making. After the Transport Regulations were published in 1961, the IAEA General Conference adopted a resolution[32] in 1975 calling on member states and the Director General to consider ways and means of facilitating international co-operation in dealing further with problems of physical protection of nuclear facilities and material which are common in member states. This resolution was a first milestone in the development of the law on physical protection and security of nuclear material. Document INFCIRC/225 served as a technical basis for the Convention on the Physical Protection of Nuclear Material ("CPPNM") which was adopted in 1979.

30. Article 1(2)(d).

31. Article 1(1) "General Provisions".

32. IAEA GC(XIX)RES/328. The wording of the resolution reflects approaches and uses terms that have not lost their validity until today, e.g. "Conscious of the potential hazards to the health, safety and welfare of the public and to the environment that could arise from interference with nuclear facilities or the unauthorized use of nuclear material as a result of theft, vandalism, terrorism and high-jacking", "Mindful of the urgent need to minimize the possibility of sabotage".

The CPPNM is not only the first, but also the only comprehensive set of norms applicable exclusively to the security of transport defined in terms of the physical protection of nuclear material. In view of the large number of states party[33] to the CPPNM, these norms have achieved universal validity.

The objectives of the convention recalled in the preamble are *inter alia* to facilitate "international co-operation in the peaceful application of nuclear energy" and to "avert the potential dangers posed by unlawful taking and use of nuclear material".

The CPPNM applies to nuclear material used for peaceful purposes[34] while in international nuclear transport.[35] The physical protection of nuclear material in domestic use, storage and transport is however also covered as set forth in the convention but remains exclusively a national responsibility. The states parties are bound by different types of commitments.[36] The first two basic

33. Status as of 10 May 2010: 143 states.

34. In the conventions adopted under IAEA auspices, reference to material used for non-peaceful purposes is either omitted or covered indirectly, agreed often with cryptic language as in Article 3 of the Convention on Early Notification of a Nuclear Accident: "Other nuclear accidents" refers, as was agreed in the course of the drafting negotiations, to accidents in military installations/facilities. With reference to Article 3, the five nuclear weapon states made unilateral declarations at the adoption of the convention, see Legal Series No. 14 IAEA, 1987 pages 103-105. Nuclear material originating from military use is also covered under the specific *proviso* that such material has been transferred "permanently" to civilian uses, see Article 3(2)(3) of the 1997 Joint Convention. The 2005 CPPNM Amendment specifically excludes material retained for military purposes or nuclear facilities containing such material, Article 2. See also 2005 Amendment: Article 2 Paragraph 4(c) goes beyond the exclusion of military material or facilities by providing that "[n]othing in this Convention shall be construed as a lawful authorization to use or threaten to use force against nuclear material or nuclear facilities used for peaceful purposes".

35. See Article 2 of the CPPNM and the definition of the terms (a) nuclear material (b) uranium enriched in the isotope 235 or 233 and (c) international nuclear transport which "means the carriage of a consignment of nuclear material by any means of transportation intended to go beyond the territory of the State where the shipment originates beginning with the departure from a facility of the shipper in that State and ending with the arrival at a facility of the receiver within the State of ultimate destination".

36. CPPNM Article 3-14.

obligations concern the protection of the material during international transport:[37]

First, states are to take appropriate steps within the framework of their respective national law and consistent with international law to ensure as far as practicable that during international nuclear transport, nuclear material – as defined in Article 1 and as categorised in Annex II – for the purpose of the recommended physical protection for transport within that state's territory, or on board a ship or aircraft under its jurisdiction is protected at levels specified in Annex I of the convention.

States are not to authorise the export of nuclear material unless the state receives assurances that the material will be protected at the prescribed levels, nor to import material from a non-party unless it has received assurances that the material will be protected at prescribed levels, nor allow transit of nuclear material through its territory, by land, or through internal waterways or airports or seaports between states that are not parties to the convention, unless the state has received assurances that the material will be protected as provided in the convention. States shall also in the framework of their national law apply the prescribed levels of protection of nuclear material for national transport.

A second type of commitment[38] concerns national implementation of certain specific provisions of criminal law. The state party is under the obligation to incorporate in its domestic law a number of offences listed in the convention[39] and to define them as being extraditable offences. The commission of these offences also has to be made punishable under domestic law. The state is bound to establish its jurisdiction over these offences, both personal and territorial,[40] to adopt rules on extradition or prosecution concerning the listed offences,[41] and to establish or designate channels of co-operation – with a view to *inter alia* provide other states parties with "the greatest measure of assistance in connection with criminal proceedings". In connection with the above provisions, states are to establish measures and procedures of co-operation[42] in the field of criminal law. This covers in particular rules concerning the scope of

37. CPPNM Articles 3 and 4.

38. Article 5(1).

39. CPPNM Article 7.

40. CPPNM Article 8: *Jurisdiction ratione loci and ratione personae*.

41. CPPNM Article 10: *aut dedere aut iudicare*.

42. CPPNM Article 5(2).

national jurisdiction, extradition as well as intergovernmental co-operation in this field.

A third type of obligations concerns mutual information and co-operation of the parties, through "central authorities" and "points of contact" having responsibility for the physical protection of nuclear material and for co-ordinating recovery and response operations in the event of any unauthorised removal, use, alteration of nuclear material or in the event of credible threat thereof.

Amendment to the CPPNM, 2005[43]

The Amendment to the CPPNM expands the scope of application of the convention, adds new obligations of the states parties, new types of offences and new areas of co-operation. The confidentiality rules are further strengthened. National responsibility for physical protection and the respect of the sovereign rights of states are maintained. The convention's prime concern for the physical protection in international transport is broadened to include international nuclear security and non-proliferation. The scope of application also covers use, storage and transport within the national territory.[44]

The evolution of the scope of relevance of the convention is well documented in the preamble, which adds a number of new *considerata*. The convention is placed in the context of the principles of the UN Charter as regards the maintenance of international peace and security and linked to the UN General Assembly Resolution 49/60 of 1994 on "Measures to Eliminate International Terrorism". The convention addresses concerns about worldwide escalation of acts of terrorism and recognises that physical protection plays an important role in supporting nuclear non-proliferation and counter-terrorism objectives, as well as protection of the environment.

The amendment excludes the application of the convention to activities of armed forces during armed conflict governed by humanitarian law and by other rules of international law. It also excludes nuclear material and facilities retained for military purposes.[45] The purpose of the amended CPPNM[46] is "to

43. See Vez Carmona, L., "The international Regime on the Physical Protection of Nuclear Material and the Amendment to the CPPNM", *Nuclear Law Bulletin* No. 76 (2005/2).

44. CPPNM Article 2 (not amended): Articles 3, 4 and paragraph 4 of Article 5 specifically apply to international transport only.

45. *Ibid*.

achieve and maintain worldwide effective physical protection of nuclear material and of nuclear facilities used for peaceful purposes; to prevent and combat offences relating to such material and facilities worldwide, as well as to facilitate co-operation among States Parties to those ends".

Two new terms are added and defined, namely "nuclear facility" and "sabotage".[47] The threat of sabotage and the committed offence of "sabotage" also requires states to adopt a set of specific measures aimed at increasing mutual co-operation.[48] Other new offences[49] include "damage to the environment". New provisions are added in order to specify the obligation to extradite alleged offenders in accordance with the "no safe haven" principle, but also to exclude extradition in certain circumstances so as to protect a person's race, religion, nationality ethnic origin or political opinion.[50] Among the new obligations of states parties is the establishment of a legislative and regulatory framework to govern physical protection, the establishment or designation of a competent authority responsible for the implementation of the legislative and regulatory framework, and to take appropriate measures necessary for the physical protection of nuclear material and nuclear facilities. States are encouraged to apply a number of "fundamental principles".[51]

The co-operation among states parties is to be expanded to include co-operation regarding design, maintenance and improvement of systems of

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46. CPPNM 2005 Amendment new Article 1A.

47. Article 1(d) "'nuclear facility' means a facility (including associated buildings and equipment) in which nuclear material is produced processed, used, handled, stored or disposed of, if damage to or interference with such facility could lead to the release of significant amounts of radiation or radioactive material"; (e) "'sabotage' means any deliberate act directed against a nuclear facility or nuclear material in use, storage or transport which could directly or indirectly endanger the health and safety of personnel, the public or the environment by exposure to radiation or release of radioactive substances".

48. CPPNM Amendment Article 5(3); see also new Article 13A.

49. CPPNM Amendment Article 7.

50. CPPNM Amendment: Article 11A and 11B are a verbatim "loan" from the 1997 Convention for the Suppression of Terrorist Bombings. Articles 11 and 12 and *idem* International Convention for the Suppression of Acts of Nuclear Terrorism.

51. CPPNM Amendment: new Article 2A paragraph 3 list of principles A-L.

physical protection of nuclear material in domestic use, storage and in domestic and international transport.[52]

Despite broad international support, five years after its adoption the amendment has not yet entered into force. In an apparent paradox, the growing success in terms of quasi-universal adherence to the CPPNM delays the entry into force of the 2005 Amendment. This seemingly contradictory development is due to the amendment provisions of the CPPNM.[53] The more states adhere to the CPPNM the more are required for entry into force of the amendment.[54]

"The Physical Protection of Nuclear Material and Nuclear Facilities" INFCIRC/225 (as revised)

Most international binding instruments established under the auspices of the IAEA are based on the Agency's technical/scientific documents drafted by international groups of national experts and published as safety standards, guides, requirements and fundamentals (see above),[55] or as free-standing texts as is the case of Document INFCIRC/225 on physical protection. The adoption of INFCIRC/225[56] predates the CPPNM. It evolved through an independent revision process without a formal link to the convention but is understood as a companion document. In fact, INFCIRC/225 could be understood as a set of prescriptive recommendations.

The first initiative of the IAEA to come to terms with the fact that the physical protection of nuclear material and nuclear facilities, though a responsibility of the sovereign state, require detailed and harmonised international advice, was drafted by a panel of experts which in 1972 published "Recommendations for the Physical Protection of Nuclear Material". The first revision of that document was published in 1975 as *information circular* (INFCIRC/225) for the attention of all member states. Since 1998, the

52. CPPNM 2005 Amendment, Article 5, paragraphs 4 and 5.

53. CPPNM 2005 Amendment, Article 20 requires ratification of two thirds of the states parties to the CPPNM for entry into force of an amendment.

54. CPPNM: 143 states (10 May 2010); 2005 Amendment: 36 states (19 May 2010).

55. See above; IAEA Statute, Article IIIA.6. The IAEA Transport Regulations are of a different nature, see *supra*.

56. As noted in the Final Act, INFCIRC/225 was the only document before the "Meeting of Government Representatives to Consider Drafting a Convention on the Physical Protection of Nuclear Material", in Legal Series No. 12, IAEA 1982 pages 382-385.

recommendations also include the material in nuclear facilities and have been regularly revised thereafter.[57]

Law applicable to the transit

Transit is considered in the following as concerning (i) radioactive waste and spent fuel only, and (ii) when imported into, exported from or in transit through a member state of the EU.[58]

Council Directive 2006/117/EURATOM[59] on the supervision and control of shipment of radioactive waste and spent fuel is of relevance to all member states of the EU as well as to any third state that intends to ship radioactive waste or spent fuel to or through a member state of the EU. It applies to transboundary shipments of spent fuel whether intended for disposal or for reprocessing[60] whenever "the country of origin, or the country of destination, or any country of transit of a shipment is a Member State of the Community". However, the directive does not apply "to shipments of radioactive materials recovered, through reprocessing, for further use", nor to "transboundary shipments of waste that contains only naturally occurring radioactive material which does not arise from practices", see Article 1(4)(5) of the directive.

The directive[61] covers "shipments related to processing and reprocessing operations", see Article 2. It also provides that the directive shall not affect the right of a member state or an undertaking in a member state to which (a) radioactive waste is to be shipped for processing; or (b) other material is to be shipped with the purpose to recover the radioactive waste, to return the radioactive waste after treatment to its country of origin.[62] The directive notes the competence of each member state to define its own spent fuel cycle policy and to export spent fuel for reprocessing.[63]

57. INFCIRC/225/Rev.5 is being prepared.

58. Directive 2006/117/EURATOM of 20 November 2006 on the supervision and control of shipments of radioactive waste and spent fuel.

59. *Official Journal of the European Union*: OJ L 337; 5 December 2006.

60. *Ibid*, Article 1(2)(a).

61. Other Euratom Directives have been adopted regarding e.g. shipment of radioactive substances between member states applying to shipment of sealed sources and other relevant sources.

62. Article 2(a) and (b) of the directive.

63. Article 3 of the directive.

The main relevant provisions applicable to third states concern transit procedures.[64] The procedures are simplified in as much as the natural or legal person who has the responsibility for managing the shipment (i.e. through whose customs post the material) in the first member state of entry for transit submits an application for authorisation to its competent authorities. The competent authority sends the application to the competent authorities of other member states of transit. This "person" responsible in the first transit state notifies all other states of transit that the shipment has reached its destination and crossed the customs point of entry into that third country.

The directive also provides for a consultation procedure in case a shipment cannot be completed, i.e. if the conditions for shipment are no longer complied with in accordance with the directive or with the authorisations or consents given ("shipment failure").[65]

Code of Conduct on the Safety and Security of Radioactive Sources, 2003[66]

The IAEA established the code as a non-legally binding instrument to address a growing concern about radioactive sources that are used and shipped worldwide but are not always sufficiently submitted to regulatory control. This code has been adopted by member states for member states. It is based on technical criteria[67] and concerns "radioactive sources that may pose significant risk to individuals, society and the environment". It sets forth general recommendations regarding safe management, secure protection, authorisation procedures and, *inter alia*, a national register of radioactive sources. The code applies to the safety and security of radioactive sources, disused source(s) and orphan sources as defined in Section I of the document.

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, 1997

The Joint Convention applies[68] to the safety of spent fuel management,[69] when not intended for reprocessing, and of radioactive waste management, in both

64. Article 14 of the directive.

65. Article 12 of the directive; see also Article 27 of the Joint Convention.

66. Code of Conduct on the Safety and Security of Radioactive Sources, IAEA, 2004.

67. See "Annex I List of Sources Covered by the Code" and "Table I. Activities Corresponding to Thresholds of Categories" of the Code.

68. Article 3 of the Joint Convention.

cases when the material results from civilian reactors or applications or when transferred permanently to civilian programmes. Only one article[70] applies to "transboundary movement" and provides for a number of steps states parties are to take in carrying out such movements. This includes notably prior notification and consent of the state of destination, and compliance with transit provisions. Authorisation for such transport shall depend on the administrative and technical capacity needed to manage the spent fuel or radioactive waste in the recipient state and a "take-back" provision to allow re-entry into national territory if a transboundary movement is not or cannot be completed or alternatively arranged. The convention recalls the general prohibition under international law to licence any shipment of spent fuel or radioactive waste for disposal or storage to a destination south of latitude 60.[71] However, it also recalls the freedom of navigation under international law and the specific right of states to reprocess and return products or waste resulting from such reprocessing, see Article 27(3) of the Joint Convention.

International Convention for the Suppression of Terrorist Bombings, 1997

This convention, established in 1997 under the auspices of a Committee of the General Assembly of the UN, also applies to nuclear transport. It covers *inter alia* weapons or devices with "radiation or radioactive material"[72] to the extent that the offences to be criminalised by the states parties are acts committed by using nuclear and/or radioactive material. These acts include the discharge or detonation of an "explosive or other lethal device"[73] when committed during

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69. Article 2(i) and (p) of the Joint Convention: management excludes off-site transportation.

70. Article 27 of the Joint Convention. The provisions of Article 27 "disapply" in legal terms the 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. According to its drafters – and UNEP – the Basel Convention also applied to radioactive waste [see Article 1(3): "Wastes which, as a result of being radioactive, are subject to other international control systems, including international instruments, applying specifically to radioactive materials, are excluded from the scope of this Convention"].

71. The 1959 Antarctic Treaty, Washington, aims at limiting the use of Antarctica exclusively for peaceful purposes. Article V prohibits the disposal of radioactive material.

72. 1997 International Convention for the Suppression of Terrorist Bombings, Article 1(3)(b).

73. Article 2 of the International Convention for the Suppression of Terrorist Bombing.

transport and concern “infrastructure facilities”, meaning “any publicly or privately owned facility providing or distributing services for the benefit of the public, such as water, sewage, energy, fuel or communications”.[74] According to the convention “explosive or other lethal device(s) include a weapon or device capable of causing damage through the release of radiation or radioactive material, see Article 2(3)(b) of the convention. The main objective of the convention is to obligate states parties to enact legislation which establish as criminal offences under its domestic law the offences set forth in Article 2 of the convention, to establish jurisdiction over these offences, to co-operate with the states parties in matters of exchange of information on criminal procedure or on extradition procedures of alleged offenders. The convention does not address physical protection or security of nuclear material *per se*.

International Convention for the Suppression of Acts of Nuclear Terrorism, 2005[75]

The Nuclear Terrorism Convention covers very broadly defined categories of nuclear materials. It is drafted on the same pattern as the Terrorist Bombing Convention and other antiterrorism instruments established under UN auspices. Its main objective is to commit states parties to criminalise a number of nuclear and radioactive material related offences, to establish jurisdiction over these offences and to co-operate among the states parties, with the UN and with the IAEA in specified matters.

The convention does not cover nor define “nuclear terrorism” *per se* but applies to “acts”, i.e. criminal offences. It defines[76] radioactive material, nuclear material, uranium enriched in the isotope 235 or 233, nuclear facility and device and also covers a “conveyance” when used for transport of nuclear material, [Article 1(3)(b)]. States parties are to establish as criminal offences under their domestic law the offences set forth in Article 2[77] of the convention, to make these offences punishable, to prosecute or extradite alleged offenders and to co-

74. See Article 1(2) of the convention.

75. In the UN context reference is also made to Security Council Resolution 1540(2004) on non-proliferation and counter-terrorism which establishes a permanent Security Council Committee and defines “non-state actors”.

76. Article 1 of the Nuclear Terrorism Convention.

77. Article 2(1)-(4) of the Nuclear Terrorism Convention lists the offences committed in relation to the materials defined. There are a number of differences in terms of criminal law between this convention and the CPPNM and its Amendment, notably as to the criminal intent and as regards the international character of the offence (Article 3 of the Nuclear Terrorism Convention).

operate in matters related to the implementation of the convention. The co-operation among the states parties concerns matters of both criminal law and criminal procedure. The state party in possession of the radioactive material, device or nuclear facility may request the assistance and co-operation of other states parties and in particular the IAEA, see Article 18(5) of the convention.

In this context, the convention provides that for the prevention of offences, states parties shall adopt measures to protect radioactive material, "taking into account relevant recommendations and functions of the IAEA".[78] Further references to the IAEA's field of competence concern the Agency's general physical protection recommendations as well as health and safety standards.[79]

The drafting history[80] of the convention, documented by the Ad Hoc Committee of the UN General Assembly, refers to several meetings held between the Committee's drafting group of the Nuclear Terrorism Convention and the Secretariat of the IAEA in the context of the then preparatory work on an Amendment of the CPPNM.[81] The Ad Hoc Committee had been initially set up for the purpose of establishing a comprehensive "convention against terrorism". However, as no agreement could be reached on such general instrument, the Ad Hoc Committee decided to elaborate separate sectoral instruments which were subsequently adopted and which cover specific acts of terrorism.[82]

General international law: the mode of transport determines the application of regional and international law of transit through land or sea

To a large extent, most of the international modal law existed well before any nuclear material or radioactive material was transported, before the adoption and publication of the UN Classification of Dangerous Goods and the IAEA Transport Regulations. Although the UN Convention on the Law of the Sea was adopted only in 1982, the law of international navigation and its main principles

78. Article 8 of the Nuclear Terrorism Convention.

79. *Ibid*, Article 18(1)(b)(c).

80. Comprehensive reports on the *travaux préparatoires* in UN General Assembly, Ad Hoc Committee: A/59/37 Supplement 37, published under And A/53/37.

81. A/AC.252/1998/L.5 of 5 February 1998.

82. Detailed discussion in Jankowitsch-Prevor, O., "International Convention for the Suppression of Acts of Nuclear Terrorism", *Nuclear Law Bulletin* No. 76 (2005/2).

– notably the freedom of navigation, special regimes of straits, channels and other passages – had long been part of international customary law. The rivers had their regimes, agreed among the riparian states, the roads and the railways specific transport rules and the postal service its own international instrument.

However, international binding norms for nuclear transport evolved rapidly since the early 1960s. The main motivation was to harmonise national rules and avoid impediments so as to facilitate exchanges and trade, as well as to promote transparency of the international transport instruments and the corresponding national laws and regulations.

One major step in this direction was the internalisation of the IAEA Transport Regulations in different – binding – instruments of international law. A seemingly complicated process soon became the routine to ensure incorporation of the IAEA Transport Regulations into international modal instruments, as soon as these regulations are published in conformity with an established calendar.

International transport[83] *of nuclear material by land*[84]

The international instruments relating to transport by land are essentially of regional concern. Agreements were first developed under the auspices of the United Nations Economic Commission for Europe (UNECE) and its committees, notably the Inland Transport Committee covering all transport by road, rail and inland waterways. A special working party on the transport of dangerous goods co-ordinates the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR[85] and Annexes) annexed to Council Directive 94/55/EC. Regarding radioactive material, the ADR implements the requirements based on the IAEA Transport Regulations and the European Provisions Concerning the International Carriage of Dangerous Goods by Inland Waterways (AND). The two agreements are also co-ordinated and their provisions harmonised with the Regulations concerning

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83. Note on the terminology: the terms carriage, transport and shipment are used synonymously in the different instruments and documents discussed in this paper.

84. The instruments applicable to both rail as well as to road transport, namely RID and ADR provide that shipments of radioactive material by road and by rail must comply with the latest version of the IAEA Transport Regulations, i.e. updated or amended every two years.

85. Acronym (title in French) *Accord Européen relatif au transport international des marchandises dangereuses par route*, 1957, entered into force in 1968.

the International Carriage of Dangerous Goods by Rail (RID) by joint working parties, including the Organisation for International Rail Transport (OTIF). As regards transport of radioactive material, the IAEA Transport Regulations are routinely incorporated.

The Convention concerning International Carriage by Rail (COTIF)[86] has two appendices, one applying to the carriage of passengers, the second to the carriage of goods. The Regulations concerning the International Carriage of Dangerous Goods by Rail (RID) are annexed to that convention. The RID applies to dangerous goods classified in accordance with the UN Orange Book and the IAEA Regulations for the Transport of Radioactive Material.

The Regulations Concerning the International Carriage of Dangerous Goods by Rail (1980) are applied through COTIF, the requirements of which are also included in an EU directive.

Outside the European continent

The Mercosur/Mercosul[87] Agreement[88] has been established to regulate the road and rail transport of dangerous goods. It aims at facilitating the transport of dangerous goods among the countries of the southern common market, i.e. Argentina, Brazil, Paraguay and Uruguay. The provisions of the agreement covering the transport of radioactive material are consistent with the IAEA Transport Regulations (as revised).

86. Acronym (title in French): *Convention relative aux transport internationaux ferroviaires*, adopted 1980 and entered into force in 1985, amended in 1985 by the Vilnius Protocol; it has 39 states parties from Europe, the Middle East and North Africa.

87. As noted in the IAEA document NAFTA and ESCAP, UN Economic Commission for Asia and the Pacific have considered establishing an International Dangerous Goods Code, or a regional convention based ECOSOC Regulations consistent with the IAEA Regulations for the Safe Transport of Nuclear Material.

88. Agreement of Partial Reach to Facilitate the Transport of Dangerous Goods, signed in Montevideo, 30 December 1994 for the states of the South American Common market.

Carriage of nuclear material by inland waterways

The European Agreement Regarding International Carriage of Dangerous Goods by Inland Waterways[89] (AND) replace earlier non-binding European provisions of 1996. The agreement also applies to domestic traffic and to traffic within the EU. Provisions are aligned with the IAEA Transport Regulations.

Both international agreements concerning transport of goods on the Rhine and on the Danube contain provisions that affirm the right of free passage on lanes on the river that are not under the jurisdiction and control of the riparian state. The revised 1969 Convention on the Navigation of the Rhine, protocols and regulations refer to the carriage of dangerous goods. The Central Commission for the Navigation of the Rhine is the body responsible for implementation of the convention and for the safety of navigation on the river. The Dangerous Goods Committee of the Commission provides as regards the transport of radioactive material for alignment with the IAEA Transport Regulations.

The 1948 Convention regarding the Regime of Navigation on the Danube covers the navigation regime on the river Danube providing for free navigation for vessels of commerce and goods of all states. The convention establishes a Danube Commission with various functions. Article 26 provides for sanitary and police regulation on the Danube which covers *inter alia* the transport of dangerous goods, including radioactive material, aligned with the IAEA Transport Regulations.

Transport of nuclear material by air[90]

The operation of commercial aircraft is governed by the 1947 Convention on International Civil Aviation, Chicago Convention, which established the International Civil Aviation Organisation (ICAO). It also sets forth the rights and obligations of states parties and provides, *inter alia*, for the adoption of international standards and recommended practices to regulate air navigation. The governing body of ICAO, the Council, is mandated to adopt these standards and to incorporate them after their examination by the Organisation's Air Navigation Commission into the Annexes of the Convention.

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89. Adopted in 2000 under joint auspices of the UNECE, the Central Commission for the Navigation of the Rhine.

90. This section covers international commercial air transport only. In practice, nuclear fuel has also been transported by air on a case-by-case basis under special conditions and in special cargo planes.

Annex 18 to the convention contains the principles, international standards and recommended practices governing the international transport of dangerous goods by air. In addition, there are Technical Instructions for the Safe Transport of Dangerous Goods by Air (TI) setting forth definitions of dangerous goods, establishing the international standards and recommended practices These technical instructions are aligned with the IAEA Transport Regulations.

The International Air Transport Association (IATA) is the organisation grouping and representing the airlines worldwide. One of its aims is the harmonisation and standardisation of the rules governing the transport of dangerous gods by air. Its recommendations for the transport of dangerous goods, the "Dangerous Goods Regulations", are based on Annex 18 of the ICAO and related technical instructions. It takes account of the UN Orange Book and applies the most recent rules and regulations for the transport of nuclear material (TS-R-1), declared as the sole authentic legal source material in air transport of dangerous goods, thus achieving full compatibility with the IAEA Transport Regulations.

Transport of radioactive material by post

The Universal Postal Union ("UPU"), established by the 1964 UPU Convention, prohibits certain items from being transport by letter-post but provides for carriage by post of radioactive material subject to compliance with specific additional conditions. The convention covers the carriage by post of radioactive material and fully complies with the IAEA Transport Regulations.

A special provision applying to radioactive material requires the prior consent from the competent authority in the state of origin of the shipment. Packages have to be specially marked in accordance with the IAEA Transport Regulations as "radioactive materials".

A special issue: denial of shipment[91]

Today, international movement of radioactive material faces increasing barriers. In a number of states radioactive material is no longer accepted for transport by the postal services, or for air transport, even when packaged and designated in

91. See IAEA Publication: Industry Fact Sheets Related to the Denial of Shipments of Radioactive Material". International Steering Committee on the Denials of Shipments of Radioactive Material", June 2007 and updates.

conformity with the IAEA Transport Regulations. This denial of shipment[92] notably as regards transport of radioisotopes for use in nuclear medicine and routine industrial applications has raised serious international concern. Indeed, there is worldwide increasing use and need for reliable supply of such isotopes that are produced by a limited number of companies only. These isotopes have short half lives and must be delivered and utilised within a limited, specific time frame.

Transport of nuclear material by sea

General international law

The United Nations Convention on the Law of the Sea UNCLOS,[93] adopted in 1982 codifies to a large extent international customary law of the sea. Two basic principles are of direct concern to nuclear transport: first, the freedom of navigation on the high seas according to which "[t]he high seas are open to all States, whether coastal or land-locked"[94] and secondly, the right of navigation according to which "[e]very State whether coastal or land-locked, has the right to sail ships flying its flag on the high seas".[95] Further, "[s]ubject to this Convention, ships of all States, whether coastal or land-locked, enjoy the right of innocent passage through the territorial sea".[96] Innocent passage is defined in the following terms: "passage is innocent so long as it is not prejudicial to the peace, good order or security of the coastal state. Such passage shall take place in conformity with the convention and with other rules of international law".[97] The coastal states are entitled to establish and enforce sea lanes in respect of ships exercising the right of innocent passage. A general restriction is set forth

92. The issue of increasing number of cases of denial of shipment have led to the setting up in 2007 under IAEA auspices of a mechanism, the International Steering Committee on the Denial of Shipments of Radioactive Material, which developed an action plan which includes awareness building, training and communication to improve transparency. The issue has also been taken up by the IMO, notably for support of the "Transportation of Cobalt-60 on Humanitarian Grounds".

93. The United Nations Convention on the Law of the Sea was adopted in 1982, it entered into force in 1994, quasi-universal adherence (the United States is not party to the convention).

94. UNCLOS Article 87.

95. UNCLOS Article 90.

96. UNCLOS, Article 17.

97. UNCLOS, Article 19.

for nuclear powered ships and nuclear transport: "Foreign nuclear powered ships and ships carrying nuclear or other inherently dangerous or noxious substances shall, when exercising the right of innocent passage through territorial sea, carry documents and observe special precautionary measures established for such ships by international agreements".[98]

Other special provisions apply to straits.[99] Part III of the UNCLOS establishes rights and responsibilities of ships in transit and innocent passage through straits.

Law of maritime transport of nuclear material

First adopted in 1914,[100] the Convention for the Safety of Life at Sea (SOLAS) is the earliest international agreement dealing with the safety of ships of the merchant marine. The convention was revised, amended, completed and augmented by protocols over a period of almost seventy years. The present version entered into force in 1983. The International Maritime Dangerous Goods (IMDG) Code – IMO/SOLAS (unified code) – refers to the IAEA Transport Regulations as being the provisions governing the carriage of Class 7 ("radioactive material"). The IMDG Code is consistent with the definitions of the IAEA Transport Regulations, the categories of material according to radiation levels, labelling and stowage. The code is amended and updated according to a set two years calendar to include notably the changes introduced into the UN Recommendations on the Transport of Dangerous Goods, by the IAEA Regulations. Originally, the code was not a mandatory instrument, but a recommendation for parties to the SOLAS Convention. Since 2004 the code has become mandatory.[101] The 1994 International Code[102] for the Safe Carriage of

98. UNCLOS Article 23.

99. Main provisions: straits used for international navigation (Article 34), right of transit passage (Article 38), duties of ships and aircraft during transit passage (Article 39), innocent passage (exceptions to the rule), Article 45.

100. Adopted as a consequence of the Titanic accident, SOLAS originally prohibited the transport of goods that "by reason of their nature" were likely to endanger the lives of passenger and the safety of the ship. SOLAS did not enter into force because of World War I. A second version was adopted in 1929, a third in 1948. The present version, as amended and completed by addition of protocols was established under the auspices of the IMO,(its Maritime Safety Committee and its Sub-committee on Dangerous Goods, Solid Cargos and Containers, as of 1995), after completion in 1965 of the International Maritime Dangerous Goods Code (IMDG) it was finally adopted in 1974 and entered into force in 1982.

101. A number of provisions of the IMDG Code remain however non-binding, see IMO, IMDG Code.

Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on Board Ships, INF Code, is a complementary document, developed within the IMO and was adopted in 1993. It contains a broad set of stringent provisions specifically devised for the safe and secure transport of nuclear material. It applies in particular to the certification of ships transporting such cargoes and the definition of material that may only be carried on specially built INF cargo vessels.

The protection of the marine environment from pollution resulting from accidents and from routine effects of transport of different hazardous material, radioactive material in particular, has been a growing concern worldwide addressed by a number of international and regional instruments:[103]

Transport of nuclear material by sea: non-proliferation, anti-terrorism and security norms, the 2005 SUA Treaties[104]

The following international instruments apply:

- 1988 Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation (1988 SUA Convention).

- 1988 Protocol for the Suppression of Unlawful Acts against the Safety of Fixed Platforms Located on the Continental Shelf (1988 Fixed Platforms Protocol).

- 2005 Protocol to the Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation (2005 SUA Convention).

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102. Safe Carriage of Irradiated Nuclear Fuel, Plutonium and HL Radioactive Wastes in Flasks on Board Ships, developed by IAEA/IMO/UNEP, mandatory since 2001 under SOLAS.

103. Main Instruments: MARPOL 1973/78 International Convention for the Prevention of Pollution from Ships (Annex III covers indirectly radioactive materials). 1971 Brussels Convention Relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material, entered into force in 1975. 1972 Convention on the Prevention of Marine Pollution by Dumping of Waste and other Materials, London, amendment in 1993. OSPARCOM (North East Atlantic) 1992; Barcelona (Mediterranean) 1976, amended 1995.

104. Depositary: the Secretary General of the IMO (not yet in force). Final Act: LEG/CONF.15/21, 22, 23, 1 November 2005.

- 2005 Protocol to the Protocol for the Suppression of Unlawful Acts against the Safety of Fixed Platforms Located on the Continental Shelf (2005 Fixed Platforms Protocol).

The 1988 SUA Convention[105]

Concern about unlawful acts which threaten the safety of ships and the security of their passengers, crew and cargo grew during the 1980s following reports of high jacking and other threats. At its 14th Assembly in 1985, the International Maritime Organization (IMO) adopted a resolution on "measures to prevent unlawful acts which threaten the safety of ships and the security of their passengers and crew", noting with great concern the dangers resulting from the increasing number of incidents involving piracy, armed robbery and other unlawful acts against or on board ships, including small craft, both at anchor and under way". The IMO's Maritime Safety Committee was thereupon requested to develop measures, to ensure the security of passengers and crews on board ships. The measures were to take into account the work of the ICAO in the development of standards and recommended practices for airport and aircraft security.

In 1986, the IMO began work on a convention on unlawful acts against the safety of maritime navigation to centre on the suppression of unlawful acts committed against the safety of maritime navigation which endanger innocent human lives, jeopardise the safety of persons and property, seriously affect the operation of maritime services and thus are of grave concern to the international community as a whole. The "Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation" was then adopted at a conference in Rome in 1988.

The main purpose of the convention is to ensure that appropriate action is taken against persons committing unlawful acts against ships. Offences include seizure of ships by force, acts of violence against persons on board ships and the placing of devices on board a ship which are likely to destroy or damage it.

The 2005 SUA Convention and the 2005 SUA Fixed Platform Protocol

These conventions adopted the same year as the Amendment of the CPPNM are the outcome of a revision conference of the states parties, convened by the IMO

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105. See also: 1988 SUA Convention and 1988 Fixed Platforms Protocol, in "Instruments Related to the Prevention and Suppression of International Terrorism", United Nations, NY 2001. United Nations Publication Sales No. E.01.V.3. ISBN 92-1-133631-7.

in 2005. The preamble to the 2005 SUA Convention clearly reflects the motivation of the states parties for revising the 1988 instruments: terrorist acts threaten international peace and security. The preamble also recalls Security Council Resolution 1540(2004) which assigns states *inter alia* the responsibility "to take additional effective measures to prevent the proliferation of nuclear, chemical or biological weapons and their means of delivery".

The 2005 SUA Convention is linked to the other UN listed counter-terrorism instruments as is recalled in its preamble.[106]

The main amendments of the protocol adopted in 2005 aim at broadening the coverage of the protocol, notably by adding "BCN weapon" (biological, chemical and nuclear), "explosive devices" and "toxic chemical" "precursor". Other additions are new offences[107] relating to the unlawful and intentional uses – including the transportation – of the above mentioned nuclear materials and, again quite similarly to the Amendments of the CPPNM, enhanced co-operation among states parties, notably in connection with extraditions, criminal procedures and boarding of ships flying the flag of a state party.

The 2005 Protocol also sets forth a rather unusual provision to the effect that transportation of nuclear military material (defined) is not considered an offence if (subject to conditions) such item or material is transported to or from the territory of, or is otherwise under the control of a state party to the Treaty on the Non-proliferation of Nuclear Weapons.

The 2005 Protocol to the 1988 Fixed Platforms Protocol applies *mutatis mutandis* to the offences described in the 2005 SUA Convention when committed in relation to a "fixed platform" defined[108] as an artificial island, installation or structure permanently attached to the sea bed for the purpose of exploration or exploitation of resources or for economic purpose.

106. The 1997 Convention for the Suppression of Terrorist Bombings and the 2005 International Convention for the Suppression of Acts of Nuclear Terrorism. It provides moreover, under Article 7, that the text of nine relevant conventions under which offences can be considered for the purpose of the SUA Convention, are added as the Annex to the convention.

107. 2005 Protocol, new Articles 3, 3bis, 3ter and 3quarter.

108. 2005 Protocol to the 1988 Fixed Platform Protocol, Article 1(3).

Other international instruments relevant to the transport of nuclear material: specific prohibitions

In addition to the rights and obligations of states parties as provided in the international mode related instruments, there are a number of specific limitations and prohibitions to transport set forth by other international treaties, such as:

Geographical limit[109]

The 1959 Antarctic Treaty prohibits the transport of nuclear materials to and disposal of radioactive wastes in the Antarctic, the region also defined as latitude 60 degrees south.

The 1991 Bamako Convention[110] covers "wastes which as a result of being radioactive, are subject to any international control system, including international instruments applying specifically to radioactive material" and bans import, export and transit of such waste on the African continent. The convention, when in force, may create obstacles for the landlocked states of the African continent by prohibiting the return shipment of disused sources to the exporter/supplier in conformity with the provisions of the 2004 Code of Conduct on the Safe and Secure Management of Radioactive Sources.

Treaties establishing regional nuclear-weapon-free zones[111]

These treaties do not deal in a uniform manner with transport or transit of nuclear material through sea lanes and territorial waters covered by the different treaties. As an example, the 1967 Treaty of Tlateloco does not specifically address transport of nuclear material. Certain nuclear weapon states have, however, deposited statements upon ratification of the treaty to preserve their rights related to the freedom of the seas and transport of nuclear material within the zone of application of that treaty. The 1995 Treaty of Bangkok contains a provision which prohibits dumping of waste at sea but also stipulates that each

109. See Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, Article 27(2).

110. 1991 Convention on the Ban of the Import of Hazardous Wastes into Africa and on the Control of Transboundary Movements within Africa, not yet in force.

111. 1967 Tlatelolco, 1971 Bangkok, 1995 Pelindaba (not yet in force), 1985 Rarotonga, 2009 Central Asia. For comprehensive study on nuclear weapon free zones see Tabassi, L., "National Implementation and Enforcement of Nuclear-Weapon Free Zone Treaties", *Nuclear Law Bulletin* No. 83 (2009/1).

state party may decide for itself whether to allow visits by foreign ships in a manner not covered by the right of innocent passage. The 1985 Treaty of Rarotonga provides that transport of nuclear explosive devices is included in a general prohibition.

The variable legal "axis": agreement by the parties to a transport operation

As discussed above, the regime of laws, rules and regulations that applies in practice to any transport operation is essentially international and determined by the nature and quantity of the radioactive material transported by a given mode over a given route. However, a transport of radioactive material is a transaction, i.e. an agreement concluded between persons under domestic law. In fact, it is usually based on one or more agreements between a sender (from a country of origin, the operator, the exporter or consigner) and a recipient (from a country of destination, the importer or consignee). Either of them is the carrier (usually the exporter or, if so agreed, a third person fulfils this role). The agreement reached between the two or more parties is the only flexible element in any transport operation. The scope of decision making of the parties is however limited.

For the initiation of any transport operation, the parties determine the nature and the quantity of material to be shipped. In the framework of their agreement, the parties also establish the timing, the financial conditions and the applicable liability regime or the agreed liability clauses. The consigner/ operator is usually responsible for obtaining the relevant licences and other authorisations in the state of origin of the transport operation. In practice, once the agreement on the route has been reached the parties normally also agree on the point of transfer of title and/or of responsibility for the shipment. The responsibility and liability for the transport operation rests unless otherwise formally agreed with the sender, i.e. the operator, sometimes also the carrier.

One major issue of international concern is the security of nuclear transport in general and of the individual transport operation in particular. Contrary to the safety aspects, security of international nuclear transport is not regulated in a uniform manner. The safety norms, the IAEA Transport Regulations in particular, are however relevant to the security of transport in as much as compliance with the safety regulations also protects the material in physical terms regardless of the modes of transport.

Security is, however, not only a function of the intrinsic properties of the nuclear or radioactive material transported. Security is determined in a more comprehensive manner and regulated by the law(s) of the state on the territory of which a nuclear transport takes place, as export, import or transit. The only binding international instrument applicable to security in terms of physical protection of material is the CPPNM and its 2005 Amendment.

The sovereign state from, through or to which nuclear material is transported has the overall responsibility for the security of that transport, notably in implementing the obligations of the international instruments to which it is a party. For international transport operations of nuclear material, states usually conclude agreements or memoranda of understanding on a bilateral or multilateral level regarding the security of one or several transport operations. Such agreements cover all aspects of security during transit and in particular trans-border crossings as well as shipments through inland waterways or flights through national airspace.

The scope for a generally applicable international law of transport security is thus rather limited as it is difficult to determine the common denominator for the security of transport of all nuclear and radioactive materials and for all modes of transport. In order to ensure security, the specificity of each type of transport each individual transport operation of nuclear material has to be taken into account. International co-operation, adherence to all international relevant instruments contribute to the harmonisation of domestic laws and regulations and thereby contribute to the maintenance of a reliable universal system of safe and secure transport.

Nuclear Security: Legal Aspects of Physical Protection, Combating Illicit Trafficking and Nuclear Terrorism

*by Carlton Stoiber**

Nuclear security is a term which sometimes causes confusion with regard to its primary focus. In some states it is associated with arms control, disarmament and efforts to prevent the proliferation of nuclear weapons.[1] For purposes of this paper, the term will be used in a narrower sense. Nuclear security has been defined as "the prevention and detection of, and response to, theft, sabotage, unauthorised access, illegal transfer or other malicious acts involving nuclear material, other radioactive substances or their associated facilities".[2] This definition shifts the focus from arms control or non-proliferation to combating the threat of malevolent use of nuclear materials and technology or sabotage of nuclear facilities by sub-national criminal or terrorist elements. This field of nuclear law has seen very significant recent

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1. For example, in the United States the agency responsible for managing the nation's nuclear weapons programme and stockpile is called the National Nuclear Security Administration.

2. IAEA Advisory Group on Nuclear Security, January 2002.

developments.[3] The importance of nuclear security to global security was dramatically underlined in April 2010 with the convening of a Nuclear Security Summit in Washington by U.S. President Barack Obama. Attended by some 43 heads of state, on 13 April 2010 the Summit issued a *communiqué* and work plan with a number of elements having legal relevance. Specifically, the *communiqué* and work plan made a strong commitment to the objectives of the various international nuclear security instruments and committed to work for universal adherence to the Convention on the Physical Protection of Nuclear Material. Other parts of the work plan emphasised "the importance of robust national legislative and regulatory frameworks for nuclear security".[4] Plans were announced for a second Nuclear Security Summit in Seoul in 2012, indicating the intention of the participants to follow up on the broad range of measures set forth in the work plan (some 50 separate paragraphs in eleven sections).

Key points about nuclear security law

There are a few points concerning this field of nuclear law which are worth noting at the outset. First, it is universally recognised that primary responsibility for nuclear security rests with each state as a matter of national sovereignty. Therefore, although international instruments and guidance documents can establish a framework for managing nuclear security issues more effectively, the threat of a security incident cannot be successfully addressed unless states take concrete action. Secondly, it is significant that no single international instrument addresses nuclear security in a comprehensive manner. Instead, a broad range of international legal and guidance instruments (many developed under IAEA auspices) must be considered in determining what measures should be adopted to ensure that nuclear material and other radioactive materials and related facilities are adequately protected. In this regard, it must be noted that a significant number of states have either not adhered to the relevant international instruments or have failed to implement them effectively through their national legal and regulatory frameworks. This situation leaves gaps in the global system

3. I have discussed some of these developments elsewhere. See, for example Stoiber, C., "Need for an International Law of Nuclear Security?", in: Effective Nuclear Regulatory Systems – Facing Safety and Security Challenges, Proceedings of an International Conference, Moscow 27 February – 3 March, 2006, IAEA, Vienna (2006), at pages 215-236 and Stoiber, C., "Nuclear Security: An Emerging Domain of International Nuclear Law", in: Proceedings of Nuclear Inter Jura 2007, Bruylant (2008), at pages 851-868.

4. For the text of the Nuclear Security Summit *communiqué* and work plan, see http://whitehouse.gov/the-press-office/communiqu-washington-nuclear-security-summit.

that can be exploited by terrorist or criminal elements. Therefore, broader adherence to the relevant instruments and more effective and co-ordinated implementation must be a high priority.

This paper will address three separate aspects of nuclear security: (1) physical protection of nuclear materials and facilities, (2) combating illicit trafficking of nuclear materials, equipment and technology and (3) combating the threat of nuclear terrorism. These subjects are obviously quite closely inter-related. Measures to address one subject will usually also contribute to addressing the others. After discussing these subjects, Part IV of the paper will contain a preliminary listing of elements for nuclear security that appear to have achieved a large measure of agreement. It is submitted that these elements, though not comprehensive, represent the basis of an emerging international legal framework for nuclear security.

At the outset, it may be useful to highlight the most relevant international instruments for nuclear security. This is not to suggest that this is a comprehensive listing, the most relevant include:

- Convention on the Physical Protection of Nuclear Material (CPPNM)
- Amendment to the Convention on the Physical Protection of Nuclear Material
- International Convention for the Suppression of Acts of Nuclear Terrorism (NTC)
- United Nations Security Council Resolution 1373 on terrorist financing
- United Nations Security Council Resolution 1540 on weapons of mass destruction
- Treaty on the Non-Proliferation of Nuclear Weapons (NPT)
- IAEA Safeguards Agreements and Additional Protocol
- Comprehensive Nuclear-Test-Ban Treaty and regional nuclear-weapon-free zone treaties

Other non-binding instruments or IAEA Guidance Documents are relevant. They include:

- Physical Protection of Nuclear Materials and Nuclear Facilities, INFCIRC/225/Rev. 4
- Code of Conduct on the Safety and Security of Radioactive Sources
- Guidance on the Import and Export of Radioactive Sources
- Nuclear Suppliers Group (NSG) Guidelines

- Zangger Committee Guidelines
- IAEA Security Series

Some of these instruments and documents have provisions that address aspects of all three subjects discussed in this paper. Therefore, they appear in all three parts of this paper. Other instruments not included in the above list, but which are relevant for one of the topics, will be discussed in the appropriate part of the paper.

I. Physical protection

Although the need to protect sensitive nuclear materials and facilities has long been recognised, states have been cautious about accepting binding international commitments regarding such matters. Beginning with voluntary guidance, the legal regime for physical protection has evolved with the broader acceptance of international instruments comprising mandatory measures.[5]

Physical Protection of Nuclear Material and Nuclear Facilities INFCIRC/225

One of the earliest legal instruments to address nuclear security is the IAEA's INFCIRC/225 document entitled "The Physical Protection of Nuclear Material and Nuclear Facilities". First published in 1972, the document has been revised four times – in 1977, 1989, 1993 and 1998. A fifth revision is in the final stages of approval. The document provides non-binding guidance for states in establishing national physical protection systems. The document's provisions are mandatory for IAEA sponsored co-operation and assistance programmes. The scope of the document covers use, storage and transport of nuclear materials, both in domestic use and in transport. Originally directed only to materials, it has been extended to cover physical protection at facilities to protect against sabotage. An important feature of INFCIRC/225 is its categorisation of nuclear material by type and quantity based on the security significance of the specific material. A range of physical protection measures are set out for each category. This categorisation has been adopted in other instruments. Implementation of the measures set forth in the INFCIRC also provides a means for states to demonstrate compliance with the various binding security instruments.

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5. For a further discussion of the evolution of legal instruments for physical protection see Stoiber, C., *et al.*, Handbook on Nuclear Law, IAEA, Vienna (2003) at Chapter 14 – Physical Protection, pages 145-46. This chapter also includes a short discussion of illicit trafficking.

Convention on the Physical Protection of Nuclear Material (CPPNM)

The CPPNM[6] is the earliest international instrument related to nuclear security. It currently has 143 contracting parties, including most states with significant nuclear activities. The CPPNM was primarily focused on protection of nuclear material in international transit. However, some of its provisions also cover domestic activities. The convention includes two annexes: Annex I establishes required levels of physical protection and Annex II establishes a categorisation of nuclear material based on INFCIRC/225. An important provision of the convention for security is its requirement in Article 7 that parties make a range of intentional actions punishable as offences under their national laws. Specifically, the provision criminalises "[a]n act without lawful authority which constitutes the receipt, possession, use, transfer, alteration, disposal or dispersal of nuclear material and which causes or is likely to cause death or serious injury to any person or substantial damage to property" (Article 7.1.a). Thefts, threats to use nuclear material or to compel action, attempts and participation in unlawful acts proscribed by the convention are also criminalised. As will be seen, parallel provisions were adopted in the International Convention for the Suppression of Acts of Nuclear Terrorism to cover other radioactive materials. Other CPPNM articles require states parties to: establish jurisdiction over Article 7 offenses (Article 8); detain alleged offenders for purposes of prosecution or extradition (Article 9); prosecute or extradite offenders (Article 10); and define Article 7 offences as extraditable offences in extradition treaties (Article 11). Article 13 requires that parties afford each other "the greatest measure of assistance" in criminal proceedings.

2005 CPPNM Amendment

The 2005 Amendment to the Convention on the Physical Protection of Nuclear Material (hereinafter referred to as the "amendment") significantly extends the scope of the earlier instrument to cover domestic nuclear activities and sabotage of nuclear facilities or material in use, storage or transport. The amendment requires states parties to establish, implement and maintain an appropriate physical protection regime with the aim of protecting against theft or other unlawful taking of covered materials, ensuring implementation of rapid measures to recover missing or stolen material, protecting facilities and material from sabotage, and mitigating or minimising radiological consequences of sabotage. States parties are obligated to take the following range of actions:

6. IAEA Document INFCIRC/274/Rev. 1, IAEA, Vienna (1980); entered into force on 8 February 1987.

- establish and maintain a legislative and legal framework for physical protection;
- designate a competent authority responsible for implementing this framework;
- take other appropriate measures for physical protection.

The amendment also sets forth twelve fundamental principles of physical protection that should be applied by states parties “insofar as is reasonable and practicable”. These principles cover the following:

- Responsibility of the state
- Responsibilities during international transport
- Legislative and regulatory framework
- Competent authority
- Responsibility of licence holders
- Security culture
- Evaluation of the threat
- Graded approach
- Defence in depth
- Quality assurance
- Contingency plans for emergency response
- Confidentiality

Other provisions of the amendment require states parties to identify and make known to each other and the IAEA a point of contact for matters within the scope of the Convention and to strengthen measures of information sharing, co-ordination and co-operation in dealing with cases of sabotage, theft or unauthorised acquisition of nuclear material. The amendment extends the list of acts regarding nuclear materials that must be made punishable offences under national law. Notably, the smuggling of nuclear material has been added to these offences. The amendment also clarifies matters regarding extradition of persons suspected of committing offences.

A problem with the amendment is that its coming into force is likely to be significantly delayed by virtue of the CPPNM’s requirement that two thirds of its states parties approve the amendment before it enters into force. Also, unlike some international instruments, the CPPNM does not have a mechanism for provisional application of the amendment prior to formal entry into force. At the time this article was written, only 39 of the required 95 states had accepted the amendment after some five years since its adoption.

Code of Conduct on the Safety and Security of Radioactive Sources

The 2004 Code of Conduct on the Safety and Security of Radioactive Sources provides detailed guidance on measures needed to protect individuals, society and the environment from the harmful effects of possible accidents and malicious acts involving radioactive sources. The code is structured into three basic parts with an important Annex I that divides the most commonly used radiation sources into three categories based on the likelihood that they would cause severe or permanent injury if not safely managed or securely protected. Part I of the code provides definitions of key terms, an important aid for harmonising implementation among states parties and users of sources. Part II defines the code's scope and objectives. Part III, entitled "Basic Principles", provides guidance in several areas, including:

- General matters
- Legislation and regulations
- Regulatory body
- Import and export of radioactive sources
- Role of the IAEA
- Dissemination of the code

With specific relevance for physical protection, paragraph 22(b) establishes the principle that states should ensure that its regulatory body "ensures that arrangements are made for secure protection of radioactive sources".

An associated document providing guidance for import and export of radioactive sources will be discussed in Part II of this paper.

II. Combating illicit trafficking

Nuclear related illicit trafficking has been defined as: "[i]ncidents which involve unauthorised acquisition, provision, possession, use, transfer or disposal of nuclear materials, whether intentional or unintentional and with or without crossing international borders, including unsuccessful and thwarted events".[7] The prevention of and response to incidents of illicit trafficking is primarily the responsibility of states, acting within their sovereign authority. Measures to address illicit trafficking often implicate sensitive activities involving law enforcement, intelligence gathering, procedures for determining the reliability of persons having access to radioactive materials and the like. For this reason, suggestions that illicit nuclear trafficking should be made an international crime

7. Description of the Illicit Trafficking Database (ITDB) at www.iaea.org.

(like genocide, slavery or trafficking in human beings) have not been pursued by the nuclear community.[8]

The following discussion summarises the most relevant legal instruments and guidance documents that address illicit trafficking.[9]

Treaty on the Non-Proliferation of Nuclear Weapons (NPT)

As indicated by its title, the NPT addresses the spread of nuclear weapons to additional states. However, its Article III requirement that transfers of nuclear materials, especially designed or prepared items, be conditioned on the application of IAEA safeguards has long played a role in ensuring that nuclear-related exports and imports are not diverted from their peaceful purposes. Although focused on proliferation, the NPT provisions are also important for combating illicit trafficking.

The earliest multilateral legal arrangements to regulate unauthorised transfers of sensitive nuclear materials, equipment and technology are embodied in two sets of guidelines developed by nuclear supplier states to address the proliferation of nuclear weapons.[10]

Zangger Committee Guidelines

The first nuclear export control list developed by a group of NPT supplier states in 1971 was intended to implement the treaty's requirement in Article III that certain materials and items especially designed or prepared (EDP) for processing, use or production of special fissionable materials would not be exported unless covered by IAEA safeguards. These treaty based controls continue to be applied under IAEA document INFCIRC/209.

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8. A useful discussion of the difficulties of internationalising a crime of illicit trafficking is contained in Demeyere, B., "Sanctioning Illicit Trafficking in Nuclear Materials and Other Radioactive Substances through Individual Criminal Responsibility: Falling Between the Cracks of International Criminal Law?", in: Proceedings of the 2007 Nuclear Inter Jura Congress of the International Nuclear Law Association, Brussels, 1 October 2007.

9. See Stoiber, C., "Model Elements for a National Legal Framework on Illicit Trafficking", in: Proceedings of an International Conference on Illicit Nuclear Trafficking: Collective Experience and the Way Forward, IAEA, Vienna (2008), at pages 109-134.

10. A useful description of the two Nuclear Suppliers Groups is set out in Document INFCIRC/539/Rev. 3, IAEA, Vienna, 30 May 2005.

Nuclear Suppliers Group Guidelines

Since the mid-1970s, a number of states have committed themselves to voluntarily control the export of certain material, items and technology in accordance with procedures agreed by a group of states.[11] NSG controls are broader than those under the Zangger Committee, not being linked to any international legal instrument. For example they cover so called “dual use” items that are not especially designed or prepared under the terms of the NPT, but that could nevertheless contribute to the development of nuclear explosives. Since 1992, they also include the requirement that non-nuclear weapon state recipients accept so called “full scope safeguards” over their entire nuclear fuel cycle.

Although these guidelines are primarily focused on preventing the spread of nuclear weapons capabilities to additional states, they also establish measures that can help prevent terrorist or criminal elements from acquiring sensitive materials, equipment and technology.

IAEA safeguards agreements and the additional protocol

Provisions relevant for combating illicit trafficking are also set forth in safeguards agreements concluded between a state and the IAEA. The scope and nature of these controls depend on the applicable Agency safeguards documents. Comprehensive safeguards agreements (CSAs) under the Nuclear Non-Proliferation Treaty (NPT) contain provisions related to international transfers of nuclear material (see paragraphs 34 and 91-97 of INFCIRC/153). Broadened information requirements on nuclear related exports and imports are set forth in the model additional protocol (See INFCIRC/540). In particular, reporting requirements have been added by Article 2.a.(ix) for specified equipment and non-nuclear material set forth in Annex II. Annex II contains an extensive list of equipment and non-nuclear material related to the following:

- reactors and equipment therefore;

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11. See Guidelines for Nuclear Transfers – Communication received from certain Member States regarding Guidelines for the Export of Nuclear Material Equipment and Technology, IAEA INFCIRC/254/Rev. 8/Part 1 – 20 March 2006 and Communications received from Certain Member States regarding Guidelines for Transfers of Nuclear-related Dual-use Equipment, Materials, Software and related Technology, IAEA INFCIRC/254/Rev. 6/Part2 – February 2005.

- non-nuclear materials for reactors (deuterium, heavy water and nuclear grade graphite);

- plants for the reprocessing of irradiated fuel elements and equipment especially designed or prepared therefore;

- plants for the fabrication of fuel elements;

- plants for the separation of isotopes of uranium and equipment, other than analytical instruments, especially designed or prepared therefore;

- plants for the production of heavy water, deuterium and deuterium compounds and equipment especially designed or prepared therefore;

- plants for the conversion of uranium and equipment especially designed or prepared therefore.

Other instruments addressing illicit trafficking

Beyond the proliferation related supplier controls, safeguards and physical protection of nuclear materials in international commerce, legal measures directed specifically at preventing illicit trafficking by sub-national entities have been a more recent development. As a result of recent terrorist incidents, the IAEA and its member states, as well as other relevant international bodies, have given increasing attention to international approaches that could contribute to preventing the acquisition of nuclear and other radioactive materials by groups that might seek to use them for malicious purposes. This has led to the promulgation of a number of new or amended international instruments and guidance documents addressing this threat. Recognising the primary responsibility of states for addressing illicit trafficking, these instruments can help achieve an essential harmonisation and co-operation in combating the threat.

Some of these new or revised international instruments or guidance documents require governments to enact criminal or penal legislation to deal with nuclear related security issues. It is important in this context that a state's general criminal and penal legislation be made consistent with its nuclear law.

As has been discussed in Part I, another issue of significance in addressing illicit trafficking is extending the scope of coverage of relevant controls to radioactive materials that are not relevant for nuclear explosives, but could be used to produce a radiological dispersal device (RDD) or “dirty bomb”. Most international instruments in the nuclear security field limit their scope to nuclear material or nuclear weapons. RDDs are not considered a nuclear weapon, nor are they typically considered as a weapon of mass destruction (WMD – another term used in some instruments[12]). However, as will be discussed in Part III of this paper, the recent Nuclear Terrorism Convention includes “radioactive material” usable for RDDs within the category of materials subject to its provisions (e.g. materials or substances “which may, owing to their radiological or fissile properties, cause death, serious bodily injury or substantial damage to property or to the environment”).

Guidance on the Import and Export of Radioactive Sources

The Code of Conduct on the Safety and Security of Radioactive Sources was introduced in Part I on physical protection. However, the code also provides guidance on the import and export of radioactive sources in paragraphs 23-29 that are relevant for combating illicit trafficking. In 2004, the IAEA developed an associated document to codify more specific measures states should consider to prevent the diversion of sources that could jeopardise safety and security. The guidance adopts the categorisation of sources used in the code of conduct. It also provides a framework for review of applications and decisions on authorising the export or import of radioactive sources in Categories I and II, as follows:

- identification of a point of contact by each state for facilitating export and import of relevant sources;
- procedures for export authorisations that include recommended factors to be considered in granting consent to export, information to be provided in a request for consent, criteria for evaluation of a request, and notification prior to shipment;
- factors to be considered in import authorisations;
- guidance on handling cases involving exceptional circumstances such as considerable health or medical need or imminent radiological hazard;
- factors relating to transit and trans-shipment;
- state self-assessment questionnaire (in Annex I).

12. See, for example, United Nations Security Council Resolution 1540.

UN Security Council Resolution 1373

This resolution was adopted on 28 September 2001 in the wake of the 9/11 terrorist attacks in the United States. The resolution seeks to increase international co-operation and enhance national measures "to prevent and suppress ... the financing and preparation of any acts of terrorism". By affirming that "any act of international terrorism constitute[s] a threat to international peace and security", the Council makes its decisions binding on all UN member states under Chapter VII of the UN Charter. The resolution contains some twenty measures to be taken by member states. Eleven are mandatory and nine others are measures the Council calls upon member states to take on a voluntary basis. Only one provision specifically references nuclear materials, although another speaks of "weapons of mass destruction" that must be taken to include nuclear weapons, although not radiological dispersal devices (RDDs) or "dirty bombs".

Operative paragraph 4 specifically addresses illicit trafficking, with the Council noting "with concern the close connection between international terrorism and transnational organised crime... and illegal movement of nuclear... and other potentially deadly materials, and in this regard emphasises the need to enhance co-ordination efforts on national, sub-regional, regional and international levels in order to strengthen a global response to this serious challenge and threat to international security".

UN Security Council Resolution 1540

In April 2004, the United Nations Security Council adopted Resolution 1540 concerning weapons of mass destruction. The resolution was adopted pursuant to the Council's authority under Chapter VII of the United Nations Charter to address threats to international peace and security. Thus, its provisions are mandatory for all United Nations member states. The Council decided that "all states shall take and enforce effective measures to establish domestic controls to prevent the proliferation of nuclear, chemical or biological weapons and their means of delivery, including the establishment of appropriate controls over related materials and to this end shall:

(a) Develop and maintain appropriate effective measures to account for and secure such items in production, use, storage or transport.

(b) Develop and maintain appropriate effective physical protection measures.

(c) Develop and maintain appropriate effective border controls and law enforcement efforts to detect, deter, prevent and combat, including through international co-operation when necessary, the illicit trafficking and brokering in such items in accordance with their national legal authorities and legislation and consistent with international law.

(d) Establish, develop, review and maintain appropriate effective national export and trans-shipment controls over such items, including appropriate laws and regulations to control export, transit, trans-shipment and re-export and controls on providing funds and services related to such export and trans-shipment such as establishing end user controls; and establishing and enforcing appropriate criminal or civil penalties for violations of such export control laws and regulations".

IAEA security series

Since 2006, the IAEA has developed a number of guidance documents to address security and in 2007, the Agency published a reference manual specifically focused on illicit trafficking. Part 3 of this document entitled "International Legal Instruments" contains a comprehensive discussion of the legal framework for addressing illicit trafficking.[13] Other important subjects covered by this document include:

- Threat assessment (Part 2)
- International initiatives (Part 4)
- Understanding Radiation and its Effects (Part 5)
- Radiation Safety (Part 6)
- Authorised Uses and Nuclear Commerce (Part 7)
- Transport of Nuclear and Other Radioactive Material (Part 8)
- Preventing Criminal or Other Unauthorised Acts (Part 9)
- Technical Detection Methods (Part 10)
- Response Measures (Part 11)

Other documents in the nuclear security series also address matters connected to illicit trafficking.[14]

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13. IAEA Reference Manual "Combating Illicit Trafficking in Nuclear and Other Radioactive Material", Security Series No. 6, IAEA, Vienna (2007), pages 9-33.

14. See, for example, "Technical and Functional Specifications for Border Monitoring Equipment", Security Series No. 1, IAEA, Vienna (2006); "Monitoring for Radioactive Material in International Mail Transported by Public Postal Operators", Security Series No. 3, IAEA, Vienna (2006); "Security in the Transport of Radioactive Material", Security Series No. 9, IAEA, Vienna (2008).

III. Combating nuclear terrorism

Similar to the term nuclear security, "nuclear terrorism" is not precisely defined in any international legal instrument. One general definition of "terrorism", without the nuclear element, is contained in the 1999 Convention on the Suppression of Financing of Terrorism as follows: "Any other act intended to cause death or serious bodily injury to a civilian, or to any other person not taking an active part in the hostilities in a situation of armed conflict, when the purpose of such act, by its nature and context, is to intimidate a population or compel a government or international organisation to do or to abstain from doing any act". Considering the existing terminology used for the nuclear element in nuclear terrorism and the way it is defined, it would be more accurate to speak of "radiological terrorism". This is because, as discussed earlier, unlike the threat of nuclear proliferation – where the main concern is development of an explosive device – a consensus of experts believes that terrorists are more likely to pursue a radiation dispersal device (RDD) or so called "dirty bomb" using other radioactive (non-nuclear) materials. Thus, it is important that legal regimes for combating "nuclear terrorism" address both kinds of materials.[15]

Several factors have increased the attention of the international legal community to nuclear terrorism. Most obvious are fears that recent terrorist attacks could be followed by similar incidents using radiological materials. The spread of nuclear technology and materials to additional states and locations also raises security concerns. Further, it is clear that non state actors (terrorists, organised crime, separatists etc.) have developed increased capabilities to conduct malevolent activities, including acquisition and communication of sensitive information through electronic means. Finally, in some states and regions, weakened social and legal controls have provided opportunities for terrorist elements.

The thirteen (or 13+3) universal anti-terrorism instruments

As one of the most active fields of recent nuclear law development, nuclear terrorism has been addressed in the promulgation of new instruments and

15. IAEA guidance documents categorise the nature and quantities of isotopes of concern for both safety and security.

guidance documents, as well as in the legal literature.[16] In terms of binding international instruments, some thirteen universal anti-terrorism conventions or protocols have been developed.[17] Although many of these do not specifically mention nuclear terrorism, their provisions could be germane in an event involving malevolent use of nuclear or other radioactive materials connected with the subject matter of the particular instrument. For example, if a terrorist were to use radioactive materials to threaten or injure persons in the course of an international airline flight, one or more of the civil aviation conventions (cited below) could be applicable.

The thirteen (or 13+3) universal anti-terrorism conventions include:

United Nations Conventions

- Convention on the Prevention and Punishment of Crimes Against Internationally Protected Persons (1973 – 166 parties)
- International Convention Against the Taking of Hostages (1979 – 164 parties)
- International Convention for the Suppression of Terrorist Bombing (1997 – 153 parties)
- International Convention for the Suppression of the Financing of Terrorism (1999 – 160 parties)
- International Convention for the Suppression of Acts of Nuclear Terrorism (2007 – 67 parties)

Civil Aviation Conventions

- Convention on Offences and Certain other Acts Committed on Board Aircraft (1963 – 183 parties)
- Convention for the Suppression of the Unlawful Seizure of Aircrafts (1970 – 183 parties)

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16. A very useful overview of the subject is contained in Gehr, W., “The Universal Legal Framework Against Nuclear Terrorism”, *Nuclear Law Bulletin* No. 79 (2007/1). See also Jankowitsch-Prevor, O., “New Frontiers of Nuclear Law: Is There an Emerging International Legal Regime on Nuclear Terrorism?” in: Proceedings of Nuclear Inter Jura 2007, Bruylant (2008), at pages 883-898.

17. Sometimes this number is increased to sixteen, since three separate protocols have been developed to supplement various instruments. Another way of describing the regime has been to refer to the conventions as the 13+3 anti-terrorism instruments.

- Convention for the Suppression of Unlawful Acts against the Safety of Civil Aviation (1973 – 186 parties)
- Protocol for the Suppression of Unlawful Acts of Violence at Airports Serving International Civil Aviation (1988 – 165 parties)
- Convention on the Marking of Plastic Explosives for the Purpose of Detection (1991 – 183 parties)

Maritime Instruments

- Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation (1988 – 149 parties)
- Protocol to the (above) Convention (6 approvals, not in force)
- Protocol for the Suppression of Unlawful Acts against the Safety of Fixed Platforms Located on the Continental Shelf (1988 – 138 parties)
- Protocol to the (above) Protocol (4 approvals, not in force)

IAEA Instruments

- Convention on the Physical Protection of Nuclear Material (1987 – 143 parties)
- Amendment to the CPPNM (2005 – 39 approvals, not in force)

Most of these instruments will not be discussed in detail in this paper, both for reasons of space and because many do not specifically reference nuclear or radioactive materials or facilities. However, even those covering different subject matter areas provide support for certain common legal elements in addressing nuclear terrorism. The four most important are:

- identification of acts considered to be offences;
- a requirement to make those acts criminal under domestic law;
- a requirement to establish jurisdiction and either prosecute or extradite offenders;
- establishment of mechanisms for co-operation and assistance.

The following discussion will address the most relevant nuclear-related instruments.

International Convention for the Suppression of Acts of Nuclear Terrorism

This convention is the most recent multilateral instrument in the nuclear security field. It was opened for signature in September 2005 and entered into force in July 2007. The preamble of the convention expresses concern about the worldwide escalation of acts of terrorism and identifies an "urgent need to enhance international co-operation between states in devising and adopting effective and practical measures for the prevention" of acts of nuclear terrorism. Article 1 of the convention makes its broad scope clear by defining four key terms. The definitions of "radioactive material", "nuclear material", "nuclear facility" and "device" are incorporated into Article 2, which codifies a range of offences intended to cause death or serious bodily injury or substantial damage to property or the environment. These offences include terrorist acts associated with the development of nuclear explosives, radiological dispersion devices (so called dirty bombs) and damage to nuclear facilities. Additional offences are created for threats, demands, attempts, participation as an accomplice organisation or direction and contribution to acts of nuclear terrorism. Article 5 requires states parties to establish the offences set forth in Article 2 as criminal offences under national law. Additional articles in the convention establish a range of other obligations, including measures: to counter nuclear terrorism; to exchange information; to detect, prevent and respond to nuclear terrorist acts; to identify competent authorities and identify liaison points. A number of other articles deal with jurisdictional and procedural issues arising from apprehension and prosecution of persons alleged to have committed offences identified in the Convention. A duty to "prosecute or extradite" (known in international law as the doctrine of "*aut dedere, aut judicare*") is codified in Article 13. Very important obligations to render harmless and ensure the protection of any radioactive material seized during incidents of possible nuclear terrorism are set forth in Article 18. This article also incorporates by reference the IAEA's safeguards measures and physical protection recommendations.

Regional nuclear-weapon-free zone treaties

Five regional instruments have been developed over the past four decades for the purpose of excluding nuclear weapons from defined areas of the world. Although focused on the proliferation of nuclear weapons to additional states, some of their provisions are applicable to nuclear security, including physical protection, the prevention of illicit trafficking of nuclear materials and related items or technology and combating nuclear terrorism.[18] Because of limits on the length of this article, the following treaties (with year of entry into force) are only listed for further reference:

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18. For a useful discussion of these regional arrangements see Tabassi, L., "National Implementation and Enforcement of Nuclear-Weapon-Free Zone Treaties" in *Nuclear Law Bulletin* No. 83 (2009/1), OECD/NEA, at pages 29-57.

- Tlatelolco Treaty for Latin America (1968).
- Rarotonga Treaty for the South Pacific (1986).
- Bangkok Treaty for South East Asia (1997).
- Pelindaba Treaty for Africa (2009).
- Central Asia Treaty (2009).

Security Council Resolution 1887

Adopted on 24 September 2009, this resolution primarily addresses the issue of nuclear proliferation. The main motivation for the resolution was to support efforts to maintain and enhance the NPT regime during the review process culminating in the fifth NPT review conference in 2010. However, the resolution also contains some measures addressing nuclear security that should be noted. These measures are not mandatory, given the fact that the resolution was not adopted under Chapter VII of the Charter.

The 23 paragraph long preamble expresses concern about the threat of nuclear terrorism (para. 17), supports the CPPNM and its 2005 Amendment and the Convention for the Suppression of Nuclear Terrorism (para. 20), recognises the Global Initiative to Combat Nuclear Terrorism (para. 21) and reaffirms previous UN Security Council (UNSC) Resolution 1540 (para. 23).

Among the resolution's 29 operative paragraphs the following call upon UN member states to take a number of actions relating to nuclear security:

- stricter export controls on sensitive technologies (paragraph 13);
- states to consider the additional protocol in making export decisions (paragraph 19);
- universal adherence to the CPPNM and its 2005 Amendment and Nuclear Terrorism Convention (paragraph 21);
- support for the UNSC Resolution 1540 and its implementation (paragraphs 22-23);
- best security practices to be shared (paragraph 24);
- states to improve capabilities to prevent illicit trafficking in nuclear materials (paragraph 26);
- states to prevent financing of proliferation and to strengthen export controls (paragraph 27);
- intention to monitor situations involving proliferation, including to or by non state actors to be declared (paragraph 28).

Nuclear security series

Guidance documents developed by the IAEA in this series that focus primarily on illicit trafficking have been discussed in Part II of this paper. However, a number of other nuclear security series documents have been published or are being developed that address broader security issues including combating terrorism. Some of these include:

- Nuclear Forensics Support (No. 2)
- Engineering Safety Aspects of the Protection of Nuclear Power Plants Against Sabotage (No. 4)
- Nuclear Security Culture (No. 7)
- Preventive and Protective Measures against Insider Threats (No. 8)
- Development, Use and Maintenance of the Design Basis Threat (No. 10)
- Detection and Response to Nuclear Security Events (under development)

As will be evident, the nuclear security series will eventually provide the kind of comprehensive guidance for IAEA member states and other stakeholders in the nuclear security field that has long been provided for safety by the Agency's voluminous nuclear safety series documents.

IV. Legal elements for nuclear security

As the previous discussion indicates, the nuclear community has witnessed a great deal of recent activity in promulgating both "hard law" and "soft law" instruments in the field of nuclear security. While these instruments may be focused on different aspects, it is apparent that a number of common elements for addressing nuclear security have achieved a high level of consensus among states engaged in the peaceful uses of nuclear energy. This section attempts to identify the most important of these elements, with citations to the instruments or documents that support them.[19] It is not suggested that this listing is comprehensive but only that they represent an emerging legal framework for nuclear security. The following ten elements seem well established across a range of mandatory instruments and voluntary guidance documents.

19. The ten elements are also noted in a separate article in this volume. See Stoiber, C., "The United Nations Security Council and Nuclear Law", pages 91 *et seq.*

1. **Denial of support to nuclear terrorism**

Element: states shall refrain from providing any form of support to non nuclear weapon states or non state actors that may attempt to develop, acquire or threaten the use of nuclear explosive or radiological dispersal devices.

Sources: UNSCR 1540, para. 1; UNSCR 1373, para. 1; UNSCR 1887, preamble para. 17; NPT Articles I and II; NTC, Articles 2 and 7; NSG and Zangger Committee Guidelines; Tlateloloco Treaty, Article 1(1)(b); Rarotonga Treaty, Article 3; Bangkok Treaty, Article 4(3); Pelindaba Treaty, Article 3(c); Central Asia Treaty, Articles 3(1)(c) and (d)(iii).

2. **Legislative framework**

Element: states shall put into place a national legislative framework for the protection of nuclear and other radioactive material and associated facilities.

Sources: UNSCR 1540, para 8(b); CNS, Article 7; Joint Convention, Article 19; C of C on Radioactive Sources, para. 8; CPPNM, Article 3; CPPNM Amendment, Article 8; INFCIRC 225, Section 4.2.1.

3. **Regulatory body**

Element: states shall designate a competent body to exercise regulatory control over the implementation of nuclear security measures.

Sources: CNS Article 8; Joint Convention, Article 20; CPPNM, Article 5; INFCIRC 225, Section 4.2.3.2; C of C on Radioactive Sources, paras. 20-22.

4. **Physical protection**

Element: states shall adopt requirements, including authorisation procedures, to ensure a high level of physical protection of nuclear materials and associated facilities from theft, unauthorised use or diversion and against sabotage.

Sources: UNSCR 1540, Article 3(b); UNSCR 1887, para. 20; CNS, preambular para. (v); NTC, Article 8; CPPNM, Article 3; INFCIRC 225.

5. Measures to combat illicit trafficking

Element: states shall establish measures, including border controls, export and trans-shipment controls and enforcement measures, to detect, deter, prevent and combat illicit trafficking in nuclear materials and related equipment and technology.

Sources: UNSC Res. 1540, paras. 3(c) and (d); UNSCR 1887, paras. 13 and 26; NSG and Zangger Committee Guidelines; C of C on Radioactive Sources, paras. 23-29 and Guidance on Import and Export of Radioactive Sources; NTC; CPPNM, Article 4.

6. Criminalisation of offences against nuclear security

Element: states shall identify actions threatening nuclear security and establish them as criminal offences in national law, with appropriate criminal or civil penalties for violations commensurate with the serious nature of these offenses.

Sources: UNSCR 1373 para 2(e); UNSCR 1540, para. 3(d); CPPNM, Article 7; CPPNM Amend. New Article 7; NTC, Articles 2 and 5.

7. Offenders to be prosecuted or extradited

Element: offences against nuclear security shall be considered as extraditable offences, either pursuant to any existing extradition treaty or pursuant to relevant international instruments, subject to the laws and procedures of the extraditing state.[20]

Sources: CPPNM Articles 11(1), 11(2) and 11(3); NTC Articles 10 and 13(1), 13(2) and 13(3); UNSCR 1373 para. 3(g).

8. Co-operation and assistance

Element: states shall provide co-operation and assistance at the request of another state in recovering or ensuring the safety and security of nuclear or other radioactive material that has been unlawfully taken or appropriated or in the event of a radiological emergency.

20. See also Bassiouni and Wise, "Aut Dedere Aut Judicare: The Duty to Extradite or Prosecute Under International Law", Martinus Nijhoff (1995).

Sources: UNSCR 1373, para 3; UNSCR 1540, para. 7; CPPNM, Article 5(2); Convention on Assistance, Article 2; NTC, Articles 7, 14, 18(2) and 18(3).

9. Sharing information and best practices

Element: states shall exchange information concerning potential threats or actions jeopardising nuclear security as promptly and fully as authorised by their national laws, including on best practices for improving security.

Sources: NTC, Article 7(1)(b); C of C on Radiation Sources, Article 12; CPPNM, Article 5(2); UNSCR 1887, para. 24.

10. Protection of sensitive information

Element: states shall protect the confidentiality of information received from other states or relevant international organisations where a request for confidentiality has been made.

Sources: UNSCR 1373 para. 2(f); CPPNM, Article 6; C of C on Radiation Sources, para. 17; NTC, Article 7(2).

V. Outlook

As mentioned at the beginning of the paper, the foregoing analysis demonstrates that the international legal framework for nuclear security has seen significant development in recent years. The regime has moved from a rather narrow focus on physical protection in international commerce to much broader requirements directly applicable to domestic actions to address the threats of illicit trafficking and nuclear terrorism. It is expected that this evolution will continue in all three fields discussed in this paper. And, as has been emphasised, these fields are closely related and must be treated together to find synergies and to avoid confusion or conflicts.

In conclusion, it may be useful to identify a few, albeit important, challenges that will need to be addressed in consolidating the international legal framework for nuclear security.

First, the diversity of binding and non-binding instruments and documents covering different, but related, aspects of nuclear security can pose issues of consistent interpretation and effective implementation by national authorities and international organisations. Legal and technical experts will need to contribute actively to finding ways to achieve greater harmonisation among the various instruments and documents.

Secondly, co-ordination of the actions and capabilities of a broad range of persons and entities having responsibilities relevant for nuclear security will be needed for effective application of the legal framework. Those persons include: legal and technical experts, law enforcement officers, border control and immigration officers, intelligence professionals, legislators, regulators, judicial officers, representatives of industry, foreign policy and emergency response officials, representatives of non-governmental and academic organisations, the press and media and finally the public. Mechanisms for regularly bringing together these diverse parties to better understand how their individual efforts can contribute to implementation of the legal framework will be important.[21] The creative use of modern information and communications tools will also be essential to enable continuing contacts.

Thirdly, adequate resources must be available for implementing the measures set forth in the various instruments. Many states will require technical, legal and financial assistance to develop needed human and technical means for implementing their commitments and best practice. Official bodies (like the IAEA and national governments) and non-governmental organisations will need to contribute to this effort. Better co-ordination will be essential to avoid duplication of effort and inefficiency in utilising limited resources.

Fourthly, sharing of current and accurate information on nuclear security threats and other relevant conditions will be important for both prevention of and response to nuclear security incidents. Much of this information is likely to be sensitive. Thus, it is understandable that national governments will be reluctant to share such information widely. However, it should be possible to find ways to provide access to relevant information promptly to those who have a clear need for such information to take effective action to prevent or respond to security incidents.

Finally, with the convening of the Nuclear Security Summit discussed in the introduction and the commitment to reconvene the summit in South Korea in 2012, it is clear that nuclear security will continue to receive high-level policy attention on a global basis. Nuclear lawyers thus will have continuing

21. The periodic review meetings or conferences associated with various international nuclear instruments can provide one such forum. See a discussion of issues with such meetings in Stoiber, C., "The Review Conference in Nuclear Law: Issues and Opportunities", *Nuclear Law Bulletin* No. 83 (2009/1), OECD/NEA, at pages 5-27.

opportunities and responsibilities to contribute to the development and enhancement of the legal framework for ensuring the protection of nuclear and other radioactive materials and preventing sabotage of nuclear facilities.

What is clear from this brief listing is that addressing these challenges will require the diligent and thoughtful contribution of the international nuclear law community for the foreseeable future.

The IAEA Safeguards System

*by Laura Rockwood**

The nuclear non-proliferation regime is a complex of varied and evolving instruments and measures intended to deter and detect the proliferation of nuclear weapons. It includes, *inter alia*, global and regional treaties on non-proliferation, export controls, physical protection, measures designed to track and deter illicit trafficking in nuclear and other radioactive materials, and international verification. Taken together, these instruments and measures, if effectively implemented, create a finely woven fabric which reduces the risk of the proliferation of nuclear weapons through state and non-state actions. The cornerstone of this regime is the safeguards system of the International Atomic Energy Agency (hereinafter the "Agency" or IAEA). This article describes the legal framework of IAEA safeguards and how the system has developed.

A. Legal framework

I. IAEA Statute

The IAEA's safeguards system is grounded in the provisions of the Agency's Statute which entered into force on 29 July 1957. As originally contemplated, the IAEA was to be a sort of broker of controlled nuclear assistance and trade. It was anticipated that the majority of the safeguards arrangements would be a function of the Agency's responsibility under Article II to "ensure, as far as it is able, that assistance provided by or through it, is not used in such a way as to further any

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military purpose". However, the Statute was drafted in such a way as to permit growth and flexibility in the system.

Article III.A.5 authorises the Agency to establish and administer safeguards designed to ensure that projects in the field of nuclear energy carried out or fostered by the Agency are not used in such a way as to further any military purpose (a requirement with respect to which Article XI.F.4 sets out in more detail: the assistance provided shall not be used in such a way as to further any military purpose, and the project shall be subject to the safeguards provided for in Article XII to the extent the agreement specifies particular controls to be relevant). In addition, Article III.A.5 authorises the IAEA to apply safeguards to any bilateral or multilateral arrangement, at the request of the parties, and to any of the nuclear activities of a state, at that state's request.

Article XII of the Statute sets out the fundamental features of Agency safeguards in three paragraphs:

1. the rights and responsibilities that the Agency has when carrying out safeguards, to the extent relevant to the specific situation:

    - to examine the design of specialised equipment and facilities;
    - to require the maintenance and production of operating records to assist in ensuring accountability for and control of source and special fissionable materials;
    - to require the submission of reports;
    - to send into the state inspectors, designated by the Agency after consultation with the state or states concerned, who shall have access at all times to all places and data and to any person who by reason of his occupation deals with materials, equipment or facilities which are required by this Statute to be safeguarded, as necessary to account for nuclear materials and to determine whether there is compliance with the undertaking against use in furtherance of any military purpose and with any other conditions prescribed in the agreement; and
    - impose certain sanctions.

2. the requirement that the Agency establish a staff of inspectors, whose general functions are specified in the Statute (including right of access).

3. the steps available to inspectors, by the Director General and by the Board of Governors in the event a state is found to be in violation of its safeguards agreement, including calling upon the state to remedy the non-compliance, reporting such non-compliance to the member states of the Agency, to the Security Council and the General Assembly of the United Nations and imposing certain sanctions.

II. Treaty and supply agreement obligations

1. Assistance provided by the Agency

Article III.A.5 of the Statute contemplates the application of Agency safeguards to assistance provided by the IAEA. As indicated in Article XI.F of the Statute, assistance may be provided to Agency member states by the IAEA in connection with any project for research on, or development or practical application of, atomic energy for peaceful purposes. Assistance provided under such projects can take the form of special fissionable or other material, services, equipment and/or facilities. These projects, which are administered by the IAEA's Department of Technical Co-operation, normally entail the conclusion of two documents: first, a supply agreement between a supplier state, the recipient state and the Agency and secondly, a project agreement between the Agency and the recipient state which, among other provisions, requires the application of Agency safeguards where relevant. That is so, for example, where the project involves the supply of nuclear material or facilities.

2. Multilateral and bilateral treaties

a. The NPT

The first global treaty calling for IAEA safeguards was the Treaty on the Non-Proliferation of Nuclear Weapons (the NPT) which entered into force on 5 March 1970. Article III.1 of the NPT requires each non-nuclear weapon state[1] (NNWS) to accept safeguards, as set forth in an agreement to be concluded with the IAEA in accordance with its Statute, on all source or special fissionable material in all peaceful nuclear activities within its territory, under its jurisdiction or carried out under its control anywhere, for the exclusive purpose of verifying that such material is not diverted to nuclear weapons or other nuclear explosive devices. The safeguards agreements required under

1. Article IX.3 of the NPT defines a nuclear-weapon state (NWS) as one which had manufactured and exploded a nuclear weapon or other nuclear explosive device prior to 1 January 1967, of which there are five: China, France, the Soviet Union (now the Russian Federation), the United Kingdom and the United States.

Article III.1 are referred to as "full scope agreements" or, more commonly, "comprehensive safeguards agreements" (CSAs).

In addition, Article III.2 of the NPT requires each state party to the NPT not to provide source or special fissionable material, or equipment or material especially designed or prepared for the processing, use or production of special fissionable material, to a NNWS for peaceful purposes unless the source or special fissionable material is subject to Agency safeguards. There is no corresponding requirement with respect to exports to NWSs.

Negotiation of the NPT resulted in accommodation of a number of states' interest in retaining the right to use nuclear energy for non-explosive military purposes, specifically, nuclear naval propulsion. In addition, the treaty contemplates availability to NNWSs of the potential benefits of peaceful applications of nuclear explosives, although not necessarily access to the nuclear explosive devices themselves or to the relevant technology.

b. The Tlatelolco Treaty

The first regional treaty on non-proliferation and a nuclear-weapon-free zone was the Treaty for the Prohibition of Nuclear Weapons in Latin America, which was opened for signature in Tlatelolco, Mexico on 14 February 1967, and has entered into force for the states in the zone of application. Article 1 of the treaty requires all parties to use exclusively for peaceful purposes the nuclear material and facilities which are under their jurisdiction and to prohibit and prevent in their respective territories (a) the testing, use, manufacture, production or acquisition by any means whatsoever of any nuclear weapons by the parties themselves directly or indirectly, on behalf of anyone else or in any other way and (b) the receipt, storage, installation, deployment and any form of possession of any nuclear weapons, directly or indirectly, by the parties themselves, by anyone on their behalf or in any other way.

Articles 12-18 of the Tlatelolco Treaty establish a control system for the purpose of verifying compliance with the obligation under the treaty to use nuclear energy exclusively for peaceful purposes. Under that system, a party to the Tlatelolco Treaty is required to conclude multilateral or bilateral agreements with the IAEA for the application of its safeguards to its nuclear activities. Similar to the NPT, the Tlatelolco Treaty also contemplates the possibility of peaceful applications of nuclear explosions conducted by a nuclear-weapon state (NWS). However, unlike the NPT, the Tlatelolco Treaty does not contain a requirement of safeguards as condition of nuclear supply.

There are two additional protocols to the Tlatelolco Treaty. Additional Protocol I of the treaty is open to any state which has territories in the zone of application of the treaty for which it is, *de jure* or *de facto*, internationally responsible (France, the Netherlands, the United Kingdom and the United States) and requires the state to conclude a safeguards agreement with respect to such territories. Additional Protocol II is open to the five NWSs and contains an undertaking not to use or threaten to use nuclear weapons against the parties to the Tlatelolco Treaty (referred to as "negative security assurances").

c. The Rarotonga Treaty

The South Pacific Nuclear Free Zone Treaty (the Rarotonga Treaty) was opened for signature in 1985 and entered into force on 11 December 1986. Article 8 of the treaty, which establishes the control system under the treaty, requires the application to peaceful nuclear activities of safeguards by the IAEA pursuant to an agreement required in connection with the NPT or equivalent in scope. Unlike the NPT and the Tlatelolco Treaty, no nuclear explosives or nuclear explosive devices are permitted within the zone of application of the treaty. With regard to exports, Article 4 of the Rarotonga Treaty requires each party not to provide source or special fissionable material, or equipment or material especially designed or prepared for the processing, use or production of special fissionable material for peaceful purpose to any NNWS unless subject to IAEA safeguards, or to any NWS unless subject to applicable safeguards agreements with the IAEA. Under that same article, each state party also expressly undertakes to support the continued effectiveness of the international non-proliferation system based on the NPT and the IAEA safeguards system.

The Rarotonga Treaty includes three protocols: Protocol 1 is similar to Additional Protocol I of the Tlatelolco Treaty and is open to states with territories for which they are internationally responsible which are situated within the South Pacific nuclear-free zone (France, the United Kingdom and the United States). Protocols 2 and 3 are open to the five NWSs. Protocol 2 contains an undertaking not to use or threaten to use nuclear explosive device against any party to the treaty or any territory within the zone for which it is internationally responsible. Protocol 3 contains an undertaking not to test any nuclear explosive device within the zone.

d. The Bangkok Treaty

The Southeast Asia Nuclear Weapon-Free Zone Treaty (the Bangkok Treaty) was opened for signature by all states in Southeast Asia, namely Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam, on 15 December 1995, in Bangkok, and entered into force on 27 March 1997. Under this treaty, each state party undertakes to use exclusively for peaceful purposes nuclear material and facilities which are within its territory and areas under its jurisdiction and control and to conclude an agreement with the IAEA for the application of full-scope safeguards to its peaceful nuclear activities. The treaty also prohibits the export of source or special fissionable material, or specially designed or prepared equipment or material, to any NNWS except under a comprehensive safeguards agreement, and to NWSs, in conformity with applicable safeguards agreements with the IAEA. The control system set up under the Bangkok Treaty also has a mechanism permitting a state party to request that a fact-finding mission be sent to another state party in order to clarify and resolve a situation which may be considered ambiguous or which may give rise to doubts about compliance with the provisions of the treaty. The Bangkok Treaty includes a protocol on negative security assurances open to signature by the NWSs.

e. The Pelindaba Treaty

The African Nuclear Weapon-Free Zone Treaty (the Pelindaba Treaty) was opened for signature in Cairo, Egypt, on 11 April 1996. Pursuant to this treaty, each party undertakes not to conduct research on, develop, manufacture stockpile or otherwise acquire, possess or have control over any nuclear explosive device by any means anywhere; not to seek or receive any assistance in the research on, development, manufacture, stockpiling or acquisition or possession of any nuclear explosive device; and not to take any action to assist or encourage the research on, development, manufacture, stockpiling or acquisition or possession on any nuclear explosive device. The parties also undertake to prohibit the stationing of nuclear weapons on their territory and to prohibit the testing of any nuclear explosive devices on their territory. As regards safeguards, each state party undertakes to conduct all activities for the peaceful use of nuclear energy under strict non-proliferation measures to provide assurance of exclusively peaceful uses, to conclude a comprehensive safeguards agreement with the IAEA and not to export source or special fissionable material, specially designed or prepared equipment or material to NNWSs except subject to a comprehensive safeguards agreement. Associated with the treaty are three protocols: Protocol I, which is open to signature by the five NWSs, binds those states not to use or threaten to use a nuclear explosive device against a party to the treaty or in the African nuclear-weapon-free zone; Protocol II, also open to signature by the five NWSs, commits the parties to it not to test or assist or encourage the testing of a nuclear explosive device within the zone; and Protocol III, which is open to all states with territories with respect to which it has *de jure* or *de facto* international responsibility situated in the zone, requires, *inter alia*, the application of safeguards to such territories.

f. The CANWFZ Treaty

The Central Asian Nuclear-Weapon-Free Zone (CANWFZ) Treaty was signed on 8 September 2006 by Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan and Turkmenistan in Semipalatinsk, Kazakhstan. The treaty, which entered into force on 21 March 2009, created the first denuclearised zone in the northern hemisphere and the first bordered by two NWSs. Similar to the other NWFZ treaties, the parties undertake not to conduct research on, develop, manufacture stockpile or otherwise acquire, possess or have control over any nuclear explosive device by any means anywhere; not to seek or receive any assistance in the research on, development, manufacture, stockpiling or acquisition, or possession of any nuclear explosive device; and not to take any action to assist or encourage the research on, development, manufacture, stockpiling or acquisition or possession on any nuclear explosive device. The parties also undertake to prohibit the stationing of nuclear weapons on their territory and to prohibit the testing of any nuclear explosive devices on their territory. As regards safeguards, each state party undertakes to use nuclear material and facilities for exclusively peaceful uses, to conclude with the IAEA, if it has not already done so, a CSA. Significantly, the CANWFZ Treaty also requires each state party to conclude an additional protocol (AP) as well as a CSA (see discussion below) and not to export source, or special fissionable material, specially designed or prepared equipment or material, to a NNWS unless that state has concluded with the IAEA a CSA and an AP. Associated with the treaty is a protocol, open to signature by the five NWSs, containing negative security assurances and an undertaking not to contribute to any act that constitutes a violation of the treaty or the protocol.

g. The Argentina/Brazil Agreement

The Governments of Argentina and Brazil entered into an agreement in 1990 calling for the establishment of a bilateral inspectorate (ABACC – the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials) and for the conclusion of a comprehensive agreement with the IAEA for the application of safeguards to all nuclear material in nuclear activities in Argentina and Brazil.

3. At the request of a state

This provision of the Statute covers agreements between the IAEA and a state concluded at the request of that state, generally because of supply arrangements with other states who insist on safeguards as a condition of supply to provide assurance that nuclear-related trade is not used for military purposes. This provision also serves as the basis for the conclusion and implementation of the so called voluntary offer agreements (VOAs) concluded with the five NWSs.

III. Basic documents

1. INFCIRC/66/Rev.2

The first safeguards document (INFCIRC/26) was worked out by interested governments and the Secretariat in 1959 and 1960 and approved by the Board of Governors on 31 January 1961. It contained the principles and procedures for the application of safeguards to small reactors. This document was extended to larger reactors by decision of the Board on 26 February 1964. In 1964 and 1965, a completely revised safeguards document was worked out by a group of government experts and approved by the Board after unanimous concurrence by the General Conference in September 1965 (INFCIRC/66). Annex I to INFCIRC/66, which contains provisions for reprocessing plants, was approved by the Board in 1966, and Annex II, which contains provisions for safeguarded nuclear material in conversion and fuel fabrication plants, was adopted by the Board in 1968. With its two annexes, the safeguards document is now referred to as INFCIRC/66/Rev.2. Its provisions are incorporated by reference in the safeguards agreement.

In June 1961, the Board of Governors adopted a document referred to as the inspectors document [GC(V)/INF/39, Annex], developed with the help of government experts, which covers four different areas of inspection activities, including designation of Agency inspectors, notification of inspections, the conduct of inspection and rights of access and the privileges and immunities of inspectors. This document is also incorporated by reference in INFCIRC/66-type agreements (the comparable provisions in comprehensive safeguards agreements are included in the text of the agreements themselves). Hence, the inspectors document is of relevance only to agreements concluded pursuant to INFCIRC/66/Rev.2.

INFCIRC/66-type safeguards agreements originally included a basic undertaking on the part of the state or states party to the agreement not to use any safeguarded item for any military purpose. As will be discussed below, after 1974, that undertaking was expanded to limit the use of any item safeguarded thereunder to peaceful purposes and to prohibit the use of such items for the manufacture of any nuclear weapon, or to further any other military purpose or for the manufacture of any other nuclear explosive device.

2. INFCIRC/153 (Corr.)

In 1970, the Board of Governors established a Safeguards Committee (Committee 22) to advise it on the contents of safeguards agreements to be concluded between the NNWSs party to the NPT and the IAEA. Participation in the Committee was open to all member states of the Agency and included, in addition to many states party to the NPT, states which were not party, such as France, India and Pakistan. The Safeguards Committee developed a document entitled “The Structure and Content of Agreements between the Agency and States Required in connection with the Treaty on the Non-Proliferation of Nuclear Weapons”, which the Board approved in 1972, and requested the Director General to use as the basis for negotiating safeguards agreements under the NPT. The document was published by the Agency as INFCIRC/153 (Corr.).

INFCIRC/153 has also served as a basis for the structure and content of comprehensive safeguards agreements concluded pursuant to the Tlatelolco Treaty and is considered the standard for safeguards agreements under the Rarotonga Treaty, the Pelindaba Treaty and the Bangkok Treaty. In addition, it provided a basis for the negotiation of the first unilateral comprehensive safeguards agreement with Albania, a non-NPT comprehensive agreement with Ukraine,[2] and the quadripartite safeguards agreement concluded with Argentina and Brazil.

The basic undertaking of the state under a CSA tracks the language of the NPT. In such agreements, the state undertakes to accept safeguards on all source or special fissionable material in all peaceful nuclear activities carried out on its territory or subject to its jurisdiction or control anywhere for the exclusive purpose of verifying that such material is not used for nuclear weapons or any other nuclear explosive device.[3] For its part, the IAEA has the right and obligation to ensure that all such material is safeguarded in accordance with the

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2. Ukraine has since concluded an NPT CSA.

3. It is worth noting that, as under the NPT, while all explosive uses of nuclear material are prohibited under CSAs, not all military uses of nuclear material are prohibited. However, should a CSA state wish to withdraw nuclear material for use in a non-proscribed military activity, such as nuclear propulsion for submarines, the state must first agree with the IAEA on arrangements to ensure that the material is not removed from safeguards only for so long as it is in that use.

agreement, that is to say, to verify that there is no diversion of declared nuclear material to proscribed purposes and that there is no undeclared nuclear material or activity in the state.

Following the end of the cold war, a series of events resulted in a dramatic change in the IAEA's safeguards system. The discovery of a clandestine nuclear weapons programme in Iraq, the continuing difficulty in verifying the initial report of the Democratic People's Republic of Korea (DPRK) upon entry into force of its NPT CSA and the decision of the South African Government to give up its nuclear weapons programme and join the NPT, all played a role in an ambitious effort by IAEA member states and the Secretariat to strengthen the safeguards system.

Motivated by these events, between 1991 and 1993, the Board confirmed the IAEA's authority under CSAs to verify not just the correctness, but the completeness of states' declarations concerning nuclear material and facilities, with a view to ensuring that there is no diversion to proscribed purposes of any nuclear material in the state, whether declared or undeclared. The Board also confirmed the IAEA's right to have early access to design information about nuclear facilities and its continuing right to verify such information. In addition, the Board confirmed the IAEA's authority to use: environmental monitoring, a novel tool developed by the IAEA during its Security Council mandated verification in Iraq for detecting undeclared enrichment and reprocessing activities; satellite imagery and any other information available to it, whether from open sources or national technical means (intelligence information).

In June 1993, the Board of Governors requested the Director General to submit to it concrete proposals for the assessment, development and testing of measures for strengthening safeguards and improving its cost effectiveness. In response to that request, the Secretariat of the IAEA, in December 1993, initiated "Programme 93+2".

Over the course of the following two years, the Secretariat identified a comprehensive set of strengthening and efficiency measures for greater access to information, more extensive physical access to locations and maximisation of the efficiency and cost-effectiveness of the existing system of safeguards under INFCIRC/153 (GOV/2807) and tabled it for the Board's consideration in June 1995.

The measures were divided into two parts: Part 1, consisting of measures which could, in the Secretariat's view, be implemented under existing legal authority; and Part 2, consisting of measures which were believed to require complementary legal authority. The Board took note of the Director General's plan to implement at an early date those measures which fell within existing authority, thus indicating the Board's concurrence with the Secretariat's legal interpretation of the Agency's existing rights of access to information and locations, and urged states party to comprehensive safeguards agreements to co-operate with the Secretariat to facilitate such implementation. The Board also tasked the Secretariat with developing a legal instrument for the implementation of the Part 2 measures.

3. Model Additional Protocol – INFCIRC/540 (Corr.)

Between June 1995 and June 1996, the Secretariat of the IAEA, in close consultation with member states of the Agency, developed for the Board's consideration a draft model of a protocol additional to safeguards agreements for that complementary authority. That draft served as the basis for the deliberations of Committee 24, the Committee established by the Board of Governors to negotiate and present to it a model protocol. On 15 May 1997, the Board of Governors, in a special session, approved the model for a new legal instrument designed to strengthen the effectiveness and improve the efficiency of the IAEA safeguards system: the Model Protocol Additional to Agreements between States and the IAEA for the Application of Safeguards [INFCIRC/540 (Corr.)].

The text of the model additional protocol consists of a preamble, eighteen articles and two annexes. The language of the preamble reflects the backbone of the negotiations: the need for a balance to be struck between, on the one hand, the desire to strengthen the effectiveness and improve the efficiency of the Agency's safeguards system and, on the other hand, the obligation to keep the frequency and intensity of activities to a minimum consistent with this objective. The measures provided for in the model additional protocol include:

- information about, and inspector access to, all aspects of a state's nuclear fuel cycle, from uranium mines to nuclear waste and any other location where nuclear material intended for non-nuclear uses is present;
- information on, and short-notice inspector access to, all buildings on a nuclear site;
- information about, and inspection mechanisms for, fuel cycle-related research and development;
- information on the manufacture and export of sensitive nuclear-related technologies and inspection mechanisms for manufacturing and import locations;

- the collection of environmental samples beyond declared locations when deemed necessary by the IAEA; and
- administrative arrangements that improve the process of designating inspectors, the issuance of multi-entry visas (necessary for unannounced inspections) and IAEA access to modern means of communications.

Article 1 of the model additional protocol establishes the relationship between an AP and the relevant safeguards agreement. It provides that the agreement and the AP are to be read as a single document with, in cases of conflict, the provisions of the additional protocol prevailing.

An AP, in combination with a state's CSA, provides as complete a picture as practicable of that state's production and holdings of nuclear source material, the activities for further processing of nuclear material (for both nuclear and non-nuclear application), and specified elements of the infrastructure that directly support the state's current or planned nuclear fuel cycle. The increased "complementary access" not only strengthens the IAEA's ability to verify declared nuclear material and activities but helps it provide assurances that undeclared nuclear activities are not concealed within declared nuclear sites or at other locations in the state.

4. Privileges and Immunities Agreement – INFCIRC/9/Rev. 2

Agency safeguards inspectors are entitled to certain privileges and immunities while carrying out their responsibilities. These are grounded in Article XV.A of the Agency Statute, which provides that the staff of the Agency shall enjoy such privileges and immunities as are necessary in the independent exercise of their functions in connection with the Agency, and are spelled out in the Agreement on the Privileges and Immunities of the Agency (INFCIRC/9/Rev.2). The relevant provisions of this agreement are incorporated by reference into the safeguards agreements. They include immunity from legal process in respect of words spoken or written and all acts performed by an inspector in his or her official capacity, immunity from personal arrest or detention for non-official capacity, immunity from personal arrest or detention for non-official as well as official acts occurring during a mission, inviolability of papers and documents and freedom from seizure of personal baggage.

These privileges and immunities are extended to inspectors not only by the country in which an inspection takes place, but also by those member states through which inspectors are transiting on their way to and from that country. It bears noting that the IAEA has consistently taken the position that the Statute creates an obligation for member states to grant immunities as specifically defined in INFCIRC/9/Rev.2 and that non-acceptance of that agreement does not reduce the obligation of a member state to accord inspectors immunities adequate to enable them to efficiently complete their missions.

IV. Decisions and practices of the IAEA's Board of Governors

The legal framework of IAEA safeguards is formed not only by legal instruments, such as the documents referred to above, but also by the decisions and practices of the IAEA's Board of Governors. Some of the more significant decisions are referred to above. A number of other significant actions taken by the Board in the context of interpretation of the Agency safeguards agreements are described below.

1. Duration and termination of INFCIRC/66 agreements (GOV/1621)

Paragraph 16 of the INFCIRC/66/Rev.2 makes reference to the "desirability" of providing for the continuation of safeguards with respect to produced special fissionable material and to any materials substituted therefor. In 1973, the Board expressed concern about the need for safeguarding such material after the expiry of a safeguards agreement. As a consequence, since 1974, the duration of 66-type agreements has been tied to the actual use in the recipient state of supplied material or items, rather than to fixed periods of time. Under these agreements, safeguards are required to continue on all safeguarded items, including subsequent generations of produced nuclear material derived from safeguarded material or facilities, until safeguards are terminated in accordance with the revisions of INFCIRC/66/Rev.2.

2. Nature of the "no military" use undertaking

As indicated above, the early safeguards agreements concluded in accordance with INFCIRC/66/Rev.2 contained an undertaking by the state not to use safeguarded items for "any military purposes". Following the Indian testing of a so called "peaceful" nuclear explosive device in 1974, the Director General proposed, and the Board accepted, an interpretation of that undertaking precluding the use of safeguarded items for any nuclear explosive device, whether intended for peaceful or non-peaceful ends, owing to the technical impossibility of distinguishing between a nuclear explosive device for peaceful uses and one for military uses. Although a small number of states expressed reservations about this interpretation, all INFCIRC/66/Rev.2 safeguards agreements since 1975 have incorporated a basic undertaking which expressly precludes the use of safeguarded items for the manufacture of any nuclear weapon or to further any other military purpose or for the manufacture of any other nuclear explosive device.

3. Coverage of transfers of technology, non-nuclear material

Although originally limited in applicability to nuclear material and certain types of nuclear facilities, the scope of INFCIRC/66-type agreements over the years has been expanded with the approval of the Board. These agreements have since included provisions for the safeguarding of such items as non-nuclear materials (e.g. heavy water, zircaloy), non-nuclear facilities (such as heavy water production plants) and transferred technology.

4. Containment and surveillance

Although originally not expressly included in INFCIRC/66-type safeguards agreements, the Board of Governors has approved specific provisions for the application of containment and surveillance measures, which have routinely been included in the more recent INFCIRC/66-type agreements.

5. Policy in implementation of financial clauses in safeguards agreements

While all Agency safeguards agreements reflect the basic principle that the expenses of safeguards are to be shared between the Agency and the state concerned, with each party bearing the expenses of carrying out its own responsibilities under the agreement, questions have arisen over the years as to the responsibility for particular expenses associated with certain safeguards activities. In 1990, the Director General presented to the Board a uniform policy with respect to the allocation of such expenses under INFCIRC/66/Rev.2-type agreements and INFCIRC/153 agreements (GOV/INF/577). The Secretariat has, since that time, included in the Subsidiary Arrangements to all Safeguards Agreements the provisions presented to the Board.

6. Interpretation of provisions related to the early provision of design information

On 26 February 1992, the Board of Governors adopted a recommendation of the Director General related to the early provision of design information (GOV/2554/Att.2/Rev.2). In so doing, the Board interpreted paragraph 42 of INFCIRC/153, which stipulates that such information shall be provided by a state "as early as possible before nuclear material is introduced into a new facility", as requiring the provision of design information as soon as the decision to construct, to authorise construction or to modify a facility has been taken and, on an iterative basis, as the design is developed. The implementation of this interpretation required the modification of, *inter alia*, the standardised Code 3.1 of the General Part of Subsidiary Arrangements, which previously had provided for the submission of information on new facilities only 180 days before the introduction of nuclear material into a new facility. At the direction of the Board, the Secretariat negotiated with states with subsidiary arrangements in force the modification of Code 3.1. As of 2010, all such states have agreed to the modified Code 3.1.[4]

B. Contents, comparison and implementation of safeguards agreements

The safeguards agreements concluded by the IAEA may be categorised generally as:

- the item-specific agreements concluded in accordance with INFCIRC/66/Rev.2;
- CSAs concluded in accordance with or along the lines of INFCIRC/153 (Corr.); and
- safeguards agreements applicable to all or part of the civil nuclear fuel cycles of NWSs (the so called voluntary offer agreements or "VOAs").

The basic goals of all safeguards agreements are similar: to verify compliance with the undertakings of the states parties not to use safeguarded items for proscribed purposes. Moreover, the basic technical aspects of the implementation of safeguards are applied in all states subject to safeguards. Each agreement provides for Agency review of design information; reporting and record keeping by the state; inspection activities to be carried out by the IAEA, including rights of access and notification of inspections; and provisions related to the exemption and termination of safeguards. To the extent practical and legally permissible, efforts are made to standardise the Agency's safeguards approaches, taking into account technical variations among the states' nuclear programmes.

While INFCIRC/66/Rev.2 identifies the safeguards procedures which are to be implemented under item-specific agreements, its provisions are simply incorporated by reference into the agreements and, while there is some consistency in the format and content of such agreements, there is no "model" INFCIRC/66-type agreement. INFCIRC/153, however, is much more comprehensive, and was intended to serve as guidance to the Secretariat on the

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4. However, Iran, which agreed to the modified Code 3.1 in 2003, announced in 2007 that it was suspending its implementation of the modified Code 3.1 and reverting to the previous formulation of that provision.

content and format of CSAs.[5] Hence, agreements concluded pursuant to INFCIRC/66/Rev. 2 reflect a greater degree of variation than do agreements concluded pursuant to INFCIRC/153. The agreements concluded with the NWSs (all of which are party to the NPT) more closely resemble the latter in format, with substantive variations reflecting the more limited scope of the VOAs. This latter category of agreements is often referred to as "voluntary offer agreements", owing to the fact that the NPT does not impose on NWSs a requirement similar to that assumed by NNWSs party to the NPT to conclude safeguards agreements with the IAEA.

Some of the differences between the three types of agreements are outlined below, the most significant of which relate to the scope of the agreements and the basic undertakings of the states thereunder.

I. Scope

Safeguards agreements concluded pursuant to INFCIRC/66/Rev.2 are designed to cover only specified items, such as certain facilities, equipment, nuclear material and non-nuclear material. Therefore, they must describe in detail their scope of application. This is usually done in the provisions concerning basic undertaking provision and the inventory of safeguarded items. Agreements with NNWSs along the lines of INFCIRC/153 cover all source and special fissionable material in all peaceful nuclear activities of the state party. Hence, there is no elaborate provision on the scope of the agreement and/or on the inventory. The scope of the VOAs varies from agreement to agreement. However, while some provide for the application of safeguards to all of the state's civil nuclear activities and others to only some of the state's civil programme, all provide for the selection by the Agency of all, some or none of the facilities from those which is offered by the state concerned for the application of safeguards.

II. Basic undertaking

Safeguards agreements under INFCIRC/66/Rev.2 prohibit the use of safeguarded items in such a way as to further any military purpose (including non-explosive uses, such as nuclear naval propulsion). Agreements with NNWSs party to the NPT prohibit the diversion of nuclear material from peaceful nuclear activities to nuclear weapons or other nuclear explosive devices. There is, however, no prohibition against non-explosive military

5. The standardised model text for such agreements is contained in GOV/INF/276, Annex A (1974).

applications of nuclear material under the NPT. Accordingly, agreements with NNWS parties to the NPT contain provision for the withdrawal from safeguards of nuclear material for use in non-proscribed military nuclear activities (see para. 14 of INFCIRC/153). As regards VOAs, the NWSs' undertaking is limited to a commitment not to use nuclear material for proscribed purposes while it is subject to the agreement, and not to withdraw material or facilities from safeguards except in accordance with the terms of the relevant agreement, which provide in each case for withdrawal at the state's discretion.

III. Subsidiary arrangements

The nature and content of subsidiary arrangements are discussed below under Section E.

IV. Design verification and inspections

All safeguards agreements require states parties to submit to the Agency information on the design of facilities where safeguards are applied. They also provide for Agency access to verify the design information. All of the agreements contemplate a three-tier approach to inspections (as distinguished from design information verification visits), consisting of *ad hoc* inspections (those carried out prior to entry into force of detailed arrangements for routine inspections and those used to verify exports/imports of nuclear material), routine inspections and special inspections.

Safeguards agreements concluded in accordance with INFCIRC/66/Rev.2 incorporate the Agency's statutory right of access to all persons, places and information relevant to the implementation of safeguards. INFCIRC/153 agreements, on the other hand, limit the Agency's access to carry out routine inspections to strategic points identified in the Subsidiary Arrangements (as do the VOAs). However, it should be noted that this limitation does not apply to *ad hoc* inspections, nor does it apply to special inspections.

INFCIRC/66/Rev.2 limits the maximum number of routine inspections annually at nuclear facilities based on the inventory or throughput of nuclear material at the facility in question, while providing for a right of access at all times to facilities with an inventory or annual throughput in excess of 60 effective kilograms of nuclear material. INFCIRC/153, on the other hand, limits the Agency's "inspection effort", permitting the Agency to distribute its inspection activities within categories of facilities in the state, depending on the type and size of facility.

V. *Privileges and immunities; visas*

As referred to above, each of the safeguards agreements contains a provision obliging the state or states party to extend to IAEA inspectors while on mission certain privileges and immunities. It must be pointed out that these privileges and immunities are granted to inspectors in the interest of the Agency and not for the personal benefit of the inspectors. Therefore, the IAEA has the right and duty to waive immunity in any case where, in the Agency's opinion, the immunity would impede the course of justice and can be waived without prejudice to the interest of the Agency.

Before an inspector begins to travel for the Agency, he or she must apply for a *Laissez-passer* through the Visa Section. Where required by the state concerned, visas must be secured in the *Laissez-passer*, which is honoured by most member states of the IAEA. In an effort to streamline this process, and allow the IAEA to deploy its inspectors more efficiently, the Model Additional Protocol includes a provision which requires that a state which insists on visas (and not all do) grant IAEA inspectors multiple-entry/exit/transit visas for a period of at least one year.

VI. *Duration*

The duration of INFCIRC/153 agreements is generally linked to the state's adherence to the NPT, to the Tlatelolco Treaty or to other underlying treaties or agreements. There is no provision for the survival of safeguards on produced special fissionable material upon expiry of such an agreement. However, as noted above, more recent safeguards agreements concluded on the basis of INFCIRC/66/Rev.2 include a provision requiring continuation of the agreement until safeguards are terminated in accordance with the provisions of the safeguards document.

VII. *Safeguards on exports*

INFCIRC/66/Rev.2 contains provisions requiring in general the application of safeguards as a condition of re-transfer of safeguarded items. INFCIRC/153 contains no such condition as it was considered unnecessary in light of the requirement in Article III.2 of the NPT prohibiting the transfer of nuclear material to NNWSs unless the material will be subject to safeguards in that state.[6] However, INFCIRC/153 does contain a provision requiring notification

6. However, a number of CSAs not concluded pursuant to the NPT do contain undertakings by the state(s) concerned to require safeguards on exports of nuclear material (e.g. early CSAs concluded pursuant to the Tlatelolco Treaty).

to the IAEA if safeguards will not be applied in the importing state, a provision included to address the circumstance of transfers to NWSs.

VIII. Disputes resolution

Because safeguards agreements are treaties, the principles of international law, rather than the rules of domestic national law, are used in the interpretation and application of safeguards agreements. While the court systems of most countries are available to resolve differences between private parties to a contract, the International Court of Justice (ICJ) is available to sovereign states to resolve disputes concerning treaties if the requirements of the Statute of the Court are met. The IAEA, however, is not subject to the jurisdiction of national courts, nor under the Statute of the ICJ is it eligible to be a party to an action before that tribunal. Thus, there is no court or established judicial tribunal which has competence to resolve a dispute between the IAEA and a state relating to the interpretation and application of a safeguards agreement.

For this reason, all safeguards agreements contain provision for resolving disputes concerning the interpretation and application of the agreement. Principally, they provide that the parties shall, at the request of either, consult about any question arising out of the interpretation or application of the agreement and that the state has the right to request that any question arising out of the interpretation or application of the agreement be considered by the Board. The agreements also include the possibility of submitting disputes to binding arbitration. Although several versions of these provisions have been developed, they all basically provide for the establishment of an arbitration panel (or arbitral tribunal) composed of one member selected by each of the parties to the dispute, plus one or two members designated by the panel members chosen by the parties to the dispute, plus one or two members designated by the panel members chosen by the parties. The arbitration provisions are designed to ensure that the panel is always composed of either three or five members to avoid the possibility of a tie vote. However, no recourse to arbitration has been made to date in the course of implementing safeguards.

1. Compliance and enforcement

Because a safeguards agreement is a treaty, the responsibility to fulfil the obligations of the agreement rests with the government of the state that is party to the agreement. For example, if the operator of a privately-owned facility subject to safeguards refused to allow IAEA inspectors to conduct a properly scheduled inspection, the IAEA would request the government of the state concerned to take whatever steps were necessary to ensure that Agency inspectors have adequate access to the facility. If the government did not or could not obtain adequate access for the inspectors, then the government, not the operator, would have violated the agreement, unless the failure to do so was excused. It is the government's responsibility to ensure that persons under its jurisdiction or control act in accordance with the treaty obligations assumed by that government.

The information that a safeguards inspector is likely to uncover, however, is such that, rather than demonstrating a clear violation of the agreement it would raise doubts as to whether the state were fulfilling its obligations under the agreement. Regardless of the type of agreement, the IAEA has the right and the duty to try to resolve these doubts through the examination of the information assembled and by obtaining from the state additional information and/or access to additional locations.

If such doubts cannot be resolved to the satisfaction of the Director General, he would, under an INFCIRC/153 agreement, report to the Board of Governors that action by the state concerned is essential and urgent to ensure the verification of non-diversion or report to the Board the Agency's inability to verify that nuclear material required to be safeguarded has not been diverted, or, under an INFCIRC/66/Rev.2 agreement, that the state is in non-compliance with the agreement.

The nature of non-compliance by a state with its safeguards obligations may vary. Non-compliance could derive, for example, from the unaccounted for presence or absence of nuclear material, from misleading and/or falsified records or reports, from the denial of access to Agency inspectors or from the tampering with Agency instruments or seals.

Upon report by the Director General to the Board under an INFCIRC/66 agreement, the Board is to call upon the state concerned to remedy forthwith any non-compliance which the Board finds to have occurred. The Board is also required to report such non-compliance to all members of the IAEA.

Under INFCIRC/153, any actions considered by the Board to be "essential and urgent" are required to be implemented by the state without delay. If the state does not take the required action, the Board may conclude, on the basis of the information reported to it by the Director General, that the IAEA cannot fulfil its obligation under the agreement to verify non-diversion; the Board may also find that the state is in further non-compliance with its safeguards agreement.

Under the Statute of the Agency, failure by a state to take fully corrective action within a reasonable time with respect to non-compliance could subject the state to curtailment or suspension of assistance provided by the Agency or by a member state, to the recall of material and equipment and to the suspension of the privileges and rights of Agency membership. Non-compliance can also be reported to the Security Council and to the General Assembly of the United Nations which may trigger measures by the Security Council within the framework of the United Nations Charter.

Since the inception of safeguards, the IAEA has reported to the Security Council cases of non-compliance by five states: Iraq, Romania, the Democratic People's Republic of Korea, Iran and Libya. In the cases of Romania and Libya, the non-compliance was reported to the Council "for information" in light of the fact that those states had themselves brought their respective non-compliance to the attention of the IAEA.

C. Protocols to safeguards agreements

A number of protocols to INFCIRC/153 agreements have been concluded by the Agency, including co-operation protocols, suspension protocols, small quantities protocols and additional protocols.

I. Co-operation protocols

Protocols for co-operation and co-ordination with multinational or national inspectorates have been concluded with EURATOM, with ABACC and with Japan. In each case, the IAEA's ability to reach independent conclusions concerning compliance with the agreement is reaffirmed as an indispensable element.

II. Suspension protocols

Paragraph 24 of INFCIRC/153 requires the suspension of the application of safeguards under other agreements with the state or states concerned while a comprehensive safeguards agreement is in force. Accordingly, the IAEA has concluded protocols giving effect to this article ("suspension protocols") in cases where states have had pre-existing safeguards agreements with the Agency. In cases where a state concerned had concluded a trilateral agreement for the application of safeguards (i.e. between that state, the IAEA and another party), the third party to the trilateral agreement is also a party to the suspension protocol.

III. Small quantities protocols

The standardised text for INFCIRC/153 agreements also provides for the conclusion of protocols with states having little or no nuclear material and no nuclear material in facilities (the so-called "Small Quantities Protocols" or "SQPs"). As originally developed, the model for SQPs provided that implementation of most of the provisions of Part II of the CSA be held in abeyance, with the exception of those relating to the starting point of safeguards, subsidiary arrangements, design information and international transfers, until such time as the quantity of nuclear material in the state exceeds certain prescribed limits or the state has nuclear material in a nuclear facility (GOV/INF/276, Annex B).

In 2005, the Board of Governors, acting on the advice of the Director General, decided that the SQP, in its original form, constituted a weakness in the Agency's safeguards system and that although SQPs should remain part of the system, they should be subject to certain modifications in the standard text and a change in the SQP criteria (GOV/INF/276/Mod.1 & Corr.1). Now, in order for a state to qualify for an SQP, it must not only have only limited quantities of nuclear material, but also no existing or planned nuclear facility. In addition, the new SQPs will require submission by the state of an initial report on nuclear material and notification as soon as a decision has been taken to construct or to authorise construction of a nuclear facility and will permit the Agency to carry out inspections in the state.

IV. Additional protocols

As mentioned above, a number of states have concluded additional protocols along the lines of the model additional protocol [INFCIRC/540 (Corr.)]. Those concluded with NNWSs are substantively identical to, and contain all of the measures referred to in, the model. The additional protocols concluded with the NWSs vary in scope and content, ranging from those which include all of the measures, but exclude activities with direct national security significance, to the protocols which contain only those measures which the states have concluded have a relevance to NNWSs. Only two APs have been concluded in connection with INFCIRC/66-type safeguards agreements, one with Cuba, which was signed but not brought into force prior to Cuba's conclusion of an NPT CSA and one signed with India.

D. Negotiation of safeguards agreements and protocols

While the IAEA is not a nation or a state under international law, it is an entity having an "international personality". That is to say, governments have recognised the IAEA as an entity which has some of the powers and privileges normally associated with a sovereign state. One of the IAEA's recognised powers is to become a party to treaties. In simple terms, a treaty is an agreement between two or more entities, usually governments, having international personality. Thus, the IAEA's safeguards agreements, and the protocols thereto, which are negotiated and concluded between the IAEA and governments of states or other non-governmental entities with international personality (such as EURATOM or ABACC) are treaties.

The process of concluding a safeguards agreement is begun with a request by the state or states concerned that the Secretariat prepare a text in accordance with the particular underlying obligations and commitments of that state or states. The Secretariat then prepares a draft text of the agreement, along with any relevant protocols, and submits it to the state or states for consideration. If necessary, negotiations are held between the Agency and the state authorities with a view to agreeing *ad referendum* to a text that provides for adequate safeguards. In conducting these negotiations, the Secretariat is guided by the policies and practices previously approved by the Board of Governors. Upon conclusion of the negotiations, the safeguards agreement, along with any protocol(s), is presented by the Secretariat to the Board of Governors for its approval.

In approving the text, the Board authorises the Director General to sign and implement the safeguards agreement and protocol(s) where relevant. Depending upon the state and its own national legislation, the agreement/ protocol then enters into force either upon signature or upon receipt by the Agency of notification from the state that its statutory and constitutional requirements for entry into force of the agreement have been met. The choice of mechanism for entry into force is for the state concerned to make.

E. Subsidiary arrangements

INFCIRC/153 agreements expressly require the conclusion of subsidiary arrangements between the state and the IAEA detailing how the procedures in the agreement are to be implemented. These subsidiary arrangements consist of a general part and facility attachments, and generally an attachment or attachments for locations outside facilities, where applicable. Although INFCIRC/66/Rev.2 itself does not refer to "subsidiary arrangements", most recent agreements based on INFCIRC/66/Rev.2 do include a specific reference to them. However, this only formalises the Agency's practice of making detailed arrangements for the implementation of safeguards in all states with such agreements. Subsidiary arrangements are also concluded with NWSs in implementation of their voluntary offer agreements.

The model additional protocol permits, but does not require, the conclusion of subsidiary arrangements with respect to the measures laid down in an additional protocol, unless requested by one of the parties to the safeguards agreement.

The procedures for concluding the subsidiary arrangements are not the same as for the conclusion of the safeguards agreements. The process is generally initiated by the Secretariat before or shortly after the entry into force of the relevant agreement with the drafting of subsidiary arrangements based on standardised texts. Efforts are made to maintain the standardisation of these documents in the interest of non-discrimination, while taking into account the technical differences and circumstances of the individual states. The negotiations are conducted both in writing and in meetings with the state authorities. Agreement on the texts of the subsidiary arrangements is reflected in exchanges of letters, not, as is the case with the safeguards agreements, by formal signature. Nor do they normally require review or approval by the Board of Governors. They may be amended at any time upon agreement between the Agency and the state. The subsidiary arrangements are treated as confidential documents and are not published by the Agency.

F. Amendment and renegotiation

The parties to an agreement concluded pursuant to INFCIRC/66/Rev.2 are required to consult, at the request of either party, on the amendment of such an agreement. If the Board modifies the safeguards document, the inspectors document or the scope of the safeguards system, the agreement shall be amended if the government(s) party to the agreement so request(s). Amendments to INFCIRC/66/Rev.2 safeguards agreements are usually made for the purpose of extending the duration of the agreement, and occasionally, the scope.

INFCIRC/153 agreements provide that either party (the state or the IAEA) may request consultations on the amendment of the agreement. Any amendment would require the agreement of all parties to the agreement. Entry into force of such an amendment would be subject to the same conditions as entry into force of the agreement. To date there have been no amendments to the substance of INFCIRC/153 agreements, except to add parties to an agreement.

Amendments to APs may be modified in accordance with the same procedures as are provided for in the relevant safeguards agreement, with the exception of amendments to the two annexes to the AP. Annex I [List of Activities referred to in Article 2.a.(iv) of the Model Additional Protocol] and Annex II [List of Specified Equipment and Non-Nuclear Material for the Reporting of Exports and Imports according to Article 2.a.(ix)] may be amended by the Board of Governors upon the advice of an open-ended working group of experts which would be established by the Board. Any such amendment would take effect automatically for all APs four months after its adoption by the Board.

G. Implementation and analysis

As of 25 June 2010, of the 185 NNWSs party to the NPT, 167 have CSAs in force. Of the 18 remaining NNWS NPT parties, 8 have signed CSAs and 3 more have had a CSA approved by the Board. In addition, each of the NWSs has a voluntary offer agreement in force. The IAEA is applying safeguards under INFCIRC/66-type agreements in three other states.

The programme for strengthening safeguards was originally developed for states with CSAs. However, it was acknowledged early in the evolution of the programme that the implementation of certain of the measures identified thereunder in other states (i.e. the NWSs and the INFCIRC/66 states) could improve the effectiveness and efficiency of the safeguards implemented in such states while enhancing the effectiveness of safeguards implementation in comprehensive safeguards agreement states. This so-called "universality" issue was a central feature in the negotiation of the model additional protocol. Both the Board and the open-ended committee of the Board that negotiated the model additional protocol expressed their expectation that its adoption by CSA states (in its entirety) and by non-CSA states (selected measures) would maintain a certain "parallelism". Several CSA states indicated that evidence of action toward adoption of the model additional protocol in other states would be necessary to obtain approval of an additional protocol in their own countries. As a consequence, during the 15 May 1997 meeting of the Board at which the model additional protocol was approved, each of the five NWSs announced its intention to conclude and AP and indicated which of the measures contained in the model they were prepared to accept.

As of 25 June 2010, the Board of Governors has approved additional protocols with 139 states and Euratom, 132 of which states (and Euratom) have signed them. Of those, additional protocols with 101 states and Euratom have entered into force. All of the VOA APs are in force. The AP signed by India is not yet in force.

Since 1997, the IAEA Secretariat's implementation of APs has required the development of a whole new infrastructure, including:

- the development of guidelines and formats for use by states in the preparation and submission of declarations under APs;

- the development of model subsidiary arrangements and model language for required communications to and from states under APs;
- the development of detailed internal guidelines for complementary access; and
- the development of integrated safeguards.

It was recognised early in the field trial phase of Programme 93+2 and acknowledged at several junctures during Committee 24 negotiations that it would be necessary to develop specific guidelines defining the additional, largely qualitative information to be provided by states to the Agency under Article 2 of the model additional protocol. Such guidelines were needed by states to help them formulate internal procedures and regulations to ensure that the necessary information, with the appropriate level of detail and timeliness, would be available to them. For the Secretariat's part, the guidelines were needed to ensure consistency in the declarations from states, both in terms of level of detail and reporting formats. The most recent iteration of the guidelines, "Guidelines and Format for Preparation and Submission of Declarations Pursuant to Articles 2 and 3 of the Model Protocol Additional to Safeguards Agreements" (Services Series 11), was issued in May 2004. This document provides specific guidance on each sub-article including a description of the purpose and use of the information and a definition of reporting format through example. A simplified version of the guidelines for states with SQPs was issued in April 1999.

Guidelines for complementary access were also developed for the internal use of the Secretariat to ensure that complementary access is carried out in an efficient, technically effective and non-discriminatory manner.

Using all of the information available to it, the IAEA carries out annual analysis of the safeguards situation in each state with a safeguards agreement in force. The state evaluation reports reflect the results of those analyses and the conclusions which the IAEA is able to draw from the analyses. These conclusions are collectively summarised and reported to the Board of Governors in the safeguards implementation report in June each year for the previous calendar year.

For those states with only a CSA in force, the Agency draws a conclusion about the non-diversion of declared nuclear material. While the IAEA has the authority to verify the absence of undeclared nuclear material and activities in states with CSAs only and no AP in force, without an AP for a state, the Agency provides assurances only with respect to declared nuclear material in the state. If a state has both a CSA and an AP in force, the IAEA will, after full verification and resolution of any questions or inconsistencies, provide, where appropriate, confirmation not only of the non-diversion of declared nuclear material, but the absence of undeclared nuclear material and activities.

When a state has in place a CSA and an AP, and the IAEA is able to find that there are no indications of the diversion of declared nuclear material and no indications of undeclared nuclear material or activities, it is then in a position to draw what is referred to as the “broader conclusion”, i.e. that all nuclear material in the country remains in peaceful activities. In such situations, the IAEA is then able to implement “integrated safeguards” in the state. Integrated safeguards is defined as an optimum combination of all safeguards measures available to the Agency under CSAs combined with APs which achieves the maximum effectiveness and efficiency within available resources in implementing safeguards. The premise of integrated safeguards is that, if the Agency is able to conclude that there are no undeclared nuclear material or activities in the state as a whole, reductions in the IAEA’s verification effort with respect to declared nuclear material which would need further processing to make it nuclear weapon usable is possible.

Conclusion

The implementation of strengthened safeguards requires an integrated approach dealing with both efficiency and effectiveness. Evolution of the safeguards implementation criteria has provided for a full integration of the new measures with elements of the traditional system; the elements are now in hand for a greatly strengthened and more efficient safeguards system. The strengthened safeguards system is now more information driven – more qualitative than quantitive – and relies heavily on a vastly improved system of information analysis, based on a state-wide approach, rather than a facility by facility approach.

The Control of International Nuclear Trade – Difficult Balance Between Trade Development and Non-Proliferation of Nuclear Weapons

*by Quentin Michel**

Since the possible uses of atomic fission were first discovered, nuclear energy has always generated a degree of fascination. The manufacture of the bomb and its use in 1945 indelibly marked the potential risks of this new source of energy. However, for political reasons and in order to meet the constantly growing energy needs of 20th century industrial societies, the development of peaceful uses of nuclear fission seemed to be indispensable. Faced on the one hand with the need to develop nuclear power and on the other hand the difficulty of clearly distinguishing the facilities and technology required for peaceful uses from those required for military applications, the international community set up a political system of control relating to nuclear trade. This regime, comprising rules of international law together with commitments undertaken by governments, is undoubtedly one of the rare examples of an industrial activity in which trade is subject to such restrictive rules.

This paper aims to provide a brief overview of the main stages in the development of the international nuclear control regime since the entry into force of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and to

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set out the main points thereof. In order to facilitate the reading, the expression "nuclear items" has been used to refer to nuclear materials, equipment and technology.

The increasing number of informal instruments on the control of trade in nuclear goods and technology

From the perspective of a certain number of states party to the NPT, states intending to become party to the NPT and also current or potential exporters of nuclear items, the scope of the undertakings made under this treaty needed to be clarified in order to avoid differing interpretations. To this end, consultations were initiated, aimed at agreeing on the export conditions to be required by the supplier state. In particular, there was a need to define on the one hand the meaning of "equipment or material especially designed or prepared for the processing, use or production of special fissionable material" and on the other hand the conditions and procedures governing exports of such equipment and materials to non-nuclear-weapon states (NNWS) which are not party to the NPT.[1]

These discussions – known as the Zangger Committee[2] – were conducted outside of any formal structure and resulted in 1974 in an agreement defining the fundamental rules which the states concerned intended to apply to their export policies in the future. Although these fundamental rules did not have any validity under international law,[3] they marked the first step towards a concerted policy of non-proliferation of nuclear weapons.

However, in May 1974, the Indian atomic explosion[4] using plutonium, qualified by the Indian government as being peaceful, and the conclusion of two agreements, first between the Federal Republic of Germany and Brazil and

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1. Article III of the NPT.

2. From the name of its first Chairman, Claude Zangger; the Committee met for the first time in March 1971.

3. They simply amounted to unilateral undertakings by the member states of the Committee. These undertakings were made public by means of sending a letter to the Director General of the IAEA informing him of the sender state's decision to bring its nuclear items export policy into compliance with the attached documents in the future and asking him to communicate its decision to all other member states.

4. Two months after the adoption of the Zangger Committee's guidelines.

secondly between France and Pakistan,[5] renewed the controversy about the adequacy of the mechanisms to prevent the proliferation of nuclear weapons since it appeared that the success of the Indian military atomic programme was partly thanks to the material and technical support for peaceful purposes provided by Canada, France and Germany. Even if the essential aspects of this support were provided before the NPT came into force, a treaty which India subsequently refused to sign, stricter compliance by the major powers with their national export policies relating to the non-proliferation of nuclear weapons could have prevented India from developing a nuclear weapon.[6] The fierce competition for nuclear contracts[7] combined with the arrival of new suppliers[8] on the international stage undoubtedly promoted a degree of laxity with regard to the required safeguards as to the use of the items transferred by the supplier state.

In spite of this, the United States was once again originator of a new policy to combat the horizontal proliferation of nuclear weapons. The principle of this new policy, which forms the basis of the current one, was to prevent states to take the bait to use transferred nuclear facilities for non-peaceful purposes, by imposing on them a certain number of technical protective devices.

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5. These agreements provided for the supply of spent fuel reprocessing plants as well as of nuclear power plants. Neither Brazil nor Pakistan had ratified the NPT.

6. Canada was awarded a contract to build an experimental heavy water reactor in 1955. India undertook to use the plutonium manufactured for peaceful purposes only but refused all forms of verification controls relating to this undertaking. The reactor was completed in 1960. In 1962, Germany supplied a heavy water production facility. France contributed to the construction of a pilot spent fuel reprocessing plant which was completed in 1966 (this plant enabled the extraction of the plutonium required for the construction of the Indian nuclear bomb). See in this respect, Courteix, Simone, *Exportations nucléaires et non-prolifération*, Recherches Panthéon-Sorbonne, Université de Paris I, Sciences juridiques, Droit des relations internationales, Économica, 1978, p. 7.

7. Thus, the extremely wealthy oil-producing states of the Middle East decided to launch ambitious nuclear programmes for which the commercial competition between supplier countries was tough. Germany won the orders for the first two Iranian nuclear power plants, France supplied the next two plants and a research reactor to Iraq, and the Soviet Union was awarded the Libyan contract.

8. In particular, Belgium and Germany (e.g. through ACEC's nuclear division, which was incorporated into WENESE).

Prior to this, the possession of materials which could be used for military purposes[9] as well as facilities capable of manufacturing such materials were generally considered not to be dangerous when these materials were subject to peaceful uses, guaranteed by international control and verification. However, this control, which was designed to detect the diversion of fissile materials, was ineffective when faced with a state which unilaterally decided to ban access to its territory by international inspectors and convert its civilian nuclear programme into a military research programme.

The new non-proliferation policy, put forward by the United States to combat effectively this risk of diversion of facilities, incited supplier states of nuclear items to refuse in a drastic fashion the direct transfer to NNWS of fissile materials which could be used for military purposes or of facilities considered to be sensitive and enabling the production of such materials.[10] It was suggested that alternatives be offered which were considered to be less conducive to proliferation.[11]

At the beginning of 1975, seven main supplier states of nuclear items met in London, at the United States' initiative, in an attempt to reach agreement on a common nuclear weapons non-proliferation policy. The negotiations, based on a new U.S. approach, resulted in a compromise being reached in September 1977 setting out a policy which the states agreed to apply in the future to exports of nuclear items. However, it proved impossible to reach consensus on a formal

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9. Nuclear materials for military purposes generally mean uranium enriched by more than 20% in ^{235}U and plutonium containing less than 7% of ^{240}Pu. Although these definitions are the most regularly quoted, they do not imply that said concentrations are sufficient to manufacture a nuclear weapon. For example, uranium must contain at least 93% of ^{235}U in order to be of military quality, and consequently enable initiation and expansion of the fission chain reaction in a very short period of time. See on these points, for example, Albright, David, Berkhout, Frans and Walker, William, "Plutonium and Highly Enriched Uranium: Characteristics, Sources of Information and Uncertainties", in: *SIPRI Yearbook 1995 Armaments, Disarmament and International Security*, Oxford University Press, 1995, p. 334.

10. Plutonium, enrichment and reprocessing facilities are particularly targeted.

11. This notably involved providing guarantees to states which renounced reprocessing that their reactors would be supplied. See President Carter's statement of 7 April 1977 set forth in Appendix 12 of Courteix, S., *Exportations nucléaires et non-prolifération, op. cit.*, p. 236.

agreement, and an adoption process by unilateral commitment was consequently accepted, based on the method previously tested by the Zangger Committee.[12]

These guidelines, referred to as the Nuclear Suppliers Group (NSG) guidelines, were gradually adopted by an increasing number of states[13] and were viewed, in particular by developing countries, as a further manifestation of the intention of industrialised countries to continue their monopoly or at the very least their undue interference in the energy development of countries purchasing nuclear materials, equipment and/or technology. The guidelines appeared to them to be all the more unfair in that they manifestly contradicted one of the fundamental principles of the NPT which granted NNWS the right to develop research, production and use of nuclear energy for peaceful purposes in exchange for formally renouncing nuclear weapons.[14] The NSG guidelines strongly encouraged suppliers to exercise restraint in the transfer to NNWS of "sensitive facilities, technology and weapons-usable materials",[15] despite the application of the safeguards system of the International Atomic Energy Agency (IAEA) which in fact constituted the initial step towards a blanket refusal of all such transfers.

Unlike the Zangger Committee, the NSG intentionally positioned itself on the margins of the NPT in order to meet the demands of France which had not signed this treaty at the time. The aim of the NPT is to harmonise policies relating to the transfer of nuclear items by the main states possessing and supplying nuclear know-how by agreeing on minimum competition rules in order to avoid compromises with respect to the fight against proliferation of nuclear weapons. The modalities of the control regime applying to transfers of nuclear items laid down by the NSG guidelines are based on a number of fundamental principles on the policy, to be adopted by states when considering transfer applications, and on a so called "trigger list". Thus, in order to prevent

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12. The meetings of the supplier states of nuclear items were subsequently referred to as the Nuclear Suppliers Group or the London Club. This group is usually referred to by its English abbreviation "NSG". The founding members were Canada, the Federal Republic of Germany, France, Japan, the Soviet Union, the United Kingdom and the United States.

13. Including some NNWS in the European Community (Belgium, Italy and the Netherlands) which added a Community clause upon adoption whereby the application of these guidelines was obligatory for the undertakings made within the scope of the Treaty of Rome with regard to intra-Community trade.

14. Article IV of the NPT.

15. Article 7 of the guidelines, as published in document INFCIRC/254, February 1978.

circumvention of this policy by the establishment of a nuclear research programme through a series of purchases, the NSG guidelines specify that the applicable control regime for the transfers of items included in the trigger list cannot be rendered ineffective by the transfer of the various components of these items.[16]

The NSG guidelines, also unlike the Zangger Committee, pay particular attention to technology transfers associated with any item on the list. Technology transfers associated directly with any item on the list "will be subject to as great a degree of scrutiny and control as will the item itself, to the extent permitted by national legislation".[17] The NSG guidelines also apply to transfers for peaceful purposes to any non-nuclear-weapon state (with the exception of India), regardless of whether the said state has ratified the NPT and, with respect to controls on re-transfer, to transfers to all states without distinction.[18]

In line with its actions within the NSG, the United States, under President Carter, fundamentally changed its international nuclear co-operation policy. Considering that the civilian use of plutonium posed a major risk with regard to non-proliferation and that the world had adequate uranium resources to satisfy nuclear power development, Congress on 10 March 1978 passed the Nuclear Non-Proliferation Act introducing a regime incorporating all the embargo and veto measures which both the United States and Canada had proposed in the NSG but that had nevertheless been rejected by their partners. The new international co-operation policy, which remains largely applicable today, was based on the reinforcing of both safeguards of the peaceful uses and the veto on the transfer and development of certain technologies. Thus, an embargo was imposed on the transfer of nuclear items relating to enrichment, reprocessing and breeding. The embargo also applied domestically and resulted in the cancellation or deferral of national reprocessing and breeding programmes.[19] The new Section 123 of the Atomic Energy Act[20] subjected all future co-operation agreements to nine conditions which are reduced to seven when

16. "The object of these controls should not be defeated by the transfer of component parts". Annex A, General Notes, INFCIRC/254/Rev.9/Part.1, p. 7.

17. Annex A, Technology Controls, INFCIRC/254/Rev.9/Part.1, p. 7.

18. Paragraph 1 of the NSG guidelines relating to transfers of nuclear items, INFCIRC/254/Rev.9/Part.1.

19. Completion of the only private spent fuel reprocessing plant built by Allied Chemical (Barnwell in the United States) was consequently postponed *sine die*.

20. As amended by Section 401 of the Nuclear Non-Proliferation Act (NNPA).

the other contracting party is a nuclear-weapon state (NWS). These conditions mainly imposed comprehensive and permanent safeguards, an undertaking not to use explosive nuclear devices, to return materials and equipment under certain conditions and the recognition of the principle of prior consent in the case of a retransfer of nuclear items or in the event of reprocessing, enrichment or alteration of the materials produced or supplied. However, this new act could not put an end to the co-operation established under previous co-operation agreements. The President of the United States was therefore asked to renegotiate them in order to bring them into compliance with the new provisions.[21]

In terms of the non-proliferation of nuclear weapons, the gradual reinforcement of the export control mechanisms and a seemingly stricter policy appear to have curbed, if not put an end, to the increase in the number of nuclear-weapon states. If the countries which have reached the nuclear threshold are included, in 1990, only 11 states had, or had tried to have, nuclear weapons.[22]

The tacit confidence relating to the proliferation of nuclear weapons was shattered in 1992 by the "dual shock" of the collapse of the Soviet Union and the revelation of the Iraqi military programme.

The breakup of the USSR caused a degree of uncertainty regarding ownership of the nuclear weapons stationed in the four successor states of the Union (Russia, Ukraine, Belarus and Kazakhstan). Russia, which proclaimed to be the heir of the USSR,[23] considered that all tactical and strategic nuclear weapons should be repatriated to its territory. For a long time, this repatriation was contested to varying degrees by the other three successor states[24] which considered that these weapons formed part of their heritage. However, there were a number of technical problems involved with this approach, for example the fact that Russia held the launch and arming codes. Following lengthy nuclear bargaining, the three Republics finally agreed to ratify the NPT as NNWS.[25] The breakup of the Soviet Union also raised a series of concerns

21. Sections 404 and 405 of the NNPA.

22. The five NWS, as recognised by the NPT, plus Argentina, Brazil, India, Israel, Pakistan and South Africa.

23. It had resumed its seat on the UN Security Council.

24. In particular, Ukraine.

25. Belarus ratified the treaty on 22 July 1993, followed by Kazakhstan on 14 February 1994 and Ukraine on 16 November 1994.

regarding the security of the systems relating to the non-proliferation of nuclear weapons in the splinter states and also, more generally, in the new political regimes in the member states of the Warsaw Pact. While the majority of them had the expertise and industrial potential to help manufacture nuclear weapons, the political, administrative and customs structures to combat the proliferation of weapons of mass destruction were often ill suited to the economic liberalism which these states sought to implement in the future.[26] A laborious process of adjusting national control systems to their new political and economic environment was consequently undertaken.

The revelations about the scale of the Iraqi military research programme, just after the Gulf War, provoked an unprecedented crisis in relation to the non-proliferation of nuclear weapons. They proved that ratification of the NPT and the conclusion of a safeguards agreement with the IAEA did not adequately guarantee the absence of any action or conduct involving proliferation. On the contrary, ratification of the NPT had enabled Iraq to benefit from a degree of respectability and did not at all prevent it from developing secretly a military nuclear research programme.[27] Officially, Iraq submitted all of its nuclear facilities to regular inspections by IAEA inspectors, who never discovered the diversion of the materials used.[28] Iraq proved to be particularly skilful in avoiding suspicion of the various secret services about its covert programme. The purchases of items, required to conduct its military programme, were carried out through import and export shell companies. Shipment was effected by carriers sailing under a flag of convenience to non-suspect states, which acted in reality simply as transfer points. Finally, in order to avoid suspicion, no weapon system or turnkey nuclear device was imported or purchased as such. They were purchased as components, the orders being placed with different

26. See on these aspects notably Potter, William C., "Before the Deluge, Assessing the Threat of Nuclear Leakage from Post-Soviet States", *Arms Control Today*, October 1995, pp. 9-16.

27. On the discovery and scope of the Iraqi nuclear programme for military purposes, see for instance: Thorne, L., "Les inspections de l'AIEA en Irak", *IAEA Bulletin*, Vol. 34, No. 1/1992, p. 17, Vienna.

28. This was logical insofar as the main part of the Iraqi military programme was located at secret sites which were by definition not reported to the IAEA. At the time, the Agency was not authorised to inspect suspect sites, and the major powers' various intelligence services had not yet detected or realised the scale of the secret programme.

suppliers. Moreover, Iraq resorted widely to dual-use items,[29] not directly covered by the principles of the Zangger Committee or the NSG, concealing the military use by applying for an export licence for goods for medical, agricultural purposes etc. One of the most worrying aspects of the Iraqi nuclear military research programme was undoubtedly that the Iraqis did not refrain from using techniques which were deemed to be obsolete and fell under the public domain.

The breakup of the Eastern Bloc and the disbanding of the Soviet Union also meant that serious doubts were expressed about the need to maintain a specific embargo regime, COCOM,[30] with respect to certain transfers to states that had emerged from the dissolution of the Warsaw Pact. A number of these states, including the Czech Republic, Hungary, Poland and the Slovak Republic, publicly expressed their wish to join the European Union and NATO as soon as possible. They, along with Russia, requested the easing or indeed abolishment, of this embargo. This request was received favourably by the European members of NATO that pushed their U.S. allies to ease the transfer rules with regard to these states. Negotiations about reviewing this regime were started. Against all expectations, they resulted, on 16 November 1993, in a decision to clearly and simply abrogate this regime.[31]

At the same time, informal discussions between the member states of the former COCOM, including Russia, Hungry, Poland, the Czech and the Slovak Republic, were initiated on the elaboration of a new multilateral export control regime. On 18 December 1995, in Wassenaar in the Netherlands, the representatives of the 28 participating states established new export control rules for conventional weapons and some dual-use items and technology, rules better known as the "Wassenaar Arrangement". This arrangement was intended to supplement existing export control instruments; it covers conventional weapons and ammunition and some dual-use items that could be used to develop a weapon of mass destruction (WMD).

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29. Dual-use item in this context means items which can be used equally for civilian or military nuclear purposes, and for non-nuclear purposes (medical, agricultural etc.).

30. The Co-ordinating Committee for Multilateral Export Controls.

31. Anthony, Ian, *SIPRI Yearbook 1995 Armaments, disarmament and international security*, Oxford University Press, 1995, p. 619.

The revelations relating to the secret Iraqi programme together with the attitude of North Korea[32] provided sufficient proof that accession to the NPT and the conclusion of a safeguards agreement were not enough to guarantee that a state did not simultaneously carry out a secret programme to develop a nuclear weapon. It was therefore clear that even when trading with NNWS parties to the NPT, supplier states needed to be more careful and to rigorously apply a more restrictive export policy.

This concern to reinforce the system against the proliferation of nuclear weapons was raised not only by supplier states but also by some developing countries, even before the revelations about the Iraqi programme. In order to address this concern, an informal meeting of the NSG participating governments was convened in The Hague between 5 and 7 March 1991. The reactivation of the NSG – no meeting had been convened since 1978 – set its objectives to first review and complete the guidelines in light of the events in Iraq and, secondly, to consider ways of controlling transactions relating to dual-use items not covered by the guidelines. It was also a try to convince new suppliers to adhere to the guidelines.

Given this favourable context for the reinforcement of the system, three fundamental decisions were adopted in the subsequent meetings:

First, further to several unilateral declarations by certain supplier states such as France,[33] the United Kingdom[34] and Belgium,[35] it was decided that

32. During the IAEA's first inspection in 1992, in implementation of the safeguards agreements, the inspectors recorded a number of inconsistencies between their analysis and the analysis provided by North Korea. According to the Agency, North Korea had nuclear materials and facilities which it had not reported. For a comprehensive analysis and details of this affair, see "Activities of the International Atomic Energy Agency relevant to Article III of the Treaty on the Non-Proliferation of Nuclear Weapons", prepared by the Secretariat of the IAEA for the 1995 Conference of the Parties to the NPT, presented in Geneva in the Preparatory Committee for the 1995 Conference of the Parties to the NPT (12-16 September 2005 (NPT/CONF.1995/PC.III/7), p. 9.

33. Requirement announced in the speech by Roland Dumas, French Foreign Minister, to the 49th United Nations General Assembly in New York on 24 September 1991.

34. Requirement announced in the speech by the Hon. Douglas Hurd MP, Secretary of State for Foreign and Commonwealth Affairs, to the 49th United Nations General Assembly in New York on 25 September 1991

35. Statement by the Belgian delegation at the third meeting of the "Nuclear-Related Dual-Use Working Group" in Annapolis, on 7 October 1991.

recipient states should be requested to apply the principle of full scope safeguards (FSS)[36] as a prerequisite for the granting of export licences relating to items defined in the NSG lists.[37]

Secondly, guidelines governing the principles and conditions of transfers of dual-use nuclear items and a list of items to which these guidelines apply were adopted.[38] A memorandum of understanding was also agreed in order to ensure the consistent application of the guidelines. It established information exchange mechanisms between member states as regards applications for an export licence. A significant aspect of this wish to reinforce the coherence of the system was the definition, for the first time and within the guidelines relating to dual-use items, of the objectives set by the NSG with respect to the non-proliferation of nuclear weapons.[39] These objectives consisted of a commitment by the supplier states to avoid all transfers of dual-use items which could have a major contribution to the pursuit of "nuclear explosive activities" or a "nuclear fuel cycle activity not subject to safeguards" required under the NPT. In practical terms, this meant that all transfers of dual-use items had to be refused when the risk of diversion could not be ruled out. The NSG's new export policy was going to unhinge the apparent equality between non-proliferation and peaceful development, which formed the cornerstone of the NPT, and replaced it by a hierarchy of priorities. In the future, even if the guidelines stated explicitly that they were not designed to impede international co-operation in relation to the peaceful uses of nuclear energy, they only authorised such co-operation if it was deemed not to conflict with the NSG's non-proliferation objectives. Moreover, they introduced the concept of universality by making this non-proliferation principle applicable not only to NNWS but also to NWS where in general an unacceptable risk of diversion existed.

36. Full scope safeguards: application of IAEA controls to all existing or future raw or special fissile materials located in the territory of a state or under its jurisdiction. This requirement already applied to NNWS which had adhered to the NPT, which is not the case for India, Algeria or Pakistan.

37. List included in IAEA document INFCIRC/254.

38. Plenary meeting of the NSG held in Warsaw on 3 April 1992.

39. Similar objectives were added to the NSG guidelines on nuclear items during the NSG Plenary Conference held in Madrid (1994).

Finally, the third decision adopted by the NSG was related to the revision of the list of nuclear items subject to export controls and the incorporation of all updates since 1978 into the lists drawn up by the Zangger Committee.[40]

Article X.2 of the NPT provides that the treaty was concluded for a term of 25 years. In 1995, an extension conference of the parties to the treaty was held to decide whether the treaty should be extended indefinitely or by one or several fixed terms. The majority of the NNWS saw the extension conference as their last chance to entice NWS to comply more adequately with their commitments.[41] The possible imposition of a conditional extension of the NPT had already been the principal subject of the discussions at the 1990 NPT review conference forming the main reason for its failure. Under the impetus of the conference chairman,[42] the parties endeavoured to reach a compromise which, assuring an indefinite extension, would appeal to the greatest number of states while allowing those which were opposed to save face. A document in three parts[43] was adopted at the plenary meeting on 10 May 1995.[44]

Although the extension conference succeeded in finalising its work and adopting a decision to extend the treaty indefinitely and unconditionally, the

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40. The Zangger Committee had regularly reviewed its lists since the adoption of its fundamental rules.

41. By imposing formal and verifiable undertakings to be fulfilled in accordance with a precise schedule.

42. The Sri-Lankan, Jayantha Dhanapala.

43. It included:
    - a document establishing the mechanisms for periodic review of the application of the treaty;
    - a document relating to the principles governing the application of the treaty with regard to nuclear non-proliferation and disarmament;
    - a resolution recognising the majority in favour of extending the treaty indefinitely.

44. Final Document, Part I, Organisation and Work of the Conference [NPT/CONF.1995/32 (Part I)].

three main committees,[45] set up by the treaty review conference, did not succeed in reaching agreement on the wording of a final declaration.[46]

However, in one of the four documents adopted in the plenary session, entitled "Principles and Objectives for Nuclear Non-Proliferation and Disarmament" and focusing on "peaceful uses of nuclear energy", it was recognised that the need for "transparency in nuclear-related export controls should be promoted within the framework of dialogue and co-operation among all interested states party to the treaty".[47]

The move to establish genuine transparency of the control measures for nuclear trade was one of the main demands of a large number of NNWS. In an attempt to meet this demand, the supplier states within the NSG have taken a series of measures since 1996.[48]

In order to promote dialogue and co-operation between member states of the NSG and non-member states, the NSG drafted a paper entitled "The Nuclear Suppliers Group: its Origins, Role and Activities".[49] The document was initially communicated on 15 September 1997 and reviewed subsequently in 2000, 2003 and 2005, its objective being to enhance the transparency of NSG activities.

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45. Committee I: Disarmament; Committee II: Export Safeguards and Controls; Committee III: International Cooperation, Technology Transfers.

46. Under Article VIII.3 of the NPT and the Resolution of the General Conference of the NPT in 1995 entitled "Strengthening the Review Process of the Treaty" (NPT/CONF.1995/L.4), an NPT Review Conference is organised every five years. The purpose of such conferences is to "evaluate the results of the period they are reviewing, including the implementation of undertakings of the states parties under the treaty, and identify the areas in which, and the means through which, further progress should be sought in the future". "Review Conferences should also address specifically what might be done to strengthen the implementation of the treaty and to achieve its universality", [paragraphs 2 and 7 of the Decision entitled "Strengthening the Review Process of the Treaty" (NPT/CONF.1995/L.4), as published in *Nuclear Law Bulletin* No. 56 (1995/2), p. 112].

47. Paragraph 17 of the Final Document, Part I, Organisation and Work of the Conference [NPT/CONF.1995/32 (Part I)], p. 12.

48. Of the most critical states *vis-à-vis* the NSG, only India accepted to participate therein.

49. It is referred to as document INFCIRC/539.

The issue of transparency was again discussed during the NPT review conference in May 2000. The conference recognised for the first time the need to control transfers of dual-use items in order to effectively combat the proliferation of nuclear weapons. However, the conference's work was largely tarnished by a context less favourable with respect to the adoption of a final document.[50] An agreement was reached undoubtedly due to the NWS that, giving preference to co-operation rather than exploiting their different views, agreed to negotiate with the "new agenda coalition".[51] They jointly agreed on the principles, which were subsequently included in the final review document, setting out a 13-step action plan for progressive and systematic nuclear disarmament.

Post 11 September 2001: impact of terrorism

The terrorist attacks of 11 September 2001 paradoxically provoked a number of questions about the need to reinforce measures relating to the non-proliferation of weapons of mass destruction even though this type of weapon was not used in these attacks. The acquisition of WMD by non-state actors and a terrorist attack against nuclear facilities were two types of threat which had previously not been considered by international non-proliferation regimes. It appeared to be necessary to include the fight against terrorism not only in the guidelines of informal instruments such as the NSG, the Wassenaar Arrangement and the Missile Technology Control Regime (MTCR) in relation to the proliferation of nuclear weapons, but also within specific bodies[52] "whose natural role was not

50. In particular, following the refusal by the U.S. Senate in 1999 to ratify the CTBT (Comprehensive Nuclear-Test-Ban Treaty), the concern prompted by the Indian and Pakistani nuclear tests in 1998, the disagreements between the United States, Russia and China regarding the deployment of the U.S. national missile defence system (NMD) ("Star Wars") and the Preparatory Committees' failure to draft substantive recommendations. Moreover, uncertainty remained regarding Iraq's nuclear capacity while NATO intervention in Kosovo was creating tension among the major powers.

51. Group established in 1998 comprised of Brazil, Egypt, Ireland, Mexico, New Zealand, South Africa and Sweden. Its purpose was to formulate proposals relating to the progress of nuclear disarmament.

52. These are global bodies such as the UN and more restricted regional bodies (EU, OSCE) or strategic bodies (NATO).

in principle to handle these issues",[53] such as the G8 Summit,[54] NATO,[55] the OSCE,[56] the European Union[57] and the UN.[58]

In 2002, at its annual plenary meeting held in Prague on 16 and 17 May, the NSG was one of the first to react by amending its guidelines to include the prevention of terrorist nuclear attacks. Thus, the non-proliferation principle laid down in the guidelines relating to nuclear items was amended.[59] In addition to verifying that these transfers do not contribute to the proliferation of nuclear weapons or explosive devices, the participating states undertake to export nuclear materials, equipment or technology only if they are convinced that these transfers will not be "diverted to acts of nuclear terrorism".[60] This "unacceptable risk of diversion to acts of nuclear terrorism" also became a condition to be taken into account in relation to granting export licences for nuclear-related dual-use items.[61] Moreover, the NSG guidelines relating to

53. Dahan, Paul, "La PSI, poste avancé de la lutte contre la prolifération: De la diplomatie de réaction à la diplomatie d'anticipation", *AFRI*, Vol. VI, December 2005, p. 436-449.

54. The G8 adopted an "Action Plan on Non-Proliferation" at the Sea Island Summit on 9 June 2004.

55. NATO referred to non-proliferation in paragraph 14 of the communiqué issued on 28 June 2004 at the end of the Istanbul Summit.

56. Pursuant to the document entitled "OSCE Strategy to Address Threats to Security and Stability in the Twenty-First Century", adopted by the Ministerial Council meeting in Maastricht on 2 December 2003.

57. On 13 December 2003, the EU adopted the "EU Strategy against Proliferation of Weapons of Mass Destruction".

58. Pursuant to UN Security Council Resolution 1540 adopted on 28 April 2004.

59. Paragraph 10 of the guidelines relating to transfers of nuclear items (INFCIRC/254/Rev.6/Part 1) and paragraph 2 of the guidelines relating to transfers of dual-use items (INFCIRC/254/Rev.5/Part 2).

60. INFCIRC/254/Rev.6/Part 1.

61. Paragraph 4 of the guidelines relating to transfers of dual-use items (INFCIRC/254/Rev.5/Part 2).

transfers of nuclear items also referred to the IAEA, recognising its role in the prevention of proliferation and of the threat of nuclear terrorism.[62]

In 2004, a catch-all clause was introduced into the NSG guidelines relating to transfers of dual-use items. This clause provides that exporters are required to request authorisation for a transfer of items not covered by a given control regime, where they are or may be intended for a research or development programme relating to weapons of mass destruction. This clause became a preferred instrument in the fight against the proliferation of WMD in the 2000s. It had indeed become clear that the use of control lists was, under certain circumstances, of limited effectiveness since updates to the lists can take a certain period of time given that they need to be negotiated at inter-government level. As a result, technology which may be used by states or importers seeking proliferation technology may be available on the international market before the lists have been updated.

In 2004, a catch-all clause was added to the NSG guidelines regarding transfers of dual-use items.[63] It provides that "suppliers should ensure that their national legislation requires an authorisation for the transfer of items not listed in the Annex if the items in question are or may be intended, in their entirety or in part, for use in connection with a 'nuclear explosive activity'".[64]

The MTCR also took measures to prevent their means of delivery falling into the hands of terrorist individuals and groups. The attacks of 11 September 2001 equally led the states participating in the plenary meeting held between 24 and 27 September 2002 in Warsaw to consider this type of risk. The following statement was adopted: "in view of growing concern over the continuing proliferation of weapons of mass destruction and their delivery

62. A second type of threat was also taken into account by the NSG: a terrorist attack against nuclear facilities. The guidelines promote the reinforcement of the physical protection of plants in order to better take account of the risk of a nuclear attack.

63. An agreement had already been reached within the consultative group which met in Vienna in October 2003. It agreed to recommend the insertion of a catch-all clause into the NSG guidelines at the plenary meeting in Gothenburg in 2004.

64. Paragraph 5 of the guidelines relating to dual-use nuclear-related items (INFCIRC/254/Rev.7/Part 2). The paragraph continues as follows:

    "Suppliers will implement such an authorisation requirement in accordance with their domestic licensing practices.

    Suppliers are encouraged to share information on 'catch all' denials".

systems, and of the fact that not only states but also terrorist groups and individuals may acquire such weapons, and remembering the tragic events of September 11, 2001, the Partner countries of the MTCR stress the need to give the necessary impetus to actions to combat terrorism. The MTCR will continue to contribute to the fight against terrorism by limiting the risk of controlled items and their technology falling into the hands of terrorist groups and individuals and calls upon all states to take similar action. Partner countries will further study how possible changes to the MTCR guidelines may contribute to this objective".[65]

Following the NSG's example, the MTCR guidelines were amended to specify that "the risk of controlled items falling into the hands of terrorist groups and individuals" must be taken into account when evaluating transfer applications for items contained on the appended list of controlled equipment and technology.[66]

The Wassenaar Arrangement considered the issue of the fight against terrorism at its plenary meeting held in December 2002, adopting several significant initiatives. Thus, a decision was taken to enhance co-operation between participating states in order to prevent the acquisition by terrorist organisations or groups of conventional arms and dual-use items. To this end, new methods for sharing information between participating states and implementing concrete action to strengthen export controls were developed.[67] An *ad hoc* group was also set up aimed at first, examining to what extent export controls can help combat terrorism and secondly, identifying the goods and technology used by terrorists and the methods they use to acquire them.

As with the NSG negotiations, the question of inserting a catch-all clause was discussed during the eighth plenary meeting of the Wassenaar Arrangement in 2002,[68] and at the following plenary meeting in December 2003, approval was obtained. The clause provides that participating states must take appropriate

65. See "Plenary Meeting of the Missile Technology Control Regime", Warsaw, Poland, 24-27 September 2002", available on the website: info www.mtcr./english/press/warsaw.html.

66. See "MTCR Guidelines and the Equipment, Software and Technology Annex", available on the website: www.mtcr.info/english/guidelines.html.

67. In this respect, a series of agreements on the transfer of specific non-nuclear items were reached relating to man-portable air defence systems (MANPADs), small arms and light weapons (SALWs) etc.

68. A proposal to add a catch-all clause into the initial wording of the Wassenaar Arrangement had already been put forward in 1999 but it was not accepted.

measures to ensure that their national legislation requires authorisation for the transfer of non-listed items to destination countries subject to a UN Security Council arms embargo or any other arms embargo to which a participating state has voluntarily consented to adhere, when the authorities of the exporting country inform the exporter that the items in question are or may be intended, entirely or in part, for a military end-use.[69] Moreover, this catch-all clause specifies that if the exporter is aware or suspects that the items in question are intended, entirely or in part, for a military end-use, he must notify his authorities who will decide whether or not it is expedient to make the export concerned subject to authorisation.[70] This catch-all clause differs from the one added to the NSG guidelines in terms of its implementation methods and the risks which it takes into account. It is for the authorities of the participating states and the exporters to implement it. The authorities must notify the exporters that the items in question may be used for military purposes and, likewise, exporters must notify the authorities if they are aware of, or suspect, such a risk. However, the latter case does not systematically trigger a requirement for an export licence, which continues to be evaluated by the authorities, its main result being to release the exporter from any future liability as to any illicit use of the transferred item. To help exporters detect suspicious situations, a list of questions was adopted specifying various (non-exhaustive) suspicious signs and situations with regard to which the exporter is required to contact his national authorities.[71] The second issue concerns taking into account the risk incurred. For the NSG, the risk relates to “nuclear explosive activity” whereas the risk under the Wassenaar Arrangement concerns “military end-use”. However, a problem lies in the definition of the scope of “military end-use”. The catch all clause provides that each participating state must adopt its own definition of this term, while at the same time specifying that it refers to uses of a controlled item on the national list of military items. With a view to harmonisation or a shared definition, the catch-all clause provides furthermore that participating states are encouraged to share information on their respective national definitions.[72]

69. Statement of Understanding on Control of Non-Listed Dual-Use Items, agreement reached during the plenary meeting held in 2003, available on the website: www.wassenaar.org/guidelines/docs/Nonlisted_Dual_Use_Items.pdf.

70. *Ibid*.

71. List of Advisory Questions for Industry, agreement reached during the plenary meeting held in 2003, available on the website: www.wassenaar.org/public documents/2003/docs/Final_Questions_for_Industry.pdf.

72. *Ibid*.

While the development of informal anti-proliferation control regimes appears to be essential in order to better deal with the new global challenges, the introduction of specific provisions on terrorism in these instruments nevertheless appears to be inappropriate. They were essentially created to structure and harmonise the export control rules between participating and non-participating states, and not between states and sub-national entities or groups, including terrorists.[73] Thus, their fundamental guidelines contain undertakings made by the participating states to adopt export control rules, share information on proliferation with other participating states, notify export refusals and examine a list of criteria before issuing an export licence. In this respect, the risk that sensitive nuclear items fall into terrorists' hands had already been indirectly taken into account in these undertakings. For example, the NSG had taken measures to deny export licences if there was an unacceptable risk of diversion, including a terrorist risk, in which case the transfer of nuclear items or dual-use items must be refused.[74] Furthermore, the guidelines require a statement by the end user specifying the end use of the item and its ultimate location. In addition, nuclear suppliers have undertaken to demand an explicit safeguard that the item to be transferred or any replica thereof "will not be used for explosive nuclear activities or an unsafeguarded nuclear fuel cycle".[75]

Moreover, a series of events at the beginning of the 2000s seemed to demonstrate that these instruments reinforcing the various non-proliferation treaties were no longer capable of combating alone the proliferation of WMD.[76] The 2003 crisis where Iraq was suspected of manufacturing WMD, North Korea's announcement of its withdrawal from the NPT, the interception of a ship sailing towards Libya containing items which could be used to manufacture

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73. Michel, Quentin, "The evolution of nuclear export control regimes: from export control list to catch-all clause", *Atom for Peace: An International Journal*, Vol. 1, No. 1, 2005, p. 81.

74. Paragraph 2 of the guidelines relating to transfers of nuclear-related items (INFCIRC/254/Rev.4/Part 1).

75. Paragraph 5, *ibid.*

76. For example, Chapter III of the EU Strategy against Proliferation of Weapons of Mass Destruction adopted by the European Council on 12 December 2003 highlighted with regard to multilateral treaties and their control mechanisms that "while all are necessary, none is sufficient in itself".

WMD and the discovery of Dr. Khan's network in 2004,[77] prompted states to seek new ways in which to combat proliferation. Although there were many initiatives, this analysis is limited to those taken in the framework of the United Nations and those relating to implementation of the Proliferation Security Initiative (PSI) and the Global Initiative to Combat Nuclear Terrorism. The Hague Code of Conduct against Ballistic Missile Proliferation will also be discussed.

The PSI was proposed by the United States in Krakow in May 2003 and subsequently endorsed by the G8 at the Evian Summit in June of the same year. The PSI is not a formal international organisation but rather a variable-geometry group of activities open to all states, structured around the fundamental principle of intervention.[78] This principle introduced the mutual recognition of the participating states in the conducting of interception operations relating to

77. Abdul Qadeer Khan, the father of the Pakistani nuclear bomb, formed an acquisition network to enable his country to build the nuclear bomb. He subsequently used his network based at hubs and operating by means of false end-user certificates, to provide technological support to other countries such as Iran, Libya or even North Korea. He was also suspected of trading with Iraq and Syria and maintaining contacts with some Sub-Saharan African countries. The discovery on this network proved that non-state actors could have access to WMD technologies (Khan acted alone and not on behalf of Pakistan) and that an illicit international WMD-related market existed. See in this respect, Clary, Cristopher, "A.Q. Khan et les limites du régime de non-prolifération", *Forum du désarmement*, No. 4, 2004 p. 35-46.

78. At June 2008, 91 states had adhered to the PSI: Afghanistan, Albania, Germany, Andorra, Angola, Saudi Arabia, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Belarus, Belgium, Belize, Bosnia-Herzegovina, Brunei, Bulgaria, Cambodia, Canada, Chile, Cyprus, Croatia, Denmark, Djibouti, United Arab Emirates, Spain, Estonia, United States, Finland, France, Georgia, Greece, Honduras, Hungary, Fiji Islands, Marshall Islands, Iceland, Iraq, Ireland, Israel, Italy, Japan, Jordan, Kazakhstan, Kyrgyzstan, Kuwait, Latvia, Liberia, Libya, Liechtenstein, Lithuania, Luxembourg, the former Yugoslav Republic of Macedonia, Malta, Morocco, Moldova, Mongolia, Montenegro, New Zealand, Norway, Oman, Uzbekistan, Panama, Papua New Guinea, Paraguay, Netherlands, Philippines, Poland, Portugal, Qatar, Czech Republic, Romania, United Kingdom, Russia, the Holy See, Salvador, Samoa, Serbia, Singapore, Slovakia, Slovenia, Sri Lanka, Sweden, Switzerland, Tadzhikistan, Tunisia, Turkey, Turkmenistan, Ukraine, Yemen. However, by adhering to the PSI, a state does not make any formal undertakings. The most active states meet in the Operational Experts Group which discusses past and future activities of the initiative.

illicit transfers within their territories.[79] The objective was to combat trafficking in WMD and their means of delivery and components, to or from any states or non-state actors raising concerns relating to proliferation. In this respect, the PSI's main role is to intercept suspect transfers associated with WMD. Originally, the PSI mainly related to sea transport, but it was subsequently extended to land and air transport. Based on the finding that the various non-proliferation treaties lacked effective mechanisms for ensuring compliance with the undertakings made, the PSI accordingly proposed moving away from an approach of verifying treaties towards one of monitoring cargoes and from a non-proliferation approach towards an anti-proliferation one by introducing concrete and effective measures against those engaged in proliferation.[80] To this end, it introduced co-operation mechanisms between states and between their authorities.[81] On 4 October 2003, the PSI allowed U.S. and British forces to intercept in Italian waters a ship coming from Malaysia and heading to Libya under the German flag on which centrifuge components were seized.[82]

The PSI is above all a co-ordination instrument based on a series of one-off measures implemented solely through the goodwill of the participating states.[83] These states do not make a legally binding undertaking and are not obliged to participate in all related activities.[84] They may limit themselves to approving the fundamental interception principle and then decide whether to take part in measures on a case-by-case basis only.[85] Thus, like the NSG and other export control regimes, it is an informal instrument but unlike them, it does not have a permanent operating structure.

79. For example, since the end of 2004, the United States has concluded seven bilateral inspection agreements to intercept ships in international waters, six of which with flag-of-convenience countries – Belize, Cyprus, Marshall Islands, Liberia, Malta and Panama (and another agreement with Croatia).

80. Dahan, P., *op. cit.*

81. This relates to co-operation between the customs, intelligence and diplomatic authorities.

82. "PSI: Cas réel d'intervention – BBC China", 3 October 2003, *France Diplomatie*, available at: www.diplomatie.gouv.fr.

83. It is not possible to refer to member states as it relates to a group of activities in which states participate and not to an institution or an informal group of states.

84. Heupel, Monika "L'initiative de sécurité contre la prolifération : renforcer la mobilisation et les capacités en faveur de l'interception de cargaisons liées aux armes de destruction massive", *Forum du désarmement*, No. 4, 2007, pp. 61-70.

85. In September 2008, 91 states adhered to the PSI principles and a group of approximately 20 states participate actively in PSI activities.

The Hague Code of Conduct, adopted in November 2002, was the first multilateral instrument against ballistic missile proliferation. It resulted from an undertaking by member states of the MTCR,[86] which considered that export controls could not be the sole solution to the proliferation of missiles and that a new, more global policy was required. Accordingly, the code, open to all states, aims to fill a loophole in the international system of controlling weapons by laying down principles with a universal scope in relation to the non-military use of ballistic technology. Thus, using a structure similar to the NPT, the code recognises, on the one hand, the need to combat the proliferation of ballistic missiles for military purposes whilst at the same time acknowledging the right of states to use outer space for peaceful purposes.[87] In other words, the Hague Code of Conduct sets itself up as a legitimate regulator of “demand” for missiles, whereas the MTCR rather establishes common rules between supplier states dealing with “missile supply”.[88]

The code is comprised of an introduction and five politically “binding” paragraphs. Like the PSI, it aims to be a flexible instrument which establishes acceptable rules for all. The legitimacy of this informal instrument was reinforced by the adoption of Resolutions 59/91, 60/62 and 63/64 by the United Nations General Assembly, which invited all states that had not subscribed to the code to do so. Participation in the code is voluntary; 130 states have currently adhered thereto and have thus undertaken to respect its principles.[89]

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86. The participating states of the MTCR prepared an International Code of Conduct (ICOC). This was finally separated from the MTCR and a process, open to all states, supported strongly by the European Union, was launched. Two preparatory meetings were organised in Paris and Madrid in 2002. They resulted in the drafting of the Code of Conduct, which was finally launched at the conference in The Hague on 25 and 26 November 2002. Two other multinational initiatives were taken but ultimately did not result in anything: the global control system (GSK) proposed by Russia in 1999 and a governmental panel of experts decided by the 55th of the General Assembly of the United Nations pursuant to an Iranian proposal in 2000. See in this respect, Pal, W., Sidhu, S., and Carle, Christophe, “Managing missiles: blind sport or blind alley?”, *Disarmament Diplomacy*, No. 72, August – September 2003.

87. Provided that space programmes are not used to conceal ballistic programmes.

88. Bertolotti, David, “Le code de conduite de La Haye contre la prolifération des missiles balistiques : le régime qui n’existe pas ?”, *AFRI*, Vol. VII, 2006, p. 802-819.

89. Paragraph 2 of The Hague Code of Conduct, document UN A/57/724. The unofficial translation for French diplomacy is available on the French diplomatic website.

They recognise the need to prevent and curb worldwide the proliferation of ballistic missile systems capable of delivering WMD, the need to continue pursuing international endeavours, the importance of strengthening and gaining wide adherence to multilateral disarmament and non-proliferation mechanisms, the need to ensure that states are not deprived of the possibility of benefitting from the use of outer space for peaceful purposes, the need to ensure that space launch vehicle programmes are not used to conceal ballistic missile programmes, and finally the need for appropriate transparency measures on ballistic missile programmes and space launch vehicle programmes in order to increase confidence and promote non-proliferation of ballistic missiles and ballistic missile technology. Paragraphs 3 and 4 lay down measures for the implementation of paragraph 2: the first targets ballistic missile non-proliferation while the second is aimed at implementing measures to ensure transparency, thus fostering mutual trust. It should be noted that the code does not prohibit the development, possession, deployment or even use of ballistic missiles.

In 2004, the United Nations Security Council unanimously adopted Resolution 1540.[90] This resolution, which has become a reference document in the combat against proliferation, stipulates that “states shall refrain from providing any form of support to non-state actors that attempt to develop, acquire, manufacture, possess, transport, transfer or use nuclear, chemical or biological weapons and their means of delivery”.[91] It legitimises the reinforcement of multilateral and unilateral political rules to control exports of sensitive items. In order to fulfil the objectives of the resolution, all member states “shall take and enforce effective measures to establish domestic controls to prevent the proliferation of nuclear, chemical, or biological weapons and their means of delivery, including by establishing appropriate controls over related materials”.[92] To this end, the resolution lists the elements which national export regimes must include in order to combat effectively the proliferation of WMD. Laws and regulations must be adopted to control export, transit, trans-

90. The negotiation of this resolution exceeded widely the restrictive framework of the Security Council. Thus, in addition to many bilateral discussions (in particular, between France and Russia), regional groups were consulted (such as the French-speaking world), as was the movement of the unaligned parties, while the G8 played an important role. Japan was not a member of the Security Council at the time.

91. Committee 1540, “Resolution 1540 (2004) of the United Nations Security Council”. The text is available on the website: http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N04/328/43/PDF/N0432843.pdf?OpenElement.

92. Paragraphs 2 and 3, *ibid*, p. 3.

shipment and re-export operations, control measures relating to end users are needed, appropriate criminal and civil sanctions must be introduced, item control lists need to be adopted and kept up to date, and finally co-operation mechanisms between states need to be introduced.

This resolution was adopted pursuant to Chapter VII, entitled "Action with respect to threats to the peace, breaches of the peace, and acts of aggression" of the United Nations Charter.[93] Article 41 of the Charter provides that the Security Council may decide what measures not involving the use of armed force are to be adopted in the event of threats to the peace, breaches of the peace, and acts of aggression, and it may call upon the members of the United Nations to apply such measures. These may include a decision resulting in the "complete or partial interruption of economic relations" in relation to dual-use arms and items. For example, in 2009, Security Council Resolution 1903 renewed the ban on delivering, selling or transferring weapons and related materials to Liberia.

However, these provisions applied only to states found clearly in breach on a temporary basis. On the other hand, Resolution 1540 has legislative force, is general and permanent.[94] An objection to this resolution was raised by China, which objected to the prescriptive power thereby granted to the Security Council, arguing that its role should be limited strictly to re-establishing peace. The text was consequently amended[95] but its application continues to be general

93. Some states, including China, were not in favour of this reference which gave the resolution greater weight, preferring wording of an incentive rather than binding nature, under Chapter VI.

94. Sur, Serge, "La Résolution 1540 du Conseil de sécurité (28 avril 2004) entre la prolifération des armes de destruction massive, le terrorisme et les acteurs non étatiques", *Revue Générale de Droit International Public*, 2004, No. 4, pp. 855-882.

95. See Tercinet, Josiane, "Le pouvoir normatif du conseil de sécurité : le Conseil peut-il légiférer ?", in *Arès*, *Défense et sécurité de la France, sécurité européenne et internationale, Course aux armements et Désarmement, Économie de la défense*, Vol. XXI, No. 55, Fascicule 3, May 2005, p. 77.

and permanent, as the Council[96] considered that "the proliferation of weapons of mass destruction constitutes a threat to international peace and security".[97]

The failure of the 2005 NPT Review Conference

In May 2005, the seventh quinquennial NPT Review Conference was held in a difficult international context which prevented the adoption of a final declaration.[98] Examples for this difficult context are: the threat followed by the announcement by North Korea of its intention to build a nuclear weapon which was confirmed by its decision to withdraw from the NPT in 2003, the discovery of the Libyan nuclear programme for military end use, Iran's undeclared enrichment programme, the threat of terrorist use of nuclear technology which became credible following the discovery of Dr. Khan's underground network of nuclear technology and materials. Moreover, the little efforts made by the NWS with regard to disarmament did not contribute to perceive the conference with optimism.

Three reasons can explain the failure to reach consensus on a final declaration: first, problems relating to procedures, secondly, the matter of compliance by the member states with their commitments and obligations and thirdly, the blocking tactics adopted by certain parties during the discussions.

The problems relating to procedures and in particular the failure to reach agreement on the agenda, the subsidiary bodies and the working programme of the conference, prevented the beginning of works for more than two and a half weeks out of the four weeks scheduled for the review conference. Inevitably, this left hardly any time to address and debate the fundamental issues and even less to reach an agreement on a final declaration. These problems were unfortunately foreseeable in that the three preparatory sessions for the conference (PrepComs) failed to achieve anything concrete and demonstrated the state parties' lack of willingness to compromise.[99]

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96. Action by the Council was preferred to other types of measure such as a recommendation of the UN General Assembly (to which the Charter entrusts the task of adopting recommendations on the principles governing disarmament), negotiation of a new treaty or action taken within the framework of the conference on disarmament or of the PSI.

97. Paragraph 1 of the Recitals to Resolution 1540.

98. Only one procedure-related final document was adopted.

99. Gonneville, Etienne de, "La septième Conférence de révision du NPT : une étape dans une crise de régime?", *AFRI*, Vol. VII, 2006.

The issues of compliance with the state parties' commitments and obligations were the second reason for the conference's failure. The NWS asked for the measures against the proliferation of nuclear weapon to be reinforced while the NNWS called for more serious action on disarmament from the NWS. One of the most sensitive issues was the reference to the 13 steps evoked in the final declaration of the 2000 Conference.[100] The delay in the entry into force of the Comprehensive Nuclear-Test-Ban Treaty (CTBT), the deadlock at the Disarmament Conference, the United States' withdrawal from the Anti-Ballistic Missile Treaty in 2002 and Russia's reaction in response to it[101] as well as the increase in the Chinese budget for military end-use nuclear activities were all other factors hampering serious negotiations.

Finally, the third factor contributing to the conference's failure was the attitude adopted by some states during the discussions. Although the NWS reached agreement during the 2000 Conference, they were not able to agree on a joint declaration, while the "new agenda coalition" appeared to be strongly divided. Egypt, a member of this coalition, played a major role in blocking any consensus on the agenda of the conference for five days. Iran took advantage of Egypt's position to prevent its case from being discussed. In addition, the United States blocked all progress, followed by France which also had an interest in no result being achieved.

Although the failure of the 2005 Conference is undeniable, it should nevertheless be stressed that the essentials were preserved: the review conference was held and no member state called the treaty into question. Furthermore, there was no longer any formal challenge to the legitimacy of the supplier groups.[102] The universal nature of the IAEA's additional protocol also seems to have been better accepted, despite some minority opposition. Finally, the matter of withdrawing from the NPT was discussed for the first time by a specific subsidiary body.[103]

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100. The United States, France and the United Kingdom objected to any reference to these 13 steps as they considered that they had been overtaken by events.

101. Immediately after the withdrawal of the United States from the ABM Treaty, Russia broke with START II. In 2004, it announced the acquisition of new nuclear weapons.

102. Gonneville, E. de, *op. cit.*

103. *Ibid.*

India: the exception that overrules the rule

An agreement was signed between the U.S. President George W. Bush and the Indian Prime Minister Manmohan Singh on 18 June 2005. This agreement announced the creation of a global partnership including full co-operation on civilian nuclear energy between these two countries. Under this agreement, the re-opening of the nuclear market to foreign exporters, in particular U.S. suppliers, was made conditional on implementation of a series of commitments by the Indian authorities. In order to make this re-opening possible, President Bush undertook in return to persuade the U.S. Congress to amend the Arms Export Control Act and the Nuclear Non-Proliferation Act of 1978, and convince the NSG member states to introduce a specific exception into their guidelines for trade with India. For, India does not meet the NSG's two main export conditions, namely to authorise nuclear transfers only if the supplier state is convinced that the planned transfers will not be used to develop a nuclear weapon and that the recipient state has ratified and implemented an agreement with the IAEA on full scope safeguards.

In practical terms, India undertook to identify its civilian nuclear installations and to separate them from all military activities, to voluntarily make its civilian nuclear activities subject to a full scope safeguards agreement with the IAEA and to sign and implement an additional protocol, to maintain its unilateral moratorium on nuclear testing, to develop an export control regime in line with existing informal regimes (NSG and MTCR), to "secure" the technologies and materials in its possession in order to prevent their proliferation, to support the proposed treaty banning the production of fissile material for nuclear weapons and to promote nuclear disarmament.[104]

In order to implement these undertakings India, on 7 March 2006, adopted a plan to separate its nuclear civilian and military activities, listing the civilian facilities or activities to be subject to IAEA safeguards.[105] This separation plan was the essential basis for the resumption of international co-operation with India, as the United States could only envisage such

104. Squassoni, Sharon, "U.S. Nuclear Cooperation with India: Issues for Congress", CRS Report for Congress, 29 July 2006.

105. The separation plan provided that ten operating reactors and four reactors under construction be made subject to IAEA safeguards. It also provided that future civilian reactors and some other facilities for transforming nuclear materials into fuel would also be subject to safeguards. For additional information, see "Implementation of the India-United States Joint Statement of July 18, 2005: India's Separation Plan" (INFCIRC/731, 25 July 2008).

co-operation for Indian civilian facilities and activities that are subject to IAEA safeguards. India had not in the past separated the development of its military programme from its civilian programme, which resulted in problems in identifying facilities designed strictly for civilian use. Therefore, with the adoption of the separation plan combined with a statement affirming that it was in the process of harmonising its export rules with international regimes, India was able, by showing its good faith, to exercise a degree of pressure on the United States to comply with its 2005 undertakings.[106]

The United States applied a two-step approach at domestic level to implement this co-operation process. Section 123 of the Atomic Energy Act of 1954[107] lays down the conditions for the United States to engage in nuclear co-operation with other states. Under the act, transfers of nuclear items are conditional on the negotiation of a co-operation agreement, referred to as a 123 Agreement, which must be approved by Congress. However, the Nuclear Non-Proliferation Act of 1978, which transposes NSG guidelines into domestic law and consequently lays down the conditions for the export of nuclear items and technology, indirectly prevents the conclusion of any nuclear agreement with states with nuclear weapons which have not signed the NPT, such as India.

It was consequently necessary first to amend the Nuclear Non-Proliferation Act with a view to introducing a specific exception for India. The Hyde Act was adopted on 27 July 2006 in a plenary meeting of the United States House of Representatives by 359 votes in favour and 68 votes against. The act was then approved by the Senate on 16 November 2006 with 85 votes in favour and 12 votes against during an extraordinary "lame-duck" session. It is interesting to observe that these votes were void of partisan politics and the act was approved by a majority comprising both Republican and Democrat members.[108]

Finally, President Bush signed the Hyde Act on 18 December 2006.[109] This act introduced an exemption from U.S. legislation in order to envisage

106. Paile, Sylvain, (under the guidance of Q. Michel), "Note d'actualité décembre 2006 : commentaire de l'Accord intervenu entre l'Inde et les États-Unis sur la coopération dans le domaine du nucléaire civil", website of l'Unité d'Études Européennes de l'Ulg, 2006.

107. This act repealed the McMahon Act of 1946 (Atomic Energy Act of 1954, Public Law No. 83-703).

108. Paile, S., *op. cit.*

109. Henry J. Hyde United-States-India Peaceful Atomic Energy Co-operation Act of 2006, H. R. 5682.

nuclear co-operation with India and authorised President Bush to negotiate the details of the co-operation process through a 123 Agreement.

This peaceful nuclear co-operation agreement was concluded in July/August 2007. It related to civilian nuclear trade and specified that the signatory states must facilitate their mutual trade in nuclear materials as well as, in very specific cases, trade between third states and one of the signatories.[110] The conditions for transfers of nuclear materials and equipment were also laid down.[111] However, it was decided that this agreement could only be implemented in "accordance with its respective applicable treaties, national laws, regulations, and licence requirements concerning the use of nuclear energy for peaceful purposes".[112] This provision meant that the NSG guidelines needed absolutely to be amended. Moreover, the U.S. authorities committed *vis-à-vis* the Indian authorities to defend this exception and attempt to obtain its adoption by the Nuclear Suppliers Group.

Although the Indian-U.S. negotiations in 2005 were the precursor of nuclear co-operation with India, the prospect of the end of Indian isolation and the potential opening of a market which had previously been closed did not leave the other supplier states indifferent. France, which was anxious to prevent the United States from monopolising the Indian market, reacted rapidly by means of statements issued in September 2005 and February 2006. A meeting in 2005 between Indian and French authorities resulted in the recognition by France of the "need for full international civilian nuclear co-operation with India". Moreover, France undertook to "work towards this objective by working with other countries and the NSG and by deepening bilateral cooperation".[113] This statement announced that both countries would in the future work towards concluding a bilateral nuclear co-operation agreement. In 2006, a new statement confirmed the "fruitful bilateral dialogue", asserting their mutual wish to further develop international co-operation in promoting the use of nuclear energy and laid the foundations for such co-operation. It reaffirmed the negotiations concerning conclusion of a bilateral nuclear co-operation agreement for

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110. Article 4, Agreement for co-operation between the Government of the United States of America and the Government of India concerning peaceful uses of nuclear energy, Agreed Text, August 2007.

111. Article 2.2, *ibid*.

112. Article 2.1, *ibid*.

113. "Joint statement by M. Jacques Chirac, President of the Republic, and Mr. Manmohan Singh, Prime Minister of India", Elysée Palace, 12 September 2005.

peaceful purposes. To this end, the two countries stated that they looked forward to an adjustment of the international civilian nuclear co-operation framework with respect to India and accordingly confirmed their intention to work towards this objective so that the agreement could be fully implemented.[114]

On 1 August 2008, the IAEA Board of Governors approved by consensus a safeguards agreement between India and the IAEA which entered into force on 11 May 2009. On 15 May 2009, India also signed the additional protocol which gave the IAEA the widest possible powers to inspect and control civilian nuclear facilities and nuclear activities subject to safeguards. Thus, India fulfilled the essential points of its undertakings and the United States was able to initiate the second stage of its commitment, namely, to attempt to put pressure on the NSG to introduce an exception authorising nuclear trade with India after a nuclear embargo lasting almost 35 years.

At an extraordinary plenary meeting held on 6 September 2008, the NSG adopted the decision relating to the exception for India. The adoption of this exemption was undoubtedly the result of an intensive lobbying campaign by the United States, the initiator of the proposal, backed by the main supplier states with the notable exception of Japan. In light of India's commitments, the NSG now authorises its members to transfer items or technology[115] designed for peaceful use to Indian nuclear civilian facilities subject to IAEA safeguards. This represents a right for the participating states to trade with India but not an obligation to do so. The states party to the NSG are not obliged to apply this exception for their exports of nuclear items, as decided, for example, by Japan. It should be noted that the use of the exception for India is nevertheless restricted by a specific notification mechanism whereby the state parties, during plenary meetings, are asked to inform each other about any transfers to India and also, on a voluntary basis, to notify any national bilateral agreement concluded with that country.[116] Thus, in 2008, France, the United States and Russia concluded co-operation agreements with India, joined, in 2009 by Kazakhstan, Argentina, Canada, Namibia and Mongolia.

The exception for India granted by the NSG is one of the Bush administration's biggest successes. Russia provided support throughout the

114. "Statement by India and France on the Development of Nuclear Energy for Peaceful Purposes", New Delhi, 20 February 2006.

115. These are items shown on the NSG list relating to nuclear items and that relating to dual-use items.

116. "Statement on Civil Nuclear Cooperation with India", INFCIRC/734 (corrected).

process, even if it had in the past provided some Indian facilities with nuclear fuel well before adoption of the exception for India by the NSG.[117] Moreover, France, strongly encouraged by the French companies Areva and Airbus, was also in favour of the exception. The French hoped to be supported by the whole European Union which saw the conclusion of these agreements as a means of action to combat climate change.[118] However, this reasoning was not supported by several member states, including notably the Netherlands, Austria and Ireland. These countries, along with New Zealand, Norway and Switzerland, were sceptical about the impact of the NSG exception, in particular in the event that India resumed a series of nuclear tests after having been granted the exception.[119] In order to meet these concerns New Delhi undertook to refrain from contributing to proliferation and to suspend all nuclear testing.[120] China was initially one of the most strongly opposed countries with regard to the approval of the exception for India by the NSG.[121] Nevertheless, it did not in the end object, thus enabling the exception to be approved by consensus. However, a joint statement by the Indian Prime Minister and his Chinese counterpart, Wen Jiabao, asserted that these two countries undertook to support their co-operation with regard to civilian nuclear energy.[122] South Africa, Brazil and Argentina also backed the agreement.

In addition to opening up the Indian nuclear market, the NSG exception radically changed the principles of non-proliferation of nuclear weapons as

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117. To this end, Russia relied in an abusive fashion on the safeguard provision laid down by Article 4 of INFCIRC254/Part.1.

118. Pop, Valentina, "EU extends nuclear cooperation with India", *EU Observer*, 29 September 2008.

119. These same countries wanted at the outset to include a suspension clause to the exception agreement, in case India resumed nuclear testing.

120. It was, however, pointed out by some that this only appeared in a statement by the Minister of Foreign Affairs, Pranab Mukherjee, and not in the actual text.

121. Some sources state that China attempted to thwart the U.S. proposal throughout the negotiations. It encouraged the coalition of opposing countries in order to prevent the required consensus. The Chinese representatives apparently even left the meeting room for a moment. These sources also argue that it was only further to a telephone call from the U.S. President to his Asian counterpart that China finally decided not to block the agreement. See Kumara, Kranti and Jayasekera, Deepal, "Nuclear Supplier Group gives India unique 'waiver', but only after row between Delhi and Beijing", *WSW*, 17 September 2008.

122. "A shared vision for the 21st Century of the People's Republic of China and the Republic of India", 14 January 2008.

established by the NPT, by granting India *de facto* NWS status. If proof of this is needed, it is enough to look at the conditions laid down by the NSG for resumption of nuclear trade which are very similar to the voluntary undertakings made by the NWS signatories of the NPT. The most striking example here is the agreement on full scope safeguards which mirrors that concluded by the NWS and applies exclusively to the facilities listed by the Indian authorities. India is at present the only non-signatory party to the NPT equipped with nuclear weapons to benefit from such wide access to the civilian nuclear market. By relying on their objectively similar situations, Pakistan and Israel are currently seeking to obtain a similar exception from the NSG.[123]

It is argued by some that no provision of the NPT prohibits peaceful nuclear co-operation with states not party to the treaty, provided that such co-operation is subject to IAEA safeguards in order to verify the exclusively civilian nature of the co-operation. Moreover, they argue that by developing its military nuclear programme, India has not breached any international commitment since it is not a party to the NPT.[124]

The United Nations Security Council's growing interest in nuclear non-proliferation matters

At a meeting of heads of state and government on 24 September 2009 chaired by the United States,[125] the United Nations Security Council unanimously adopted Resolution 1887[126] granting a vital role to the United Nations in reinforcing the global framework for the non-proliferation of weapons of mass destruction, with emphasis on nuclear weapons. This resolution reaffirmed the Security Council's involvement in the combat against proliferation which is now placed in a more global framework.

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123. China is aiming for a similar exception to be granted to Pakistan also.

124. Mr. Xavier Pintat's report conducted on behalf of the Committee on Foreign Affairs, Defence and Armed Forces on the bill authorising approval of the co-operation agreement between the Government of the French Republic and the Government of the Republic of India for the development for peaceful use of nuclear energy, No. 335, 2008-2009.

125. Except for Libya. It was the fifth time in the history of the United Nations that the Security Council held a meeting of heads of state and government. The Secretary-General of the UN and the IAEA Director-General also participated in this meeting.

126. UN Security Council Resolution 1887 (2009), 24 September 2009, S/RES/1887 (2009).

The first paragraph of Resolution 1887 states that all situations of non-compliance with non-proliferation obligations shall be brought to the attention of the Security Council which will determine if the situation constitutes a threat to international peace and security. The resolution accordingly grants the Security Council primary responsibility in addressing such threats. The scope of the expression “compliance with non-proliferation obligations”, within the meaning of the resolution, also needs to be defined. It relates mainly to the various undertakings made by states with regard to non-proliferation, such as the NPT, the Chemical Weapons Convention, the Biological Weapons Convention and Resolution 1887.

The resolution places particular importance on the NPT, calling upon, on the one hand, states party to the NPT to “comply fully with all their obligations and fulfil their undertakings under the Treaty”, and on the other hand, all states that are not party to the NPT to accede to the treaty as non-nuclear-weapon states, and pending their accession to the treaty, to adhere to its terms.[127] It is somewhat paradoxical that the states which voted in favour of this resolution also backed the adoption of the NSG exception for India.

Resolution 1887 also refers to Resolution 1540 and its principles.[128] The Security Council affirmed its determination to promote Resolution 1540 in its entirety and to provide its backing to the 1540 Committee. It added that the resolution must be fully implemented by all members of the United Nations. There is no doubt that the Security Council considered implementation of this

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127. Paragraphs 2 and 4 of Resolution 1887 (2009).

128. “22. *Welcomes* the March 2009 recommendations of the Security Council Committee established pursuant to resolution 1540 (2004) to make more effective use of existing funding mechanisms, including the consideration of the establishment of a voluntary fund, and affirms its undertaking to promote full implementation of resolution 1540 (2004) by member states by ensuring effective and sustainable support for the activities of the 1540 Committee;

23. *Reaffirms* the need for full implementation of resolution 1540 (2004) by member states and, with an aim of preventing access to, or assistance and financing for, weapons of mass destruction, related materials and their means of delivery by non-state actors, as defined in the resolution, calls upon member states to cooperate actively with the Committee established pursuant to that resolution and the IAEA, including rendering assistance, at their request, for their implementation of resolution 1540 (2004) provisions, and in this context welcomes the forthcoming comprehensive review of the status of implementation of resolution 1540 (2004) with a view to increasing its effectiveness, and calls upon all states to participate actively in this review”. Paragraphs 22 and 23 of UN Security Council Resolution 1887 (2007), *op. cit.*

resolution as one of the non-proliferation obligations within the meaning of paragraph 1 of Resolution 1887.

It may be noted that the Security Council did not explicitly refer to other international treaties such as, for example, the Chemical Weapons Convention or the Biological Weapons Convention. However, it is not unreasonable to consider that they are also covered by Resolution 1887. Although the bulk of the resolution focuses on non-proliferation of nuclear weapons, the first paragraph states that the Security Council will look into any case of failure to comply with non-proliferation obligations. The use of this general term in preference to other more specific references such as "non-proliferation of nuclear weapons" or "non-proliferation of weapons of mass destruction" shows that Resolution 1887 covers non-proliferation in the broad sense of the term, not only that of nuclear weapons.

However, Resolution 1887 does not contain any obligations incumbent on states similar to those provided for in the first five paragraphs of Resolution 1540. In fact, it affirms the Security Council's responsibility in the field of non-proliferation and calls on states to help prevent the proliferation of WMD and, in particular, "to create the conditions for a world without nuclear weapons".[129] Moreover, it is on the basis of this responsibility that the Security Council sets out a series of recommendations relating to non-proliferation of WMD in the other paragraphs.

First, some recommendations call on states to ratify and implement a number of instruments with a view to improving the international non-proliferation framework. Thus, the resolution calls on states to sign and ratify the Comprehensive Nuclear-Test-Ban Treaty (CTBT),[130] calls upon the Conference on Disarmament to negotiate a treaty banning the production of fissile materials for nuclear weapons,[131] encourages the IAEA's work and calls upon states to conclude full scope safeguards agreements together with an additional protocol,[132] asks states to adhere to the Convention on Physical Protection of Nuclear Materials[133] etc.

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129. Introduction to Resolution 1887 (2009).

130. Paragraph 7 of Resolution 1887 (2009).

131. Paragraph 8, *ibid.*

132. Paragraph 15, *ibid.*

133. Paragraph 5, *ibid.*

Resolution 1887 also contains requests regarding measures which states need to take to combat proliferation and reinforce national export control systems. Thus, the Security Council urges states to take all appropriate measures to prevent nuclear proliferation financing and shipments, strengthen export controls, secure sensitive materials and control access to intangible transfers of technology.[134] Moreover, it calls upon states to adopt stricter national controls for the export of sensitive goods and technologies of the nuclear fuel cycle[135] and urges them to improve their national capabilities to detect, deter and disrupt illicit trafficking in nuclear materials throughout their territories. The resolution also encourages states to require as a condition of nuclear exports that the recipient state agree that, in the event that it should terminate, withdraw from or be found by the IAEA Board of Governors to be in non-compliance with its IAEA safeguards agreement, the supplier state would have the right to require the return of nuclear material and equipment provided prior to such termination, non-compliance or withdrawal, as well as any special nuclear material produced through the use of such material or equipment.[136] Finally, the third category relates to co-operation between states with regard to non-proliferation.[137]

The particular importance given by the resolution to nuclear matters should be noted. Apart from the first paragraph, paragraph 10 which deals with non-proliferation in general, paragraphs 22 and 23 which focus on the application of Resolution 1540 and paragraph 29 in which the Security Council decided to remain seized of the matter, the remaining provisions of the resolution relate exclusively to nuclear matters.

Conclusion

The aim of this paper has been to provide a brief overview of the main stages in the development of international nuclear export control regimes since the entry into force of the Treaty on the Non-Proliferation of Nuclear Weapons and to set out the main features of the current regime.

Although the constant tendency in the development of non-proliferation regimes has been continually to reinforce transfer control rules by filling in any gaps created by a number of more or less successful proliferation attempts, it

134. Paragraph 27, *ibid.*

135. Paragraph 13, *ibid.*

136. Paragraph 21, *ibid*.

137. Paragraphs 24 and 26, *ibid*.

must be recognised that this has also resulted in increasing and complicating international non-proliferation instruments. The lists of nuclear items covered by these regimes have become longer and longer and more technically elaborate, which has made it difficult for some states lacking the necessary technical expertise to detect effectively such items when they go through customs.

Moreover, the arrival of new forms of actual or supposed proliferation, linked in particular to nuclear terrorism, has led to the adaptation of these regimes which were initially designed to combat institutional proliferation by states.

Finally, the continuing development of technology and the use of new means of exporting it, in particular via intangible transfers, have also weakened national export control regimes essentially geared to the control of physical transfers based on an export licence verified by the customs authorities upon leaving the territory.

Nevertheless, it must be recognised that while non-proliferation regimes have not been able to prevent some states from procuring nuclear weapons, they have succeeded all the same in curbing significantly the number of nuclear weapon states. We are a long way from the pessimistic predictions made at the beginning of the 1980s which forecast some 20 nuclear weapon states by early 2000.

However, in the case of a number of states, the decision to renounce nuclear weapons was taken on political rather than technical grounds, based first and foremost on the NPT's essential principle of access to civilian technology in return for the renouncement of nuclear weapons. The NSG broke with this principle by allowing an exception for India, and this has led to the risk that some states, feeling that their efforts have not been adequately rewarded, might reconsider their political decisions.

Liability and Compensation for Third Party Damage resulting from a Nuclear Incident

*by Julia A. Schwartz**

During the early stages of development of the nuclear industry, the governments of many industrialised countries viewed nuclear power as an attractive source of indigenously produced energy that would enable their economies to rapidly expand and prosper. There were, however, a number of major barriers to this development which initially needed to be overcome.

First, it was recognised that the peaceful utilisation of nuclear energy would involve risks which, because of their potential magnitude and peculiar characteristics, could lead to far greater damage being suffered in the case of an accident than would normally be the case with conventional industrial activities. In addition, that damage might not manifest itself until many years after the accident which caused it. While governments at the time might not have envisaged a "Chernobyl" type of accident, they were very much aware that in the case of a serious nuclear incident involving a large scale emission of ionizing radiation, there could be widespread and severely detrimental effects to human health, public and private property, the environment and the economy. States wanting to promote nuclear energy production were conscious of their responsibility to protect the welfare of their citizens and of the need to ensure

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* Head of Legal Affairs, OECD Nuclear Energy Agency. This article is largely based upon the author's presentations to the International School of Nuclear Law on "Liability and Compensation for Nuclear Damage" and on the author's article "International Nuclear Third Party Liability Law: The Response to Chernobyl", published in *International Nuclear Law in the Post-Chernobyl Period*, OECD (2006), pp. 37-72. The author alone is responsible for the facts and opinions expressed in this article.

adequate financial compensation to persons suffering damage in the event of a nuclear accident.

But it was not only the public that needed protection; fear of financially debilitating liability claims that might be instituted by innocent victims following a nuclear accident was inhibiting investment in the construction of new power plants by potential investors, builders and suppliers of equipment, services and technology. All were concerned that a liability threat that was potentially unlimited both in time and amount, and for which there was little or no likelihood of obtaining adequate insurance in the normal course of business, could result in their financial ruin. Naturally, under these circumstances they were hesitant to commit to the development of the industry.

Governments realised that a solution to these conflicting interests was essential; the need to protect the public from the exceptional risks posed by the production of nuclear energy, the economic benefits of a developed nuclear power industry and the need to protect investors and suppliers from ruinous claims for damages all had to be reconciled. It quickly became obvious that the answer lay in removing legal and financial impediments to industrial development while at the same time ensuring adequate compensation for any damage that might be suffered by innocent third parties.

One major legal obstacle to this development was the application of the ordinary rules of tort law to nuclear incidents. Those rules, while appropriate for conventional risks, were seen to inhibit rather than facilitate victims from discerning which of the many potential parties involved in a nuclear accident (designers, builders, suppliers etc.) was legally liable therefore, particularly given the overwhelming technical complexities of such a task. They were also seen to inhibit victims from successfully proving how the acts or omissions of one or more of those many possible defendants actually caused the accident.

Doing away with the ordinary rules of tort law opened the door for the imposition of liability and compensation rules which address these conflicting objectives, rules which, when taken together, form a special regime that takes into account the exceptional risks involved in nuclear power production. That regime now forms the basis of national nuclear liability law in most industrialised countries of the world and it has been adopted as the foundation for today's international conventions on civil nuclear liability.

1. Application of a special regime

While there are some slight variations in the way different countries apply this special regime under national law, there is general agreement that it should apply only to a "nuclear incident" which occurs either at a facility in which highly dangerous nuclear substances are kept or highly dangerous processes are carried out or during the transport of such substances.

A nuclear incident is generally understood to mean an event which causes damage, provided that either the event or damage is due to the radioactive properties of nuclear fuel or of radioactive products or waste. Nuclear fuel is fissionable material (i.e. uranium and plutonium in all forms) and radioactive products or waste is essentially any material produced or made radioactive by exposure to the radiation incidental to producing or using nuclear fuel; the event or damage may also be due to radiation emitted by any other source inside a nuclear facility.

Nuclear facilities or "installations" therefore house quite a broad spectrum of activity; they normally include power and research reactors,[1] factories or facilities for the manufacture, processing, storage or disposal of nuclear substances, factories for the separation of isotopes of nuclear fuel and facilities for the reprocessing of irradiated nuclear fuel.

Activities which do not involve high levels of radioactivity, such as uranium mining or milling or the manufacture and processing of natural or depleted uranium do not fall within the scope of the special regime; nor do research laboratories in which only small amounts of fissionable material are kept. Also excluded from the regime are radioisotopes usable for industrial, commercial, educational or scientific purposes once they have been completely manufactured and are outside of a nuclear installation.

2. The basic principles

Five basic principles underlie the special nuclear third party[2] liability and compensation regimes at both national and international levels:

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1. Reactors comprised in a means of transport are generally excluded from the special regime.

2. A "third party" is anyone other than the operator of the nuclear installation at which the accident occurs and other than a supplier of goods, services or technology for use in connection with that nuclear installation. A third party may be inside or outside of the nuclear installation and as such the term includes employees of the operator of the nuclear installation at which an accident occurs.

Strict liability

The operator of a nuclear installation is strictly liable for damage to third parties resulting from a nuclear incident occurring at its installation or during the course of transport of nuclear substances to/from that installation. Due to the unusual risks associated with the operation of a nuclear installation or the transport of nuclear substances, it was clear that those who carried out those activities should be fully responsible for any injurious consequences therefrom. Strict liability relieves a claimant from the burden of proving fault or negligence on the part of the operator, leaving him/her to merely establish a causal link between the nuclear accident itself and the damage suffered. This is a major deviation from general tort law principles which render a defendant liable for a plaintiff's damages only where it can be established that the defendant owed a duty of care to the plaintiff and breached that duty through negligence or an intentional act or omission.

Since it would be virtually impossible for a claimant to have the necessary knowledge of what had taken place in a nuclear installation or in the course of transport when the accident occurred, strict liability (also called "absolute liability" in some jurisdictions) provides a large measure of equity that would not otherwise be available to victims. The concept has been applied in a number of different fields but it is most commonly associated with defectively manufactured products, especially in the foodstuffs and pharmaceuticals markets.

Exclusive liability (legal channelling)

As already noted, from the very beginning owners and operators of nuclear installations as well as suppliers of nuclear goods, services and technology were fearful that soaring liability claims in the event of a nuclear incident could ruin their businesses and devour their assets. To encourage investment in the burgeoning nuclear business, governments introduced the concept of exclusive liability or "channelling" of all liability for damage suffered by third parties directly to the operator of the nuclear installation at which the incident took place or to/from which nuclear substances were being transported; in other words, the operator of the nuclear installation is the only entity legally liable for such damage regardless of which act or omission was the actual cause of the incident.

A supplier of defective goods, for example, may not be held liable for that damage even if it has been negligent or at fault, unless it has accepted liability pursuant to the terms of its contract with the operator, in which case the operator has a right of recourse against the supplier/contractor. There are also cases where the operator may have recourse against an individual who has acted with intent to cause damage. Regardless of its right of recourse, the operator remains exclusively liable *vis-à-vis* third party victims.

For victims, channelling liability to the operator obviates the need to identify and pursue all defendants who are potentially responsible for causing the accident.[3] This is a significant benefit when one considers the difficulty victims would face trying to obtain the evidence necessary to establish cause after an accident has occurred. With channelling, victims are able to avoid possibly fruitless and certainly expensive investigations, claims and counterclaims. In addition to rendering victims' claims easier to establish, "channelling" has the effect of sparing non-operator owners and suppliers of goods, services and technology from having to defend complicated and expensive lawsuits or from purchasing costly third party liability insurance which, given the restricted market capacity for such coverage, could result in less coverage being available to respond to operators' needs for same.

The advantages enjoyed by suppliers and contractors are extended to carriers who are generally not responsible for the packaging or containment of nuclear substances, who do not normally have the specialised knowledge of how to handle them and who would otherwise also be required to purchase special and costly third party liability insurance to cover their exposure. Thus, liability for third party damage will lie with the operator of the nuclear installation which sends the substances, until liability therefore is transferred to the operator of another installation or the latter has taken charge of the shipment.

Generally speaking, "channelling" of liability does not affect any rights under public health insurance, social security, workers' compensation or other schemes or systems relating to occupational diseases under national law. If a victim is compensated or cared for under other legislation, the entity that has expended the funds for such compensation or care may, in certain specified cases, have a right of recourse against the operator.

3. The United States, under its Price-Anderson Act, imposes a system of "economic" rather than "legal" channelling. While "legal" channelling means that all liability is channelled to the nuclear operator and to no other entity, "economic" channelling means that any entity may be held legally liable for the damage incurred, but the economic consequences of that liability are channelled to the responsible nuclear operator. Thus any person who is held legally liable will be indemnified by that operator.

Compulsory financial security

To ensure that funds will actually be available to pay victims' claims for compensation when the time comes, it was believed necessary to require nuclear installation operators to financially secure their liability. In most cases, that security is provided by the private insurance market, although it may take other forms, such as a bank guarantee, an operator pooling system,[4] self-insurance[5] or even a guarantee or indemnity provided by the state in which the operator's installation is located.

The necessity of relying upon the private insurance market means that both monetary and temporal limits on compensation are imposed. Although the market capacity for nuclear third party liability insurance has expanded considerably since its inception some 50 years ago, it still remains limited. Governments have historically been careful to impose an amount of financial security that does not exceed the capacity of the insurance market, and for which the premiums would not be beyond the means of operators to pay. Governments have also been generally careful to respect temporal limits that are set by the insurance market such as limiting the time period following a nuclear incident within which claims may be instituted and will be honoured.

In most jurisdictions, the state in whose territory the operator's installation is situated will govern the terms and conditions applicable to obtaining and maintaining financial security in viable form. Recognising that there are not many nuclear operator clients who require coverage but that those which do need relatively high amounts, domestic insurance companies usually organise themselves into some form of "pool" in order to amass the maximum amount of market capacity. In some cases, national law stipulates that where the financial guarantor fails to provide the required security, for example for reasons of insolvency, the state will step in and provide the funds required.

Liability limits: amount

Under ordinary tort law rules there is no limit on the amount of compensation payable for damage caused by an accident; the person liable for the damage will have to pay the full amount of any judgement or settlement. However, in many countries wishing to develop or expand their nuclear industry, relieving

4. Operator pooling schemes, although very different one from the other, are in use both in Germany and the United States.

5. Self-insurance is usually only permitted in respect of nuclear installations that are owned or operated by a state.

operators from the burden of ruinous liability claims is practically a necessity and their national laws therefore impose a limit upon the amount for which an operator may be held liable for third party damage. Since private insurance is by far the method most utilised by operators to financially secure their liability, the limit usually corresponds to the amount of private insurance coverage available on the market for that purpose.

The limit constitutes the operator's total liability for third party damage regardless of the amount of damage actually suffered or claimed. Without such a limit, an operator would have to pay from its own assets any compensation awarded in excess of the amount financially secured. This could spell financial ruin for operators and in practice, victims might not receive much more than what was already available under the insurance coverage, especially if the incident resulted in destruction of the nuclear installation, the operator's major asset. This principle is, so to speak, the *quid pro quo* for the benefits to victims of the imposition of strict and exclusive liability upon a nuclear operator.

Liability limits: time

Private insurers have also limited their coverage in time, usually to not more than ten years from the date of the nuclear incident. Insurers (and other financial guarantors for that matter) generally do not wish to maintain reserves against expired or outstanding policies for potentially large amounts of liability over extended periods of time.

In addition, insurance companies are well aware of the difficulty they would encounter, for example, in defending claims in respect of radiation induced cancers that are instituted 20, 25 or 30 years after a nuclear accident has occurred and when it would be extremely hard to demonstrate whether the nuclear incident or some other factor(s) actually caused the illness.

Hence, most countries have adopted nuclear liability legislation under which the time limit for submission of claims is limited to a period of ten years following a nuclear incident. In most jurisdictions there is usually a discovery rule as well, requiring claims to be filed within two or three years of the discovery of the damage and of the identity of the liable nuclear operator. This principle may also be viewed as a *quid pro quo* for the benefits resulting from strict and exclusive liability.

3. International repercussions

The same states that were encouraging the growth of a new nuclear industry recognised that the repercussions of a nuclear accident would not stop at political or geographical borders. Ensuring adequate compensation to victims in one country who suffer damage as a result of a nuclear incident in a neighbouring country meant that some sort of international arrangement had to be adopted. This was particularly true for Western Europe where a large proportion of the world's reactors and associated facilities were located or were being constructed.

Furthermore, the possible magnitude of a nuclear incident required international collaboration between national insurance pools.[6] Only by an effective marshalling of the resources of the international insurance market by co-insurance and re-insurance[7] could sufficient financial security be made available to meet possible compensation claims. The establishment at international level of uniform third party liability rules was essential if collaboration by insurers at an international level was to be achieved.

As a result, third party liability became a subject of discussion within all of the international organisations responsible for the peaceful uses of nuclear energy: the Organisation for European Economic Co-operation (OEEC later to become the OECD), the International Atomic Energy Agency (IAEA) and the European Atomic Energy Community (Euratom).

Harmonising national laws was seen to create legal certainty, eliminate the possibility of discrimination between victims and ensure that claimants in states with harmonised legislation would have their actions judged by similar laws, regardless of the location of the accident or the damage. For potential victims, it was extremely important to adopt a common set of rules prescribing cross-border actions, allocating liability for damage arising from the transport of nuclear substances from one country to another and resolving the often complicated questions of which country's courts should have jurisdiction to hear compensation claims and which country's laws should apply to those claims.

Within a few years, two major conventions on civil liability for nuclear damage came into being. In 1960, the Paris Convention on Third Party Liability in the Field of Nuclear Energy ("Paris Convention") was adopted under the

6. National nuclear insurance pools normally resort to the international nuclear insurance market to obtain sufficient capacity.

7. "Co-insurance" means that a number of insurers collectively insure a certain risk with the sum of their individual shares totaling 100%. "Re-insurance" is where an insurer or co-insurer cedes part of the risk it has assumed to another insurer for which it pays a premium, essentially insuring the risk it has insured.

auspices of the (then) OEEC, later to become the OECD, by its Western European member countries. But it was not only this regional group of nations which foresaw the need for an international regime; the year 1963 also witnessed the adoption by a number of IAEA member states from Central and South America, Africa, Asia Pacific and Eastern Europe of a second international instrument, incorporating the same fundamental principles as those set out in the Paris Convention, but intended to have a wider geographic scope: the 1963 Vienna Convention on Civil Liability for Nuclear Damage ("Vienna Convention").

Both the Paris and Vienna Conventions enable their state parties to achieve their desired objectives at international levels not only because they are founded upon the five basic principles described earlier, but because each international instrument incorporates two additional principles which are designed to address the complexities raised by the transboundary scope of nuclear damage and the institution of cross-border compensation claims:

Jurisdiction of the "accident state"

In adopting such international arrangements, the first question to be answered was: which country's courts would have jurisdiction to hear and determine nuclear damage compensation claims in the case of an accident resulting in trans-boundary damage? After all, how could the principle of limited liability be respected if different courts in different jurisdictions were entering judgements against the liable operator for different amounts at different times? To remedy this situation, the Paris and Vienna Conventions both provide that jurisdiction over nuclear damage claims lies only with the courts of the contracting party in whose territory the accident has occurred,[8] or where it occurs in a non-contracting state then with the courts of the state where the liable operator's nuclear installation is located; furthermore judgements rendered by such courts are to be enforceable in any contracting party.

Applicable law

Similarly, in order to ensure that the law applicable to the determination of nuclear damage claims is that most closely associated with the country having jurisdiction, yet without discriminating against victims based on nationality,

8. Both conventions also contain specific provisions determining which courts will have jurisdiction where the place of the accident cannot be determined with certainty or where jurisdiction would lie with the courts of more than one contracting party.

domicile or residence, it was determined that those same courts should apply the (relevant) convention and their own national law without discrimination.

4. The Paris-Brussels Regime

The Paris Convention, as the first instrument to be established at international level, constitutes the "precedent" upon which later nuclear third party liability conventions and many countries' national laws are modelled.

At about the time of the adoption of the Vienna Convention, the Paris Convention states recognised that the liability amount fixed under their own convention would not likely be adequate to cover the damage suffered in the event of a serious nuclear accident. To remedy that deficiency, most of those states adopted a third international instrument, the 1963 Brussels Convention Supplementary to the Paris Convention (Brussels Supplementary Convention) under which *additional* compensation to that provided under the Paris Convention would be made available to victims through the establishment of a 3-tier system, 2 of which would comprise public funding. This convention, which is described briefly below,[9] applies only to incidents occurring within one of its states party and only to damage for which a Paris Convention state operator is liable.

Both the Paris Convention and the Brussels Supplementary Convention were amended in 1964, 1982 and again in 2004. The Paris Convention entered into force in 1968 and the Brussels Supplementary Convention entered into force in 1974. The most recent revision of these instruments, the 2004 Protocol to amend the Paris Convention (the "2004 Paris Protocol") and the 2004 Protocol to amend the Brussels Supplementary Convention (the "2004 Brussels Protocol") each call for a number of significant changes to those conventions, most of which are summarily described later in this paper and are addressed in more detail elsewhere in this publication.

a) The Paris Convention on Third Party Liability in the Field of Nuclear Energy (Paris Convention)[10]

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9. A comprehensive commentary on the system created by the Brussels Supplementary Convention is to be found in, Bette, Didier, Fornasier and Stein, "Compensation of Nuclear Damage in Europe", Brussels, 1965.

10. The Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960, as amended by the Additional Protocol of 28 January 1964, by the Protocol of 16 November 1982 and by the Protocol of 12 February 2004, this last Protocol not having come into effect at the time of writing.

The Paris Convention is open to all member countries of the OECD by simple accession and to any other state with the unanimous consent of all contracting parties. At present it is essentially a regional "European" agreement, with the non-European members of the OECD (e.g. Australia, Canada, Japan, Korea, Mexico and the United States) not having joined for various reasons, not the least obvious of which is geographical remoteness from Western Europe where a large share of the world's reactors are located. A list of the 15 contracting parties to the Paris Convention is set out in Annex 1.

In keeping with the premise that this special regime should be limited to risks of an exceptional nature for which common law rules are not suitable, the term "nuclear incident" is defined in the convention as any occurrence or series of occurrences having the same origin which causes damage, arising either 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, or arising from ionizing radiation emitted by any source of radiation inside a nuclear installation. Not covered are activities and substances involving a low level of radioactivity bearing only a minor risk.

A "nuclear installation" refers to "reactors other than those comprised in any means of transport; factories for the manufacture or processing of nuclear substances; factories for the separation of isotopes of nuclear fuel; factories for the reprocessing of irradiated nuclear fuel; facilities for the storage of nuclear substances other than storage incidental to the carriage of such substances; and such other installations in which there are nuclear fuel or radioactive products or waste as the Steering Committee for Nuclear Energy[11] shall from time to time determine." The NEA Steering Committee supplemented this provision in 1984 by deciding that installations for the disposal of nuclear substances shall be considered as nuclear installations in their pre-closure phase,[12] and again in 1987 by interpreting the Paris Convention as applying to nuclear installations in the process of decommissioning.[13] These two NEA Steering Committee instruments have both been incorporated into the most recent revision of the Paris Convention[14] as will be seen later in Part 9.

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11. The Steering Committee for Nuclear Energy is the body established pursuant to Article 2 of the Statute of the OECD Nuclear Energy Agency to carry out the tasks assigned to the Nuclear Energy Agency.

12. OECD/NEA document [NE/M(84)1].

13. OECD/NEA document [NE/M(87)1].

14. Reference is made to the 2004 Protocol to amend the Paris Convention.

Who is liable and under what circumstances?

Under the convention, the "operator" of a nuclear installation is the person/entity recognised or designated as such by the competent public authority. If nuclear substances are in an installation at the time of an accident, the operator of that installation is liable to compensate any third party damage thereby caused. If the accident has occurred during the course of transporting nuclear substances, the operator responsible is the sender, until the receiver has assumed responsibility in accordance with the express terms of a written contract or has taken charge of the substances.

Where nuclear substances are being sent to a person in a state not party to the convention, the sender is liable until the substances are unloaded from the means of transport. Conversely, where substances are being sent from a person in a state not party to the convention to an operator in a state party with his written consent, the latter will be liable from the time the substances are loaded onto the means of transport.

There are, however, a limited number of cases in which the operator is exonerated from liability. Under the convention, the operator is not liable for damage caused by a nuclear incident directly due to an act of armed conflict, hostilities, civil war or insurrection; nor is it liable for damage caused by a nuclear incident due to a grave natural disaster of an exceptional character unless the legislation of the installation state[15] provides to the contrary. A number of states have taken advantage of this exception to hold the operator liable in the case of an accident due to a natural disaster, believing that nuclear operators should foresee the possibility of such events and take the appropriate and necessary precautions.

Where the incident or damage is caused wholly or partly by the person suffering damage, it will be for the competent court to decide the effect of such negligence upon the claims for compensation, and finally national law may provide that an individual may be liable for damage caused by a nuclear incident resulting from that individual's act or omission done with intent to cause damage.

Who may be compensated?

Generally speaking, the convention does not apply to nuclear incidents occurring in non-contracting states or to damage suffered there, unless the

15. The "installation state" is the contracting party in whose territory the installation of the liable operator is located.

national law of the liable operator's state provides otherwise. In 1968, the Steering Committee for Nuclear Energy adopted an interpretation according to which the Paris Convention should be understood to apply to nuclear incidents occurring, and to damage suffered, on the high seas.[16] In 1971, the same Committee recommended that the application of the Paris Convention be extended by national legislation to cover damage suffered in a contracting state, even if the nuclear incident causing the damage has occurred in a non-contracting state.[17] Once again, both of these NEA Steering Committee instruments have been incorporated into the most recent revision of the Paris Convention[18] as will be seen in Part 9.

What damage may be compensated?

Under the existing convention, an operator of a nuclear installation is liable only for damage to, or loss of life of, any person and damage to, or loss of, any property other than property on the site of the accident. The extent of the damage so covered is determined by the national law of the country whose courts have jurisdiction to hear and decide upon nuclear damage claims, including any rules relating to the conflict of laws. Under the most recent revision of the Paris Convention, the concept of nuclear damage has been significantly expanded to include many of the heads of damage that were suffered as a result of the Chernobyl accident and but which, at that time, were not subject to compensation under either international conventions or national law.

The nature, form and extent of the compensation as well as the equitable distribution thereof are governed by national law. The convention provides that insurance premiums and monetary compensation as well as amounts in respect of interest and costs are to be freely transferable between the parties, while judgements are to be enforceable in the territory of any contracting party.

16. OECD/NEA document [NE/M(68)1].

17. OECD/NEA document [NE/M(71)1].

18. Reference is made to the 2004 Protocol to amend the Paris Convention.

Liability amounts and financial security

Pursuant to the Paris Convention, the maximum liability to be imposed upon a nuclear operator may not be greater than SDR 15 million[19] and not less than SDR 5 million[20] although a country may fix a higher ceiling if financial security for that excess is available. A contracting party may also set a lower limit for less dangerous installations or activities, of at least SDR 5 million, but must then provide public funds to cover liability up to the usual amount if the damage exceeds that lower limit. If more than one operator is liable, then they are all jointly and severally liable. Interest and costs are payable in addition to the liability amount.

In most contracting parties, the operator's liability is, in fact, far higher than SDR 15 million and in one, Germany, it is unlimited. In 1990, in order to promote harmonisation among the various national laws, the NEA Steering Committee for Nuclear Energy recommended that parties raise their liability limits to at least SDR 150 million,[21] a sum that is well within the range of available insurance capacity.

The convention requires an operator to have and maintain insurance or other financial security approved by the installation state for the amount of its liability established in accordance with the convention. Although insurance is the most common form of financial security, it is possible also to furnish a bank guarantee, to pledge liquid assets, to establish a mutual fund, to set up an operator pooling scheme or to benefit from a guarantee or other form of indemnity or insurance provided by the state. The state will determine the terms and conditions under which the financial security is to be acquired and maintained.

19. The SDR is a unit of account used by the International Monetary Fund and is based upon a basked of weighted currencies. As of June 2010, SDR 1 equals EUR 1.2/USD 1.5. Therefore, SDR 15 million is approximately equal to EUR 17.9 million/USD 22.2 million. All equivalent amounts in Euros and in United States dollars are based upon this exchange rate.

20. This amount is approximately equal to EUR 6 million/USD 7.4 million.

21. OECD/NEA document [NE/M(90)1]. This amount is approximately equal to EUR 180 million/USD 221 million.

Time limits

Because nuclear third party liability insurance is normally not available for more than ten years,[22] the time limit for making claims is ten years from the date of the incident, with a possible exception under national law if measures have been taken by the installation state to cover the liability of the operator for actions instituted during an extended period. Further, the convention permits states to establish in their national legislation a “discovery rule” providing that any claim must be made within a period of not less than two years from the time the victim discovered the damage and the identity of the operator. This latter period must still be within the general limit of ten years from the date of the accident.

Jurisdiction and applicable law

The right to compensation may be exercised only against a liable operator or, if provided under national law, against the insurer or other provider of financial security. The courts having jurisdiction are those of the contracting party in which the nuclear incident has occurred, except if the place of the incident cannot be determined with certainty or if the incident occurs outside the jurisdiction of any party, in which case special rules apply. This “unity of jurisdiction” principle is essential. Without it, there would be little chance of the operator’s liability limit being respected; a court hearing nuclear damage claims or granting compensation awards in one jurisdiction, for example, would have no knowledge of, or control over, a court in another jurisdiction performing the same functions.

In addition, although the existing convention provides for jurisdiction to lie with the courts of the “accident” state, there is no requirement that only one court have such jurisdiction. To facilitate consistency of decisions and the equitable distribution of compensation, the NEA Steering Committee recommended in 1990 that parties designate a single court as the competent court.[23] This recommendation is now a mandatory obligation under the 2004 Protocol to Amend the Paris Convention.

The courts with jurisdiction to hear and determine claims are required to apply the terms of the convention as well as their own national law in all matters not specifically covered by the convention. In addition, both the

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22. See Part 2 of this paper.

23. OECD/NEA document [NE/M(90)2].

convention and the national law must be applied without discrimination on the grounds of nationality, domicile or residence.

b) The Brussels Supplementary Convention[24]

The Paris Convention contemplates that its parties may wish to take additional measures outside the ambit of the convention to provide for an increase in the amount of compensation to be granted. This refers to the provision of public funds to compensate victims whose claims are, for one reason or another and/or to some extent, barred from the compensation mechanism. For the provision of public funds in excess of the current minimum SDR 5 million, states may set their own conditions including those that derogate from the provisions of the Paris Convention. The Brussels Supplementary Convention is an example of a collective use of this latter provision.

The Brussels Supplementary Convention currently counts 12 contracting parties, all of whom are states party to the Paris Convention. Annex 2 contains a list of those contracting parties. Its scope is limited to damage caused by nuclear incidents, except those occurring entirely in the territory of a non-contracting state, for which an operator would be liable under the Paris Convention and for which the courts of a contracting party would have jurisdiction.

The convention establishes a three tiered compensation system. Under the first tier, compensation is provided by the financial security of the nuclear operator up to the maximum liability amount imposed by national law. The second tier comprises the balance between the first tier and SDR 175 million[25] and is provided by the state in which the nuclear installation of the liable operator is situated. The third tier, if required, falls between SDR 175 million and 300 million[26] and is contributed jointly by all contracting parties according

24. The Convention of 31 January 1963 Supplementary to the Paris Convention of 29 July 1960 on Third Party Liability in the Field of Nuclear Energy, as amended by the Additional Protocol of 28 January 1964, by the Protocol of 16 November 1982 and by the Protocol of 12 February 2004.

25. This amount is approximately equal to EUR 209 million/USD 258 million.

26. This amount is approximately equal to EUR 358 million/USD 443 million.

to a formula based upon a party's gross national product (GNP) and the thermal nuclear power capacity of the reactors situated in that state.[27]

To implement the convention, parties may provide, either that the operator is liable up to the full SDR 300 million, or that the operator's maximum liability is some other amount with the balance between that amount and SDR 300 million being provided by some other means. If there is a nuclear accident in a state party to the Brussels Supplementary Convention from which damage exceeds the operator's liability, that state party would contribute additional funds, up to the equivalent of SDR 175 million, and if damage still remained to be compensated, all of the other contracting parties would contribute public funds in accordance with their pre-determined share, up to the maximum of SDR 300 million. In calculating the public funds to be made available under the convention, account is to be taken only of claims made within the basic ten year limitation period.

5. The Vienna Convention on Civil Liability for Nuclear Damage (Vienna Convention)

In May 1963, member states of the IAEA adopted the Vienna Convention on Civil Liability for Nuclear Damage which came into force in 1977. Unlike the Paris Convention, the Vienna Convention is universal in scope although up to the time of the Chernobyl accident it had attracted only ten adherents, eight of which had no operational nuclear reactors. During the 10 years following that accident however, the number of parties rose considerably, as is shown in Annex 3, particularly amongst the states of central and Eastern Europe.

The Vienna Convention is very similar to the Paris Convention in that it embodies the same seven basic principles that form the foundation of the Paris Convention. Yet there are also differences between the two conventions, some of which are significant. For example, the Vienna Convention stipulates only a minimum liability amount of USD 5 million,[28] permitting a state party to set its own maximum limit or even to set no limit at all; in addition, the amount of financial security to be provided by the operator is left to the discretion of the

27. As will be seen further on, both the amounts of the 3 tiers and the method of calculating contributions to the international tier have been significantly modified by the 2004 Protocol to Amend the Brussels Supplementary Convention.

28. This amount is defined by reference to its value in gold on 29 April 1963, the date upon which the Vienna Convention was adopted. That value is USD 35 per one troy ounce of fine gold. The liability amount is generally considered today to have a value of approximately USD 160 million.

contracting party. The concept of "nuclear damage" is defined in the Vienna Convention and the operator's liability is explicitly stated to be absolute (strict), neither of which is the case for the current Paris Convention. Finally, it explicitly requires a state to guarantee payment of compensation in cases where the operators' financial security fails, a benefit which is not available under the current Paris Convention.

6. The 1988 Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention (Joint Protocol)

The international nuclear liability regimes established by the Paris and Vienna Conventions retained most of their original features until the late 1980s. Victims in states party to the Paris Convention would receive the benefits available under its provisions if a nuclear incident occurred in a Paris Convention state, supplemented by the additional compensation provided for under the Brussels Supplementary Convention if the victim's state and that of the liable operator were parties to that convention as well. Likewise, victims in states party to the Vienna Convention were entitled to the benefits available under that convention in the event a nuclear incident occurred in one of its contracting parties. Neither the Paris nor Vienna Convention applied to nuclear damage suffered in the territory of a party to the other.

The 1986 accident at Chernobyl changed all that. The range of damage suffered in that case was far-reaching: loss of life, personal injury and illness including severe psychological stress, property damage, economic loss, damage to the environment and other socio-economic disruptions. In addition, in 1986 there was no special legislation in place in the former Soviet Union which would have entitled victims in the most severely affected successor countries of Ukraine, Belarus and Russia to claim compensation for nuclear damage suffered. Nor did there exist an international nuclear liability regime to which the former Soviet Union was party and under which victims in neighbouring countries would have had a right to claim compensation in respect of nuclear damage incurred. Victims both inside and outside of the Soviet Union were obliged to either fall back on civil law remedies, if any, or the political goodwill of their governments to provide compensation in one form or another. The international nuclear community recognised the need to significantly expand the geographical application of the (then) existing liability regimes and to improve the benefits available thereunder if broader adherence was expected to take place.

The Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention was the first mechanism adopted at international level to help fulfil these needs. By abolishing the status of non-contracting state as between the parties to the Paris Convention and parties to the Vienna Convention, it permits victims in a party to either of the conventions to obtain compensation for an accident occurring in a party to the other.[29] In addition to creating this system of mutual benefits, the Joint Protocol also prevents conflicts of jurisdiction by ensuring that only one convention is applied to any one nuclear accident.[30] The Joint Protocol was adopted in 1988 and came into force in 1992. A list of its contracting parties is found in Annex 4.

At the time, it was believed that a link to the Paris Convention would induce a greater number of countries to join the Vienna Convention, in particular those which had formed part of the former Soviet Union. To some extent this has proved to be true. Some 18 countries from Central and Eastern Europe have ratified or acceded to that convention; yet only 11 of them have ratified or acceded to the Joint Protocol, a disappointing development for those who had hoped to link all of Europe with one single nuclear liability and compensation regime.

The international community soon recognised that the Joint Protocol was not enough to redress the liability and compensation problems brought to harsh light by the Chernobyl accident. Reform had to be more far reaching. It had to ensure that greater financial compensation would be made available to significantly more victims in respect of much more damage than ever before. The Joint Protocol could only target the second of these goals, and it could only do so to the extent that Paris and Vienna Convention states were prepared to adhere to it.

7. The 1997 Protocol to amend the Vienna Convention (1997 Vienna Protocol)

Revising the Vienna Convention was viewed as a means of better protecting victims and of attracting new members to it, thereby extending the convention's benefits to potentially many more victims of any future accident with transboundary consequences. At the same time, states agreed that a mechanism for mobilising supplementary compensation funds, over and above those to be

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29. For example, where a nuclear incident occurs for which an operator in a Paris Convention/Joint Protocol state is liable and damage is suffered by victims in a Vienna Convention/Joint Protocol state, those victims will be able to claim compensation for damage suffered against the liable operator as if they were victims in a Paris Convention state.

30. The exclusive application to a nuclear incident of only one of the two conventions is accomplished by means of a conflict rule contained in Article III of the Joint Protocol.

provided by nuclear operators, should be established. That mechanism is set out in an entirely separate instrument, the Convention on Supplementary Compensation for Nuclear Damage, which is briefly described in Part 8 of this paper.

The following is a short summary of the major features of the 1997 Vienna Protocol.

More money available

Nuclear operator liability amounts are increased from a USD 5 million minimum to a SDR 300 million minimum. The operator may provide as little as SDR 150 million but in that case the installation state is obliged to make available an additional, equal amount. Contracting parties may fix a liability amount as low as SDR 5 million where the nature of the nuclear installation or nuclear substances involved so justifies[31] but should the nuclear damage incurred exceed that lower amount, the installation state must ensure that public funds are available to make up the difference to SDR 300 million.

States are free to impose unlimited liability on their nuclear operators if they wish. Financial security limits must match liability amounts and where unlimited liability is imposed, the financial security requirement for operators is fixed at SDR 300 million.

During a 15 year transitional period following the 1997 Vienna Protocol's entry into force,[32] contracting parties may fix their operators' minimum liability amount at only SDR 100 million,[33] or an even lower amount, if the state makes up the difference to SDR 100 million.

More victims compensated

The Vienna Convention is generally viewed as only applying to damage suffered within the territory of a contracting party and on or over the high seas. The 1997 Vienna Protocol significantly extends that geographic scope so that the revised convention will apply to nuclear damage wherever suffered,[34]

31. Generally this applies to lower risk activities such as nuclear substance transport or research installations.

32. The 1997 Vienna Protocol entered into force on 4 October 2003.

33. This amount is approximately equal to EUR 119.5 million/USD 148 million.

34. See Article 3 of the 1997 Vienna Protocol. Technically, this means damage suffered anywhere in the world, including in non-contracting states.

subject to a permitted exclusion for a non-contracting state which has a nuclear installation on its territory and does not provide equivalent reciprocal benefits. In addition, claims for personal injury or death may now be brought within 30 years from the date of the nuclear incident rather than the 10 year period provided for under the Vienna Convention. Equally if not more important, the amended convention establishes the principle that priority is to be given to claims relating to loss of life or personal injury in cases where the total cost of the damage or injury is likely to exceed the amount of money available for compensation.

Another significant amendment now authorises a state to pursue a class action for compensation in the competent court on behalf of all persons who are nationals of or resident in that state and who have agreed to allow the state to bring such an action. The advantage to this provision lies mainly in the fact that it will allow persons who have suffered nuclear damage to seek redress or compensation in foreign courts.

More damage compensated

The Vienna Convention covers personal injury (including death), loss of or damage to property, and other damage that may be compensated under the "law of the competent court".[35] Under the 1997 Vienna Protocol, and largely in response to what occurred following the Chernobyl accident, several additional heads of damage will now be covered although to what extent will depend on the law of the court with jurisdiction to hear nuclear damage claims: the cost of environmental reinstatement, economic losses consequent upon personal injury or property damage and economic loss resulting from that impairment, the cost of preventive measures taken to minimise damage and any losses suffered as a result thereof, as well as other types of loss or damage recoverable under a contracting party's civil liability law.

Furthermore, a "nuclear incident" will now include the concept of an occurrence which creates a grave and imminent threat of causing nuclear damage, for the sole and express purpose of permitting compensation to be paid for costs incurred in taking preventive measures.

The amended convention does not make explicit mention of installations intended for the disposal of radioactive waste. However, the powers of the Board of Governors of the IAEA to include new types of installations within the

35. The "law of the competent court" is defined in Article I(1)(e) of the convention to mean the law of the court which has jurisdiction under that convention, including any rules of such law relating to conflict of laws.

scope of the convention, or to exclude them where the risk in question is deemed sufficiently low, have been extended, which will make it easier to adapt the convention to new needs in the future.

Status

The adoption of the 1997 Vienna Protocol was one of the most significant developments to have taken place in nuclear liability law for several decades.[36] Yet despite the many years of difficult negotiations required to reach agreement on this instrument, the keen interest it elicited from a broad range of interested states, and the many provisions it contains to encourage and facilitate adherence to it, the 1997 Vienna Protocol has not drawn the wide support originally hoped for or expected. Some 80 states participated in its negotiation and in the Diplomatic Conference which culminated in its adoption. Yet only 15 countries have actually signed the protocol, and 13 of those did so within one year of its adoption, when motivation and impetus were both still strong. The protocol entered into force on 4 October 2003, some six years after it had been adopted. Annex 5 contains a list of the signatories and parties thereto.

While its entry into force is to be applauded, one might wonder whether this protocol will have any real effect. Of the 36 contracting parties to the Vienna Convention, only 13 of them have signed the 1997 Vienna Protocol and of those, only 5 have ratified the instrument: Argentina, Belarus, Latvia, Morocco and Romania. None of these 5 states has significant nuclear generating capacity; in fact only 2 have any nuclear generating capacity at all, Argentina and Romania, and their levels of generation are relatively low.[37] Of the protocol's remaining ten signatories, only 3 are nuclear power generating states, the Czech Republic, Hungary and Ukraine, the first two of which are also relatively low generators of nuclear power.[38]

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36. For a comprehensive study of the 1997 Vienna Protocol, see "The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage, Explanatory Texts", International Atomic Energy Agency, July 2004.

37. According to the IAEA's PRIS data, for the year 2009 the net nuclear power generating capacity of Argentina is 1 627 MWe and that of Romania is 1 300 MWe.

38. According to the IAEA's PRIS data, for the year 2009 the net nuclear power generating capacity of these countries is: Czech Republic 3 678MWe, Hungary 1 889 MWe and Ukraine 17 667 MWe.

For many of the Vienna Convention countries, the minimum liability requirement under the 1997 Vienna Protocol is seen as too steep not with standing the multiple benefits of the phasing-in provisions. Others may find that the expanded geographical scope provisions or the extended definition of nuclear damage are so broad as to be politically unacceptable.

Equally noteworthy is that none of the important “non-convention” nuclear power generating countries have joined the 1997 Vienna Protocol, countries such as Canada, China, India, Japan, Korea and South Africa.

8. The 1997 Convention on Supplementary Compensation for Nuclear Damage

During the 1997 Vienna Protocol deliberations, negotiating states decided to establish a mechanism for mobilising supplementary funds to compensate nuclear damage, in addition to the funds to be provided by the operator under the Paris and Vienna Conventions. One of the favoured approaches to this idea was to establish a system of supplementary state funding at both national and international levels in respect of which the Brussels Supplementary Convention proved to be a very useful model.

The result was the adoption, in September 1997, of the Convention on Supplementary Compensation for Nuclear Damage (Supplementary Compensation Convention) a brief description of which is set out below.[39]

More money available

The new convention envisages a first tier of compensation consisting of at least SDR 300 million, the new minimum amount required under the 1997 Vienna Protocol, to be provided by the liable nuclear operator, by the installation state or by a combination of the two. It is to be distributed on a non-discriminatory basis to victims both inside and outside of the installation state.

A second tier of compensation consists of an international fund to which all contracting parties will contribute when it appears that the damage to be compensated exceeds the first tier amount. The size of this tier will be

39. For a comprehensive study of the Supplementary Compensation Convention, see “The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage, Explanatory Texts”, International Atomic Energy Agency, July 2004.

determined by the number and type of states adhering to the convention.[40] Half of the fund is to be allocated to victims both inside and outside of the installation state and the other half to trans-boundary victims only. This 50-50 division is an important innovation in nuclear liability law; the only exception to it is where a contracting party makes available at least SDR 600 million[41] under the first tier, in which case the entire fund is to be distributed on a non-discriminatory basis.

More victims compensated

In order to attract as many nuclear power generating states as possible to participate in this new regime, the Supplementary Compensation Convention is specially designed as a free-standing convention, open to any state, with no requirement for previous adherence to either the Paris or Vienna Convention.[42] States which are not party to either of those conventions, however, must have national legislation in place that reflects their principles.[43] Special provisions are included in the convention to permit the United States, with its legal system of "economic" rather than "legal" channelling of liability, to participate in the regime.

The scope of application of the convention is determined by reference to the two different compensation tiers: as to the first tier, the law of the installation state determines to what extent nuclear damage suffered in non-contracting states will be covered; as to the second tier, the convention prohibits its distribution to compensate nuclear damage suffered in non-contracting states, a restriction which is also found in the Brussels Supplementary Convention and is in keeping with the philosophy that a fund comprising "public" money should be distributed only to victims in states which contribute to that fund.

More damage compensated

Both "nuclear damage" and a "nuclear incident" are defined in the same broad fashion as they are under the 1997 Vienna Protocol. These expanded definitions are important in terms of attracting states who have historically viewed the Paris

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40. The fund is expected to reach SDR 300 million if all major nuclear power generating states join the convention.

41. This amount is approximately equal to EUR 660 million/USD 900 million.

42. Many of the world's largest nuclear power generating states were not party to either the Paris or Vienna Conventions in 1997, nor are they today.

43. The relevant requirements are set out in the annex to the convention.

and Vienna Conventions as too narrowly restricting the types of damage for which compensation will be given.

Status

The Supplementary Compensation Convention was adopted at the same time as the 1997 Vienna Protocol with the intent of attracting as many countries as possible to participate in a global liability and compensation regime. To date, 13 states are signatories, all of whom signed within nine months of the convention's adoption in September 1997; four states have ratified it, the latest having taken place in 2008. A list of signatories and contracting states to the Supplementary Compensation Convention is set out in Annex 6. Of those four states, only the United States of America has significant nuclear generating capacity at 111 612 MWe for the year 2009.[44]

Past performance is not necessarily an indicator of future trends; but the entry into force requirements of this convention are strict compared to those of other international nuclear liability instruments. It must be ratified, accepted or approved by least 5 states with a combined minimum of 400 000 units of installed nuclear capacity[45] before it enters into force, a requirement designed to encourage the participation of "major nuclear power generating states" whose adherence was thought necessary to ensure the global character of the convention.[46]

One reason for the hesitation shown by certain countries to join this new convention is the preferential treatment given to victims who suffer damage and who are outside of the installation state's borders, a treatment that is seen by them as discriminatory.

Another reason is that "(many) of the parties (to the Brussels Supplementary Convention have) claimed … it hard to envisage signing two complementary conventions with different mechanisms, allocation rules and

44. According to the IAEA's PRIS data for the year 2009.

45. The term "installed nuclear capacity", defined in Article 1(j) of the Convention, is the total number of megawatts of thermal power authorised by the competent national authority.

46. "The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage, Explanatory Texts", *op. cit.*, p. 86.

beneficiaries".[47] The regime established under the Brussels Supplementary Convention is designed to benefit its contracting parties alone and allowing its third (international) tier to be allocated in satisfaction of an obligation under another supplementary funding regime would only be workable, in practice, if all of the contracting parties were to agree.

Under the newly revised Brussels Supplementary Convention,[48] Article 14(d) provides that where all of its contracting parties have ratified, accepted, approved or acceded to any other such regime, a contracting party to the revised "Brussels regime" may use the funds to be provided under the 3rd tier to satisfy any obligation it may have under such other regime, a provision which applies to the Supplementary Compensation Convention. However, joining that new convention at a time when there are none, or very few major nuclear power generating states party to it would result in the Brussels Supplementary convention states being called upon to make major contributions to its second tier fund without having the benefit of substantial contributions made by other second tier fund contributors available should a nuclear incident occur in a Brussels Supplementary Convention state.

9. The 2004 Protocols to Amend the Paris Convention and the Brussels Supplementary Convention (2004 Paris Protocol and 2004 Brussels Protocol)

The Paris Convention states began their revision negotiations in April 1998, less than a year after the adoption of the 1997 Vienna Protocol and the Supplementary Compensation Convention. Approximately two years later, the contracting parties to the Brussels Supplementary Convention undertook to revise that convention as well.

As with the 1997 Vienna Protocol and the Supplementary Compensation Convention, the 2004 Paris Protocol and its companion 2004 Brussels Protocol both aim to make more money available to compensate more victims for more damage than ever before. At the same time, the Paris and Brussels Supplementary Convention states conducted their revision work so as to ensure their revised conventions would be aligned and compatible with the 1997 Vienna Protocol and the new Supplementary Compensation Convention.

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47. Dussart Desart, R., "The Reform of the Paris Convention on Third Party Liability in the Field of Nuclear Energy and of the Brussels Supplementary Convention", *Nuclear Law Bulletin* No. 75 (2005/1), p. 24.

48. See the 2004 Protocol to Amend the Brussels Supplementary Convention.

a) The 2004 Paris Protocol

More money available

The protocol will affect an important increase in the nuclear operator's liability amount, raising its current *maximum* level of SDR 15 million to a new *minimum* amount of EUR 700 million. This is very significant, even if one takes into account the 1990 NEA Steering Committee Recommendation pursuant to which contracting parties were encouraged to raise their operator liability amount to not less than SDR 150 million. While reduced liability amounts for low risk installations and transport will still be permitted, the revised convention imposes minimum amounts of EUR 70 million for low risk installations and EUR 80 million for transport activities. In fixing the liability amount as a minimum, states which impose either limited or unlimited liability upon their nuclear operators are welcome to participate in the regime.[49]

Operators will still be required to provide financial security in the amount for which they are liable, but for those subject to unlimited liability, their financial security obligations will be limited to either the full minimum or one of the reduced minimum liability amounts, whichever is applicable. Paris Convention states will also be required to ensure the payment of nuclear damage claims where the operator's financial security is unavailable or insufficient to satisfy such claims, up to the amount specified in the convention.

More victims compensated

Under the existing convention, a nuclear incident must occur in the territory of a contracting party and damage must be suffered there before the convention will apply. The 2004 Paris Protocol relaxes that rule considerably. The revised convention will also apply to any nuclear damage suffered in a non-contracting state (both territories and maritime zones) if that state is a party to the Vienna Convention and the Joint Protocol, or it has no nuclear installations, or it has a nuclear installation and its nuclear liability legislation provides for equivalent reciprocal benefits and is based on Paris Convention principles.

In addition, prescription and extinction periods for nuclear damage claims will be extended to 30 years for actions respecting loss of life and personal

49. Germany adopted a regime of unlimited liability in the mid-1980s despite the Paris Convention's fundamental principle that a nuclear operator's liability is limited in amount. While its participation in the Paris Convention has never been refuted on that ground, some rather creative thinking had to be done in order to interpret the convention in a manner compatible with Germany's new regime.

injury. Unlike the 1997 Vienna Protocol however, no “priority” rule will be included in the revised Paris Convention for such claims. Where the compensation is, or is likely to be insufficient to cover all of the damage suffered, the competent court will determine whether, and to what degree priority will be given to claims for loss of life and personal injury.

As with the 1997 Vienna Protocol, the revised Paris Convention authorises a state to pursue a class action for compensation in the competent court on behalf of all persons who are nationals of or resident in that state and who have agreed to allow the state to bring such an action.

More damage to be compensated

For the first time ever, the Paris Convention will contain a definition of “nuclear damage”. The new definition is almost identical to that found in the 1997 Vienna Protocol and the Supplementary Compensation Convention, with specific references to personal injury/death and loss of or damage to property, economic loss resulting from either of these heads of damage, the cost of measures of reinstatement of a significantly impaired environment, loss of income resulting from that impaired environment and the cost of preventive measures. Measures of reinstatement and preventive measures are defined as in those other two instruments. The only major difference is that the 2004 Paris Protocol does not include a reference to other economic loss permitted by the civil liability law of the competent court, a head of damage which was thought to be already covered under other specified categories of damage.[50]

b) The 2004 Brussels Protocol

More money available

The 2004 Brussels Protocol maintains the existing three tier compensation system found in the original convention but the amounts of those tiers are increased significantly: the first tier of compensation continues to come from the nuclear operator’s financial security and will continue to be distributed in

50. Excluding this head of damage from the 2004 Paris Protocol means, in relation to the operation of the Joint Protocol, that no liable Paris Convention state operator is obliged to compensate victims for such damage, regardless of whether those victims are in a Paris Convention state or in a 1997 Vienna Protocol/Joint Protocol state. Similarly, no liable Paris Convention state operator would be obliged to compensate such damage under the Supplementary Compensation Convention as the latter would only apply to damage for which the operator is liable under the Paris Convention.

accordance with the revised Paris Convention, but the amount of that tier rises from a minimum of SDR 5 million to not less than EUR 700 million; the second tier will continue to be provided by the installation state but its current cap will be raised from SDR 175 million to EUR 500 million; and the third tier will continue to come from public funds made available by all of the contracting parties, increasing in amount from SDR 125 million to EUR 300 million. The total amount of compensation available to victims of a nuclear accident under the revised Paris-Brussels regime therefore rises from the current SDR 300 million to EUR 1.5 billion.

Following the example of the Supplementary Compensation Convention, the formula for calculating contributions to the international tier under the 2004 Brussels Protocol moves from one based equally on gross national product and installed nuclear capacity to one based 35% on gross domestic product and 65% on installed nuclear capacity, thereby taking into account the "polluter pays" principle.

More people compensated

The 2004 Brussels Protocol does not reflect the new geographic scope provisions of the revised Paris Convention which permit compensation to be paid to victims in certain non-contracting states. Compensation will continue to be made available only to victims in the territory of Brussels Supplementary Convention states, although that territory has been extended to include a contracting party's exclusive economic zone and its continental shelf with respect to exploration or exploitation of natural resources within those areas. The rationale behind this distinction is simply that since the supplementary compensation established by the 2nd and 3rd tiers is essentially "public" money, it should only be used to compensate victims in states who have agreed to participate in that supplementary regime.

More damage compensated

The 2004 Brussels Protocol is a mechanism by which supplementary funding is distributed in accordance with the provisions of the Paris Convention. It contains no definition of nuclear damage itself, but the funding to be made available under this Protocol will be allocated to the broader range of damage that may be compensated under the 2004 Paris Protocol.

Status

The 2004 Paris Protocol has been signed by 16 states and the 2004 Brussels Protocol has been signed by 13 of those same states. A list of signatories to both the 2004 Protocol and the 2004 Brussels Protocol is shown in Annex 7.[51] In both cases all signatories are members of the OECD except for Slovenia. In order for the 2004 Paris Protocol to enter into force, it must be ratified, accepted or approved by two-thirds of the contracting parties. In the case of the 2004 Brussels Protocol, it shall come into force only when all contracting parties have ratified, accepted or approved it. There have been no ratifications, as yet, of the 2004 Paris Protocol; Spain deposited its instrument of ratification of the 2004 Brussels Protocol on 12 January 2006.

Although neither protocol has yet entered into force, it is safe to predict that they will both do so in the relatively near future. Historically, the Paris and Brussels Supplementary Convention states have always negotiated their conventions and their various amending protocols on the understanding and with the intent that all signatories to the convention or an amending protocol will also ratify it, and will do so as expeditiously as possible. And no country can accede to either convention unless it joins the protocol amending that convention at the same time. Such a goal is always much easier to achieve when the number of signatories involved is relatively small as is the case with both these conventions.

Contrary to the 1997 Vienna Protocol which is open to every state, the 2004 Paris Protocol is only open to OECD member countries by automatic right, although non-member countries having obtained the unanimous consent of all Paris Convention states may accede to it, as Slovenia did in 2001. The 2004 Brussels Protocol is only open to states which are already party to the Paris Convention.

The signatories to both the 2004 Paris Protocol and 2004 Brussels Protocol are well on their way towards ratifying, accepting or approving those instruments and implementing them into national law. The Council of the European Union has urged those of its member states that are parties to the Paris Convention[52] to deposit simultaneously their instruments of ratification of the

51. Greece, Portugal and Turkey are the only Paris Convention states which are not contracting parties to the Brussels Supplementary Convention and did not sign the 2004 Brussels Protocol.

52. EU member states signatory to the 2004 Paris Protocol are: Belgium, Denmark, Finland, France, Germany, Greece, Italy, the Netherlands, Portugal, Slovenia, Spain, Sweden and the United Kingdom.

2004 Paris Protocol and it is hoped that those member states will be in a position to do so by the end of 2010.[53]

10. The "non-convention" states

What of the many countries which are not yet party to any international nuclear liability convention? According to IAEA figures,[54] there are 437 nuclear power plants in operation in 30 countries around the world and another 55 units under construction, mostly in those same countries. Data on the distribution of these power plants is shown in Annex 8.

Of those 437 operating plants, 123 units, or 28% of the total, are located in countries that are not currently party to any international nuclear liability convention, countries such as Canada, China, India, Japan, Korea and South Africa. Annex 9 indicates nuclear power generating countries that have joined one or more international conventions in the nuclear liability field. In addition, 35 of the 55 units under construction (64%) are being built in those same non-convention countries, three of which are amongst the world's most populated nations: China with 1.3 billion people, India with 1.1 billion people and Japan with 127 million people.

Nevertheless, many of these non-convention countries have already incorporated at least some of the fundamental principles contained in these conventions into their national law, thereby making legislative implementation that much easier if and when the times comes for them to join one or more of

53. Article 2 of Council Decision 2004/294/EC of 8 March 2004 reads as follows:

"1. Member States which are Contracting Parties to the Paris Convention shall take the necessary steps to deposit simultaneously their instruments of ratification of the Protocol, or accession to it, with the Secretary-General of the Organisation for Economic Co-operation and Development within a reasonable time and, if possible, before 31 December 2006.

2. Member States which are Contracting Parties to the Paris Convention shall exchange information with the Commission within the Council before 1 July 2006 on the date on which they expect their parliamentary procedures required for ratification or accession to be completed. The date and arrangements for simultaneous deposit shall be determined on that basis".

A similar decision was adopted in respect of Slovenia's ratification of the 2004 Paris Protocol – See Council Decision 2007/727/EC of 8 November 2007.

54. According to the IAEA's PRIS data on 18 March 2010.

these instruments. Canada, Korea, Switzerland and Japan all fall into this category to one degree or another.[55]

On the other hand, there are still nuclear power generating countries which have not adopted any specific nuclear liability and compensation legislation – or which have only adopted half measures to deal with this issue: India, Pakistan and the Islamic Republic of Iran are all examples.[56]

As for China, most of the international convention principles are to be found in the 1986 Reply of the Council to the Ministry of Nuclear Industry, the National Nuclear Safety Bureau and the State Council Atomic Energy Board in respect of Resolving Third Parties' Nuclear Liability and in the 2007 Reply to Questions on the Liabilities of Compensation for Damages Resulting from Nuclear Accidents. As has been observed recently however,[57] the replies do not fit within the Chinese hierarchy of laws and regulations as they are "administrative rules" only; thus their legally binding effect is open to debate even though the Chinese State Council and the Chinese nuclear industry both consider that the 2007 Reply sets forth binding rules on the subject.

One of the reasons explaining the reluctance of certain countries to join an international nuclear liability regime is that up until recently, "limited liability" has been a foundation block of the existing regimes. These countries see no reason why victims should have their compensation rights so restricted now that the nuclear industry has matured. In fact, it is obvious to those who follow what might be deemed "trends" in nuclear liability law that this basic principle is being more and more often rejected. Such was the case in 1985 for the Federal Republic of Germany, a contracting party to both the Paris Convention and the Brussels Supplementary Convention, which saw that principle as contrary to the best interests of victims.

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55. Switzerland deposited its instrument of ratification of the Paris Convention as amended by the Protocols of 1964, 1982 and 2004 on 9 March 2009 with effect as from the date of entry into force of the 2004 Protocol to amend that convention. It also deposited its instrument of ratification of the Brussels Supplementary Convention as amended by the protocols of 1964, 1982 and 2004 on 11 March 2009 with effect as from the date of entry into force of the 2004 Protocol to amend that convention.

56. It is expected that new nuclear liability and compensation legislation will soon be introduced into the Indian parliament.

57. Reference is made to the presentation by Ximena Vásquez Maignan of Gide, Loyette, Nouel to the International Nuclear Law Association Bi-annual Congress held in Toronto Canada in October 2009.

The rejection of the "limited liability" principle has already been embraced by three non-convention countries, namely Austria, Japan and Switzerland and it is being seriously considered by Denmark and Sweden, states party to both the Paris and Brussels Supplementary Conventions. As noted earlier, the concept of *unlimited liability* will now be incorporated into the revised Paris Convention once the 2004 Paris Protocol has come into force.

Following a rejection of this principle, the obligation imposed upon nuclear operators to "maintain financial security in the amount of their liability" could eventually disappear given that it is impossible to financially secure an unlimited liability. The disappearance has already occurred in Austria, Germany, Japan and Switzerland.

Equally logical would be the disappearance of the principle of "unity of jurisdiction" by which one single court is competent to rule on all nuclear damage claims, serving as it does to ensure that the "maximum" amount of liability will not be exceeded through judgments, awards and settlements which are issued or reached in several jurisdictions.

Still other states hold the view that suppliers of nuclear goods, services and technology no longer need the protection which, in the early stages of the development of the nuclear industry, was considered essential for the survival and expansion of that industry. Adherents of this view believe that the industry is now sufficiently strong economically to assume its normal share of nuclear risks and that thus the concept of channelling all liability for third party damage to the nuclear operator should also fall by the wayside.

11. An imperfect system

During the negotiations to amend or adopt these various new protocols and conventions, representatives of the nuclear insurance market made it clear that some of the proposed provisions would be problematical.[58] They noted, in particular, that there may not be sufficient market capacity to insure nuclear operators for increased liability amounts, at least not in all countries, given that insurance capacity varies from one country to another as a reflection both of national insurance markets and the available amount of re-insurance.

They also warned that coverage would not apply for the full 30 year duration of the extended prescription/extinction periods under the revised conventions in respect of personal injury actions. As has already been noted,

58. See Reitsma, S.M., Tetley, M., "Insurance of Nuclear Risks", pp. 387 *et seq.* of this publication.

one basic reason for this refusal is simply that many cancers resulting from exposures consequent upon a nuclear accident are likely to manifest themselves only decades after exposure to ionizing radiation. At that point in time, those cancers will likely be indistinguishable from those suffered naturally by the population. While it may be possible to establish causality in a small number of cases, for the vast majority of cancer victims, it will be impossible.

Insurers have also made it clear that coverage might not be available to secure all of the additional heads of damage for which operators would be liable under the revised conventions. In particular, they are concerned with the lack of a precise definition for "impairment of the environment" which is not defined either in terms of minimum levels of radioactivity or the effects of radioactive contamination. Even where insurers are prepared to provide that coverage, policies would exclude damage arising from releases of radioactive materials within authorised limits as part of the day-to-day operations.

In addition, insurers have taken the position that preventive measures would not necessarily be considered an insurable risk in many countries, even if the measures had been retroactively approved by the competent authorities. The requirement that preventive measures be reasonable under the law of the competent court involves, once again, a measure of uncertainty and leaves open the possibility of speculative claims from people who might take any manner of "preventive" action that they viewed as reasonable, the costs of which could well be quite high.

In short, insurers have pointed out that nuclear operators might simply not be able to fully comply with their financial security obligations under the revised conventions by means of private insurance coverage.

There remains, in addition, a potential problem with damage to property on the site of the installation and to be used in connection therewith. There is no right to compensation under the international conventions for damage to the nuclear installation itself or to any property on that same site which is used or to be used in connection with any such installation. The purpose of this exclusion is to avoid the financial security maintained by the operator from being used to compensate damage to such property to the detriment of third parties.

Owners of nuclear installations are obliged to assume the risk of loss of or damage to their own property and they are able to include the cost of this risk in the cost of the installation. Similarly, contractors whose property is on the site of a nuclear installation are obliged to assume the risk of loss or damage thereto, and they too are able to include the cost of this risk in the price of their supply contracts.

The conventions, however, are unclear on the question of how to deal with damage to the nuclear installation itself and property on the site of the installation ("on-site property") caused by a nuclear incident. The provisions which channel liability for nuclear damage to the operator are silent on the issue. It is thus not clear whether an operator has a right of action against a negligent supplier of goods, services or technology for damage incurred at its installation.

In this regard, there are two opposing points of view: on the one hand, since the overriding principle of the conventions is to channel liability to the operator, on-site property damage should not be recoverable from any other person; on the other hand, since the overriding purpose of the conventions is to compensate damage suffered by third parties, on-site property damage should fall outside the conventions' scope and be recoverable under ordinary civil law principles.

The most effective way of solving this problem would be to amend the text of the conventions to make it clear that operators either do, or do not, have any such right, or at least to require contracting parties to include a specific provision, one way or the other, in their national legislation. During the negotiations to adopt the Paris Convention Protocol, states were asked by representatives of the nuclear industry to adopt the first point of view, claiming that this would lead to legal clarity and certainty, but the Paris Convention states declined to do so for a variety of reasons. The problem thus remains, and will likely take on increasing importance as the construction of new reactors, particularly on the sites of existing plants begins to take place.

12. The way ahead

The post-Chernobyl response of the international nuclear community has been comprehensive; modernising two outdated international regimes, linking them together and adopting a brand new global one – all in the hope of enhancing the situation of victims of a nuclear accident, wherever they may be found. That improvement will be brought about once all of the relevant international instruments have entered into force and have attracted a good number of adherents.

Considerably more money will be available to compensate a greater number of victims and that money will be more readily and easily accessible. In addition, the period in which claims for compensation can be made in respect of personal injury and loss of life has been extended, in recognition of the fact that some such injuries may not manifest themselves for many years after the accident has occurred.

However, despite attempts to make these new or amended instruments as attractive as possible, their acceptance has not been widespread, at least not yet. This is particularly true in the case of the 1997 Vienna Protocol and the Supplementary Compensation Convention where the required liability amounts and financial security limits were intentionally established at levels low enough to be acceptable to the vast majority of potential parties.

Some countries, both nuclear power generating and non-nuclear power generating alike, have indicated that they are unlikely to make a decision on joining one or more of the conventions until they have adopted, or in some cases revised, their existing domestic legislation in the field.

On the other hand, there will always be countries which are not tempted to adhere to any of these conventions for a variety of political and legal reasons. Some governments may simply take the view that the conventions are too regional in scope, or that their countries are geographically too remote for them to be of real value. This could well be the case for certain Asian countries who might wish to explore the idea of concluding bilateral or multilateral regional arrangements with their neighbouring countries, be they nuclear power generating or otherwise.

The international nuclear liability and compensation instruments are the result of compromise – between states which utilise nuclear energy for peaceful purposes and those which do not, states which impose liability limits on their operators and those which do not, states which implement the principle of legal channelling of liability and those which do not, states which have thousands of units of installed nuclear capacity and those which have relatively few units, states which are primarily concerned with a nuclear accident occurring the during transport of nuclear substances and states which are major transporters of those substances, and finally, states which hold significantly differing opinions as to the manner in which nuclear damage is to be determined.

It is not enough to simply establish international liability regimes or to improve them – ongoing efforts are needed to attract as many states as possible to adhere to them. This can best be achieved through international co-operation with strong and committed support from both the OECD Nuclear Energy Agency and the International Atomic Energy Agency. Both agencies are there to encourage and to help. Let us hope that the goal can be achieved.

Annex 1

1960 Paris Convention on Nuclear Third Party Liability
Status of Ratifications and Accessions

Entry into force of the Convention and the 1964 Additional Protocol:
1 April 1968

Entry into force of the 1982 Protocol: 7 October 1988

Adoption of the 2004 Protocol: 12 February 2004*

Signatories	Convention / 1964 Additional Protocol	1982 Protocol
Austria	…	…
Belgium	03 August 1966	19 September 1985
Denmark	04 September 1974	16 May 1989
Finland	16 June 1972	22 December 1989
France	09 March 1966	06 July 1990
Germany	30 September 1975	25 September 1985
Greece	12 May 1970	30 May 1988
Italy	17 September 1975	28 June 1985
Luxembourg	…	…
Netherlands	28 December 1979	01 August 1991
Norway	02 July 1973	03 June 1986
Portugal	29 September 1977	28 May 1984
Slovenia	16 October 2002	16 October 2002
Spain	31 October 1961 / 30 April 1965	7 October 1988
Sweden	01 April 1968	08 March 1983
Switzerland	…	…
Turkey	10 October 1961 / 05 April 1968	21 January 1986
United Kingdom	23 February 1966	19 August 1985

* All of the above states, with the exception of Austria and Luxembourg, are signatories to the 2004 Protocol to Amend the Paris Convention.

Annex 2

1963 Brussels Convention Supplementary to the Paris Convention Status of Ratifications and Accessions

Entry into Force of Convention and 1964 Additional Protocol:
4 December 1974

Entry into Force of 1982 Protocol: 1 August 1991

Adoption of 2004 Protocol: 12 February 2004*

Signatories	Convention and 1964 and Additional Protocol	1982 Protocol
Austria	…	…
Belgium	20 August 1985	20 August 1985
Denmark	04 September 1974	10 May 1989
Finland (accession)	14 January 1977	15 January 1990
France	30 March 1966	11 July 1990
Germany	01 October 1975	25 September 1985
Italy	03 February 1976	14 June 1985
Luxembourg	…	…
Netherlands	28 September 1979	01 August 1991
Norway	07 July 1973	13 May 1986
Slovenia (accession)	05 June 2003	05 June 2003
Spain	27 July 1966	29 September 1988
Sweden	03 April 1968	22 March 1983
Switzerland	…	…
United Kingdom	24 March 1966	08 August 1985

* All of the above states, with the exception of Austria and Luxembourg, are signatories to the 2004 Protocol to Amend the Brussels Supplementary Convention.

Annex 3

1963 Vienna Convention on Civil Liability for Nuclear Damage Status of Ratifications, Accessions, Successions

Date of Adoption: 21 May 1963

Entry into Force: 12 November 1977

Signatories	Ratification, Accession, Succession
Argentina	25 April 1967
Armenia	24 August 1993
Belarus	09 February 1998
Bolivia	10 April 1968
Bosnia and Herzegovina	30 June 1998
Brazil	26 March 1993
Bulgaria	24 August 1994
Cameroon	06 March 1964
Chile	23 November 1989
Colombia	…
Croatia	29 Sept. 1992 (notif.); Oct. 1991 (effect)
Cuba	25 October 1965
Czech Republic	24 March 1994
Egypt	05 November 1965
Estonia	09 May 1994
Hungary	28 July 1989
Israel	...
Latvia	15 March 1995
Lebanon	17 April 1997
Lithuania	15 September 1992
Mexico	25 April 1989
Montenegro	21 mars 1997
Morocco	…
Niger	24 July 1979
Nigeria	4 April 2007

Signatories	Ratification, Accession, Succession
Peru	26 August 1980
Philippines	15 November 1965
Poland	23 January 1990
Republic of Moldova	07 May 1998
Romania	29 December 1992
Russian Federation	13 May 2005
Saint Vincent & the Grenadines	18 September 2001
Senegal	24 December 2008
Serbia	5 February 2002
Slovak Republic	07 March 1995
Spain	...
The former Yugoslav Republic of Macedonia	8 April 1994 (notif.); Sept. 1991 (effect)
Trinidad and Tobago	31 January 1966
Ukraine	20 September 1996
United Kingdom	...
Uruguay	13 April 1999

Annex 4

Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention
Status of Ratifications, Accessions, Approvals

Date of Adoption: 21 September 1988

Date of Entry into Force: 27 April 1992

PC: Paris Convention; VC: Vienna Convention; *Not Party to either Convention

Signatories	Ratification, Accession, Approval
Argentina (VC)	…
Belgium (PC)	…
Bulgaria (VC)	24 August 1994
Cameroon (VC)	28 October 1991
Chile (VC)	23 November 1989
Croatia (VC)	10 May 1994
Czech Republic (VC)	24 March 1994
Denmark (PC)	26 May 1989
Egypt (VC)	10 August 1989
Estonia (VC)	9 May 1994
Finland (PC)	3 October 1994
France (PC)	…
Germany (PC)	13 June 2001
Greece (PC)	16 May 2001
Hungary (VC)	26 March 1990
Italy (PC)	31 July 1991
Latvia (VC)	15 March 1995
Lithuania (VC)	20 September 1993
Morocco*	…
Netherlands (PC)	1 August 1991
Norway (PC)	11 March 1991
Philippines (VC)	…

Signatories	Ratification, Accession, Approval
Poland (VC)	23 January 1990
Portugal (PC)	…
Romania (VC)	29 December 1992
Saint Vincent & the Grenadines (VC)	18 September 2001
Slovak Republic (VC)	7 March 1995
Slovenia (VC)	27 January 1995
Spain (PC)	…
Sweden (PC)	27 January 1992
Switzerland (PC)	…
Turkey (PC)	26 March 2007
Ukraine (VC)	24 March 2000
United Kingdom (PC)	…
Uruguay	28 July 2009

Annex 5

Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage
Status of Ratifications or Accessions

Date of Adoption: 12 September 1997

Date of Entry into Force: 4 October 2003

Country	Signature	Instrument	Date of deposit	Entry into force
Argentina	19 December 1997	Ratification	14 Nov 2000	04 Oct 2003
Belarus	14 September 1998	Ratification	04 Jul 2003	04 Oct 2003
Czech Republic	18 Jun 1998			
Hungary	29 Sep 1997			
Indonesia	06 Oct 1997			
Italy	26 Jan 1998			
Latvia	07 Mar 2001	Ratification	05 Dec 2001	04 Oct 2003
Lebanon	30 Sep 1997			
Lithuania	30 Sep 1997			
Morocco	29 Sep 1997	Ratification	06 Jul 1999	04 Oct 2003
Peru	04 Jun 1998			
Philippines	10 Mar 1998			
Poland	03 Oct 1997			
Romania	30 Sep 1997	Ratification	29 Dec 1998	04 Oct 2003
Ukraine	29 Sept 1997			

Annex 6

Convention on Supplementary Compensation for Nuclear Damage Status of Ratifications or Accessions

Date of Adoption: 12 September 1997

Not yet in Force

Country	Signature	Instrument	Date of deposit
Argentina	19 Dec 1997	Ratification	14 Nov 2000
Australia	01 Oct 1997		
Czech Republic	18 June 1998		
Indonesia	06 Oct 1997		
Italy	26 Jan 1998		
Lebanon	30 Sept. 1997		
Lithuania	30 Sept. 1997		
Morocco	29 Sep 1997	Ratification	06 Jul 1999
Peru	04 June 1998		
Philippines	10 March 1998		
Romania	30 Sep 1997	Ratification	02 Mar 1999
Ukraine	29 Sept. 1997		
United States of America	29 Sept. 1997	Ratification	21 May 2008

Annex 7

2004 Protocol to Amend the Paris Convention (March 2006)	
OECD countries	**Signature**
Australia	
Austria	
Belgium	12 Feb 2004
Canada	
Czech Republic	
Denmark	12 Feb 2004
Finland	12 Feb 2004
France	12 Feb 2004
Germany	12 Feb 2004
Greece	12 Feb 2004
Hungary	
Iceland	
Ireland	
Italy	12 Feb 2004
Japan	
Korea (Rep. of)	
Luxembourg	
Mexico	
Netherlands	12 Feb 2004
New Zealand	
Norway	12 Feb 2004
Poland	
Portugal	12 Feb 2004
Slovak Republic	
Spain	12 Feb 2004
Sweden	12 Feb 2004

2004 Protocol to Amend the Brussels Supplementary Convention (March 2006)	
OECD countries	**Signature**
Australia	
Austria	
Belgium	12 Feb 2004
Canada	
Czech Republic	
Denmark	12 Feb 2004
Finland	12 Feb 2004
France	12 Feb 2004
Germany	12 Feb 2004
Greece	
Hungary	
Iceland	
Ireland	
Italy	12 Feb 2004
Japan	
Korea (Rep. of)	
Luxembourg	
Mexico	
Netherlands	12 Feb 2004
New Zealand	
Norway	12 Feb 2004
Poland	
Portugal	
Slovak Republic	
Spain*	12 Feb 2004
Sweden	12 Feb 2004

2004 Protocol to Amend the Paris Convention (March 2006)	
Switzerland	12 Feb 2004
Turkey	12 Feb 2004
United Kingdom	12 Feb 2004
United States	
Non-OECD	
Slovenia	12 Feb 2004

2004 Protocol to Amend the Brussels Supplementary Convention (March 2006)	
Switzerland	12 Feb 2004
Turkey	
United Kingdom	12 Feb 2004
United States	
Non-OECD	
Slovenia	12 Feb 2004

* Spain deposited its instrument of ratification of the Protocol to Amend the Brussels Supplementary Convention on 12 January 2006. That Protocol will come into force when all signatories have deposited their instruments of ratification, acceptance or approval.

Annex 8

Nuclear Power Plants Worldwide: Operating and Under Construction

Data taken from IAEA Power Reactor Information System. The total figures include 6 operating NPPs and 2 NPPs under construction in Taiwan, China.

Country	Operating	UC
Argentina	2	1
Armenia	1	0
Belgium	7	0
Brazil	2	0
Bulgaria	2	2
Canada	18	0
China	11	21
Czech Republic	6	0
Finland	4	1
France	58	1
Germany	17	0
Hungary	4	0
India	18	5
Iran	0	1
Japan	54	1
Korea	20	6
Lithuania	0	0
Mexico	2	0
Netherlands	1	0
Pakistan	2	1
Romania	2	0
Russian Federation	32	8
Slovak Republic	4	2
Slovenia	1	0
South Africa	2	0
Spain	8	0
Sweden	10	0
Switzerland	5	0
Ukraine	15	2
United Kingdom	19	0
United States	104	1
Total:	**437**	**55**

Annex 9

World's Nuclear Power Generating Countries that are contracting parties/states to:

- Paris Convention on Nuclear Third Party Liability, amended 1964 and 1982 (PC)
- Brussels Supplementary Convention, amended 1964 and 1982 (BSC)
- 1963 Vienna Convention on Civil Liability for Nuclear Damage (VC)
- Protocol to Amend the 1963 Vienna Convention (VCP)
- Convention on Supplementary Compensation for Nuclear Damage (CSC) (not in force)

Argentina:	VC; VCP; CSC	Mexico	VC
Armenia:	VC	Netherlands	PC; BSC
Belgium:	PC; BSC	Pakistan	
Brazil:	VC	Romania	VC; VCP; CSC
Bulgaria	VC	Russian Federation	VC
Canada		Slovak Republic	VC
China		Slovenia	PC; BSC
Czech Republic	VC	South Africa	
Finland	PC; BSC	Spain	PC; BSC
France	PC; BSC	Sweden	PC; BSC
Germany	PC; BSC	Switzerland	
Hungary	VC	Taiwan	
India		Ukraine	VC
Japan		United Kingdom	PC; BSC
Korea		United States	
Lithuania	VC		

Main Features of the Revised International Regime Governing Nuclear Liability – Progress and Standstill*

*by Norbert Pelzer***

1. The Chernobyl momentum

The 1986 Chernobyl nuclear accident disclosed lacunae of the existing international legal frameworks governing the use of nuclear energy. States reacted to these findings without delay. In the period from 1986 to 2005 they embarked on exercises to comprehensively revise and rebuild the international nuclear treaty regime. Thus Chernobyl confirmed the experience that very often an accident is required to trigger activities.[1] This applies in particular to

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* The contribution is largely based on the author's regularly revised and updated 2003, 2006, 2007, 2008 and 2009 Montpellier lectures on modernising the international regime governing nuclear third party liability. An amended and updated version of the 2003 lecture, complemented by footnotes and references, is published with the title "Modernizing the International Regime Governing Nuclear Third Party Liability", in: EurUP Zeitschrift für Europäisches Umwelt- und Planungsrecht, Vol. 3 (2005) No. 5, pp. 212-223.

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1. On the reactions of states and of international governmental organisations to the Chernobyl accident see in particular the joint OECD/NEA-IAEA publication: International Nuclear Law in the Post-Chernobyl Period, Paris 2006. This publication is also available on the internet at www.nea.fr/html/law/chernobyl/welcome.html.

the field of public international law. Already in 1986, states convened in Vienna and concluded the 1986 Conventions on Early Notification of a Nuclear Accident and on Assistance in the Case of a Nuclear Accident or Radiological Emergency.[2] In 1994 and 1997 respectively, the Convention on Nuclear Safety[3] and the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management[4] were adopted. Improvement and modernisation of the existing nuclear liability regime were also part of the agenda, and this task turned out to be a very long lasting and difficult one.

At the time of the Chernobyl accident three international nuclear liability conventions were in force, namely

- the 1960 Paris Convention on Third Party Liability in the Field of Nuclear Energy as amended in 1964 and 1982 (1960 PC);[5]

- the 1963 Brussels Convention Supplementary to the Paris Convention as amended in 1964 and 1982 (1963 BSC);[6] and

- the 1963 Vienna Convention on Civil Liability for Nuclear Damage (1963 VC).[7]

This international civil nuclear liability regime was developed in the late 1950s and the early 1960s, and, irrespective of the gaps which became evident through the Chernobyl accident, it still today provides, in principle, for a sound and consistent framework to govern the compensation of nuclear damage. This

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2. Convention on Early Notification of a Nuclear Accident of 26 September 1986 (IAEA Doc. INFCIRC/335); Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency of 26 September 1986 (IAEA Doc. INFCIRC/336).

3. IAEA Doc. INFCIRC/449.

4. IAEA Doc. INFCIRC/546.

5. Paris Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960 as amended by the Additional Protocol of 28 January 1964 and by the Protocol of 16 November 1982 on the NEA website at www.nea.fr/html/law/nlparis_conv.html.

6. Brussels Convention Supplementary to the Paris Convention of 29 July 1960 of 31 January 1963 as amended by the Additional Protocol of 28 January 1964 and by the Protocol of 16 November 1982 on the NEA website at www.nea.fr/html/law/nlbrussels.html.

7. IAEA Doc. INFCIRC/500 = UNTS Vol. 1063, 266.

applies to both the national and the international level. The liability principles forming the skeleton of that system developed into yardsticks for the assessment of the appropriateness of nuclear liability legislations. They include concepts like strict liability, exclusive liability of the operator of a nuclear installation ("legal channelling"), options for limiting or not limiting liability in amount, limitation of claims in time, congruence of liability and coverage in cases of limited liability, equal treatment of victims, exclusive jurisdiction of the courts of one country.[8] National legislation and international conventions which conform to those principles are deemed to be risk adequate.[9] Currently, there is only two national nuclear liability legislation which, with regard to certain principles, deviate from this general approach, namely the legislation of Austria and of the United States.[10]

Still when, in April 1986, the Chernobyl accident occurred, that regime could not contribute to mitigating the consequences of the accident. It could not be used to compensate the victims.

Obviously, the main reason was that the state of the incident, namely the Soviet Union, did neither adhere to any of the existing international nuclear liability conventions, nor had it enacted nuclear liability legislation at national level. The first and very simple lesson the accident taught politicians and

8. It has been pointed out that the recent exercises to modernise the liability regime never questioned the existing nuclear liability principles but confirmed them. See, *e.g.*, Vanda Lamm, The Protocol Amending the 1963 Vienna Convention, in: *Nuclear Law Bulletin* No. 61 (1998/1), pp. 7 *et seq*. (9-10).

9. For comprehensive descriptions and analyses of the international nuclear liability regime see: Reform of Civil Nuclear Liability, International Symposium Budapest, 31 May – 3 June 1999, Paris: OECD 2000; Susanne Kissich, Internationales Atomhaftungsrecht: Anwendungsbereich und Haftungsprinzipien, Baden-Baden 2004. On the early times see: Jean Pierre Piérard, Responsabilité civile, Énergie atomique et droit comparé, Bruxelles 1963; Stojan Cigoj, The International Regulation of Civil Liability for Nuclear Risk, in: *The International and Comparative Law Quarterly* Vol. 14 (1965), pp. 809 *et seq.*

10. Austria: Bundesgesetz über die zivilrechtliche Haftung für Schäden durch Radioaktivität (Atomhaftungsgesetz 1999 – AtomHG 1999) (Bundesgesetzblatt Österreich 1998/170; 2001/98; 2003/33). USA: Section 170 of the U.S. Atomic Energy Act 1954 as repeatedly amended (42 U.S.C. 2011 *et seq.*; 68 Stat. 919). Section 170 comprises the 1957 Price-Anderson-Act as amended (42 U.S.C. 2210). The current version of "The Civil Liability for Nuclear Damage Bill, 2010" (Bill No. 19 of 2010) of India does not contain the concept of legal channelling.

lawyers therefore is: it is not sufficient to establish an international liability regime, but there are also permanent efforts required to attract as many states as possible to adhere to that regime. At the time of the Chernobyl accident, fourteen European states, including Turkey, were party to the regional Paris Convention, while the worldwide Vienna Convention had only been adopted by nine states, which were dispersed all over the world and included states like Argentina, Cameroon, Egypt and the Philippines.

In addition to those political shortcomings of the existing regime, legal deficiencies also became evident. Without prejudice to most of the leading liability concepts, the international nuclear liability conventions could neither cope satisfactorily with long-distance damage caused by a nuclear incident occurring in the territory of a contracting party and causing damage in a non-contracting state nor with the size and the specific nature of nuclear damage.

Only one year after the Chernobyl accident, at the end of 1987, states commenced negotiations in order to reform the existing international nuclear liability regime. The negotiations took place in Vienna from 1987 to 1997 and resulted in two new international treaties and the revision of the Vienna Convention of 1963, namely

- the Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention of 21 September 1988 (JP);[11]

- the Convention on Supplementary Compensation for Nuclear Damage of 12 September 1997 (CSC);[12] and

- the Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage of 12 September 1997 (1997 VC).[13]

After finalisation of this exercise and without delay, the Paris Convention states in 1998 started the revision of the Paris Convention and the Brussels Supplementary Convention. This exercise was finalised at the

11. IAEA Doc. INFCIRC/402.

12. IAEA Doc. INFCIRC/567.

13. IAEA Doc. INFCIRC/566.

beginning of 2002. The revised conventions were adopted at a Diplomatic Conference held in Paris on 12 February 2004:[14]

- Protocol to Amend the Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960 as Amended by the Additional Protocol of 28 January 1964 and by the Protocol of 16 November 1982, of 12 February 2004 (2004 PC),[15]

- Protocol to Amend the Convention of 31 January 1963 Supplementary to the Paris Convention of 29 July 1960 on Third Party Liability in the Field of Nuclear Energy as Amended by the Additional Protocol of 28 January 1964 and by the Protocol of 16 November 1982, of 12 February 2004 (2004 BSC).[16]

In the following sections of this contribution, the main subject matters of the revision exercises shall be discussed.[17] Since the revised Vienna

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14. Two years elapsed between the finalisation of the negotiations in 2002 and the Diplomatic Conference in 2004. This is due to the unexpected enactment of EC Council Regulation No. 44/2001 of 22 December 2000 on jurisdiction and the recognition and enforcement of judgements in civil and commercial matters (Brussels I) (Official Journal of the EC 2001 No. L 12 p. 1). Through this regulation parties to the Paris Convention that are EU member states lost their competence to negotiate, to sign and to ratify or approve the protocol as far as it covers matters regulated by the regulation. That restriction applied to the revision of Article 13 of the Paris Convention dealing with jurisdiction. Agreement with the EC was needed to overcome this difficulty. Member states and the EC agreed that member states were authorised to sign the protocol "in the interest of the Community", which they did in 2004, see: Council Decisions 2003/882/ EC of 27 November 2003, 2004/294/EC of 8 March 2004 (Official Journal No. L 338 of 27 December 2003, No. L 97 of 1 April 2004).

15. On the NEA website at www.nea.fr/html/law/paris_convention.pdf.

16. On the NEA website at www.nea.fr/html/law/brussels_supplementary_convention.pdf.

17. See on this subject e.g. Jan Łopuski, Liability for Nuclear Damage, an International Perspective, Warsaw 1993; Vedran Soljan, Modernisation of the International Regime on Civil Liability for Nuclear Damage, in: Zeitschrift für ausländisches öffentliches Recht und Völkerrecht Vol. 58 (1998), pp. 733 *et seq.*; Lamm (footnote 8), pp. 7 *et seq.*; Patrick Reyners, Modernisation du régime de responsabilité civile pour les dommages nucléaires: Revision de la Convention de Vienne et la nouvelle Convention sur la réparation complémentaire des dommages nucléaires, in: Revue générale de Droit international public tome 105 (1998), pp. 747 *et seq.*; Håkan Rustand, The Revision of the Paris/Brussels System: Important Improvements of the

Convention and the revised Paris Convention are still nearly identical with regard to their operative parts, both conventions shall be dealt with jointly, unless there are differences. This approach at the same time also covers the Convention on Supplementary Compensation as far as the liability of the operator of a nuclear installation is concerned ("Annex legislation").

2. Territorial scope of application of the international nuclear liability regime

2.1. Restricted territorial scope of application

Chernobyl confirmed in practice what had already been known in theory: nuclear incidents may have detrimental effects in the territories of other states. Does the international liability regime cover those damages?

National legislation, in principle, only applies within the territory of the respective state. However, it may also apply to accidents occurred, or to damage suffered, in other states if the general rules of private international law (laws of conflict) so provide. It is well known that this legal situation entails uncertainties which are to the detriment of both the victims of a nuclear incident and the operator liable ("forum shopping"). These uncertainties can only be done away with by creating treaty relations among the respective states. The 1960 Paris and the 1963 Vienna Conventions established such treaty relations, they are instruments designed to overcome the described difficulties. However, the solution adopted by the conventions only applied to victims in the territories of contracting parties and did not cover victims in the territories of non-contracting states.

International Nuclear Liability Regime – Some Remarks, in: Norbert Pelzer (ed.), Brennpunkte des Atomenergierechts / Nuclear Law Problems in Focus, Tagungsbericht der AIDN/INLA-Regionaltagung in Wiesbaden 2002, Baden-Baden 2003, pp. 133 *et seq.*; Monika Hinteregger / Susanne Kissich, The Paris Convention 2004 – a New Nuclear Liability System for Europe, in: Environmental Liability Vol. 3 (2004), pp. 116 *et seq.*; Roland Dussart Desart, The Reform of the Paris Convention on Third Party Liability in the Field of Nuclear Energy and of the Brussels Supplementary Convention: An Overview of the Main Features of the Modernisation of the two Conventions, in: *Nuclear Law Bulletin* No. 75 (2005/1), pp. 7 *et seq.*; Felix Blobel, Das Protokoll von 2004 zum Pariser Übereinkommen – wesentliche Verbesserungen im internationalen Atomhaftungsrecht, in: Natur und Recht Vol. 27 (2005), pp. 137 *et seq.* See also the contributions by Julia Schwartz and by Norbert Pelzer in: OECD/NEA-IAEA (eds.), International Nuclear Law (footnote 1), pp. 37 *et seq.* and 73 (100 *et seq.*) respectively.

The 1960 Paris Convention in its Article 2 expressly states that it does not apply to incidents occurring in the territory of non-contracting states or to damage suffered in such territories unless the national law of the installation state provides to the contrary – which only very few national legislation did.[18] The Vienna Convention does not contain an express provision on the territorial restriction, but the contracting parties agreed already at an early stage that they would apply the Vienna Convention in the same way as if there was a provision identical to the one of the Paris Convention.[19]

It follows that if there was an incident in a Paris state which caused damage in a Vienna state, there would be no compensation and *vice versa*. There would neither be compensation for damage suffered in the territory of any other non-contracting state to the Paris and the Vienna Convention respectively.[20] If we assume that at the time of the Chernobyl accident the Soviet Union had been a party to the Vienna Convention, only victims from parties to that convention would have been entitled to compensation. Victims from all other states could not have claimed compensation under Soviet law.

In order to do away with this obvious shortcoming of the system, states agreed on two approaches to extend the applicability of the conventions to victims of states not party to the convention of the operator liable: they established two new international instruments expressly designed to link the existing instruments with a view to extending their benefits mutually. In addition, states revised the geographical scope of application of the Paris and Vienna Conventions and extended the applicability of the conventions to defined non-contracting states. The Convention on Supplementary

18. Section 25 paragraph 4 of the German Atomic Energy Act 1959/1985 as last amended on 17 March 2009 (BGBl. 1959 I, 814, 1985 I, 1565, 2009 I, 556) expressly excludes the application of Article 2 of the Paris Convention.

19. IAEA Standing Committee on Civil Liability for Nuclear Damage, Vienna 13 – 17 April 1964 (IAEA Doc. CN-12/SC/9). The Committee issued a non-binding recommendation to that end, which never has been disputed and apparently is accepted by the state parties. See also OECD/NEA, The Field of Application of the Nuclear Conventions, in: *Nuclear Law Bulletin* No. 5 (1970/1), pp. 22 *et seq*. (23). Kissich (footnote 9), pp. 216 *et seq*., in her well documented and thorough study, concludes that the 1963 Vienna Convention cannot be interpreted as containing a territorial restriction identical to Article 2 of the unrevised Paris Convention. Her interpretation, however, is not in line with state practice which expressly was confirmed during the revision process of the Vienna Convention.

20. Compensation under general tort law was also excluded because the liability conventions are deemed to be *leges speciales* which derogate general tort law.

Compensation also provides for an extended geographical scope of application. While the first approach is based on binding treaty relations, the second one only provides a unilateral "offer" to non-contracting states and may only be used if the choice-of-law rules applicable so provide.

2.2. Instruments designed to link the liability conventions

On 21 September 1988, states adopted the Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention.[21] Pursuant to its Article II, the Protocol extends the benefits of one convention to the victims in the territories of the other convention. This means that if there is a nuclear incident in a Paris state, victims in Vienna states will be compensated in the same way as victims in the Paris state, and this rule, of course, applies *vice versa*.

If we take into account the current statistics on the adherence to the international liability conventions, the picture looks much better than at the time of the Chernobyl accident: there are thirty six Vienna states (five revised Vienna states), sixteen Paris states, twenty six Joint Protocol states (including sixteen Vienna states and ten Paris states). Nevertheless, this "improvement" is a small one if we put it in relation to the states which are not yet party to any of the conventions. Moreover, the Joint Protocol only provides for a solution regarding the relationship between victims in Vienna and in Paris states. However, it does not solve the problems relating to victims in states which are not a party to any of these conventions.

The Convention on Supplementary Compensation[22] aims at providing a broader concept of linking existing instruments. Its purpose is "to supplement the system of compensation provided pursuant to national law" which either implements the Paris Convention or the Vienna Convention or which complies with the provisions of the Annex to the Convention [Article II(1)]. This appears to be an attractive concept which may cover under its umbrella all states with

21. See footnote 11.

22. See footnote 12.

nuclear liability legislations. Nevertheless, currently the convention has only four contracting parties and is not yet in force.[23]

2.3. Extending the territorial scope of application of the conventions

The issue of the territorial scope of application was discussed intensively at the negotiations to revise the Vienna Convention.[24] Many delegations supported the idea of extending the benefits of the convention also to victims in the territories of non-contracting states. Others held the view that the benefits should be exclusively restricted to contracting parties. They said that the convention was open to every state, and those who would like to benefit from it should join the club. Opening the convention for all victims would take away the incentive for adhering to it.

The compromise solution to this dispute is Article I A of the 1997 Vienna Convention. It stipulates that, in principle, the convention shall apply to nuclear damage wherever suffered. However, the legislation of the installation state may exclude from the application of the convention damage which is suffered in a territory of a non-contracting state or in any maritime zone established by a non-contracting state, provided that that state has a nuclear installation in its territory or in any of its maritime zones and does not afford equivalent reciprocal benefits. In short, this new provision means that the Vienna Convention applies without limitation to those non-contracting states which are so called non-nuclear states, while nuclear states may only benefit from the convention if they provide reciprocal benefits.

New Article 2 of the 2004 Paris Convention is structured differently but offers similar results. There is no general rule in the revised Paris Convention which says that it applies wherever damage is suffered. The 2004 Paris

23. The convention contains a number of problematic elements. Cf. Norbert Pelzer, On Global Treaty Relations – Hurdles on the Way towards a Universal Civil Nuclear Liability Regime, in: EurUP Zeitschrift für Europäisches Umwelt- und Planungsrecht Vol. 6 (2008) pp. 268 *et seq.* (277-279); Florence Touitou-Durand, The Convention on Supplementary Compensation for Nuclear Damage: A Solution for Europe? in: Norbert Pelzer (ed.), Europäisches Atomhaftungsrecht im Umbruch/European Nuclear Energy Law in a Process of Change, Tagungsbericht der AIDN/INLA Regionaltagung in Berlin 2009, Baden-Baden 2010 pp. 257 *et seq*.

24. See: The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage – Explanatory Texts, IAEA International Law Series 3, Vienna 2007, pp. 28 *et seq.*

Convention enumerates cases to which the Paris Convention applies. It shall apply to nuclear damage suffered in the territory of, or in any maritime zone of, or, except in the territory of a non-contracting state not mentioned under (ii) to (iv) of Article 2 paragraph 1, on board a ship or aircraft registered by:

i) a contracting party;

ii) a non-contracting state which at the time of the nuclear incident is a contracting party to the Vienna Convention and the Joint Protocol, provided that the state of the operator liable is also a party to the Joint Protocol;

iii) a non-contracting state which at the time of the nuclear incident has no nuclear installation in its territory or in any of its maritime zones;

iv) any other non-contracting state which at the time of the nuclear incident has in force nuclear legislation which affords equivalent reciprocal benefits and which is based on principles identical to those of the Paris Convention.

The 2004 Paris Convention therefore, with regard to non-contracting states which have a nuclear installation in their territory, does not only require reciprocity but establishes an additional qualifier, namely that the legislation granting reciprocity should follow the same principles as the Paris Convention. The legislation of the installation state may, however, provide for a broader scope of application.[25]

2.4. Summary

The new instruments to broaden the geographical scope of application of the nuclear liability conventions do away with the respective shortcomings of the 1960 Paris Convention and the 1963 Vienna Convention. Victims in non-contracting states are now better protected. That means progress, also on the

25. See on the territorial scope of the revised Paris and Brussels Conventions, particularly on the issue of reciprocity: Norbert Pelzer, The Geographical Scope of Application of the Revised Paris Convention and of the Revised Brussels Supplementary Convention, in: Colloquium on “Modernising the Paris Convention and the Brussels Supplementary Convention”, jointly organised by the French Government, the OECD Nuclear Energy Agency and the French section of the International Nuclear Law Association on 11 February 2004 at the Centre de Conférences internationales Paris, Paris: OECD/NEA 2004, 12 pp.

way to a unified worldwide nuclear liability regime. Extending the territorial scope of application at the same time entails that a larger number of victims are entitled to compensation. The size of the compensation amount available is becoming even more decisive.

3. Amount of liability

In the view of the general public, any liability legislation will be measured against the amount of money it makes available for compensation and quite correctly so. If we refer again to the damage caused by the Chernobyl accident, it is immediately obvious that the compensation amounts available under the international nuclear liability conventions in the year 1986 by no means were sufficient to cover such damages. The aggregate of maximum amounts under the 1960 Paris Convention and the 1963 Brussels Supplementary Convention was limited to 300 million Special Drawing Rights of the International Monetary Fund (SDR). The 1963 Vienna Convention provided a minimum amount of 5 million US gold dollars, and there was no supplementary funding system. There is no need to go into further detail here. However, before dealing with the progress gained by the revised liability conventions, a general comment should be made on liability amounts.

3.1. Limits of civil liability

We are dealing here with civil liability which is part of the private law system. Private law regulates the relationship among natural and legal persons who are equally ranked and in theory are deemed to be at a comparable economic level; unlike under public law, there is no subordination among the persons involved. Civil liability law therefore covers such size of compensation which under normal circumstances can reasonably be expected to be borne by private persons. Even if the law establishes a liability of the person liable which is not limited in amount, everybody is aware that in many cases private persons are not in a position to cover such unlimited liability. There will very often be peaks of liability which are uncovered. It follows that civil liability legislation is not designed to deal with damages of a catastrophic size. The compensation of damage caused by a catastrophe – be it a man-made catastrophe or a natural catastrophe – is the genuine task of the respective state. As we all know, states step in if there is a damage caused by a hailstorm, a flood or an earthquake. The recent financial crisis triggered states' financial aid of an immense size in many states. The same approach has to apply if there is a catastrophic nuclear incident such as the Chernobyl incident.[26]

It follows that whatever amount of liability is fixed by the conventions or by the national legislator, and even if there is unlimited liability of the operator of a nuclear installation, there is always a limit, namely the point at which the means of the person liable are exhausted. *Ultra vires nemo obligatur*. At this stage the responsibility of the operator to provide compensation ends and if the damage uncompensated is high enough to have major national relevance, the responsibility of the state to compensate starts. This limit is certainly floating and depends on various factors: the threshold to the catastrophe will be reached earlier in poor states than in rich states.[27]

3.2. Liability amounts

For this reason, it is not surprising that we, from a comparative point of view, recognise a great variety of liability and compensation amounts under the existing nuclear liability legislations.[28]

With regard to the liability amounts, the original versions of the Vienna and the Paris Conventions have different approaches. While Article V of the Vienna Convention establishes a minimum amount of liability: the liability of the operator may be limited by the installation state "to not less than $ 5 million for any one nuclear incident", Article 7 of the Paris Convention establishes a maximum amount: the aggregate of compensation required to be paid in respect of damage caused by a nuclear incident shall not exceed the maximum liability established in accordance with this article. That reference amount

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26. Roman Herzog, Keynote Address, in: OECD/NEA (ed.), Nuclear Third Party Liability and Insurance – Status and Prospects, Munich Symposium 1984, Paris 1985, pp. 13 *et seq*. (21) most graphically stated that in the event of a catastrophic accident government and Parliament would not even read respective laws on limiting liability but would quickly decide on "unconventional and unbureaucratic" indemnification and the Minister of Finance "would simply nod his head in sympathy"; the address is also reproduced in: *Nuclear Law Bulletin* No. 34 (1984/2), pp. 52 *et seq*. (60).

27. On this subject see in greater detail Norbert Pelzer, Compensation for Large-scale and Catastrophic Nuclear Damage, in: Tamás Nótári / Gábor Török (eds.), Prudentia iuris gentium potestate, Ünnepi tanulmányok Lamm Vanda tiszteletére, Budapest 2010, pp. 341 *et seq*. (347).

28. See OECD/NEA, Nuclear Operator Liability Amounts & Financial Security Limits at www.nea.fr/html/law/2009%20table%20liability-coverage-limits.pdf.

originally was SDR 15 million and in 1990, on the basis of an OECD Recommendation, proposed to be increased to not less than SDR 150 million.[29]

The Vienna Convention has always allowed contracting parties to fix high liability amounts or even to assume unlimited liability of the operator of a nuclear installation. However, none of the contracting parties to the convention made use of the second option. On the other hand, the Paris Convention did not allow for unlimited liability of the operator but stipulated limited liability. Nevertheless, the contracting party Germany in 1985 introduced unlimited liability for German operators,[30] which caused some disputes among the contracting parties to the Paris Convention but eventually was accepted as a *fait accompli*.

The revision exercise with regard to the Vienna Convention confirmed the right of contracting parties to establish unlimited liability. The minimum liability amount under the 1997 Vienna Convention was raised from 5 million US gold dollars to SDR 300 million. The 2004 Paris Convention followed the Vienna example and now also provides for a minimum amount of liability which shall be not less than EUR 700 million. Consequently, under the revised Paris Convention, unlimited liability of the operator is also permissible.

It is worth discussing the issue of limited and unlimited liability in some more detail.

3.3. Limited liability vs unlimited liability

Currently, only four states in the world provide for unlimited liability of the operator of a nuclear installation, namely Austria, Germany, Japan and Switzerland. Among these states only Germany and Switzerland are party to one of the conventions, namely to the Paris Convention. Probably the Paris states Denmark, Finland and Sweden will introduce unlimited liability when they ratify the 2004 Paris and Brussels Conventions. All other states, irrespective of whether they adopted one of the conventions or based nuclear liability solely on national legislation, limit the operator's liability to a wide range of amounts. The largest amount in existence is the amount of USD 11.9

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29. OECD/NEA Steering Committee Recommendation of 20 April 1990 to increase the maximum liability of the operator to not less than SDR 150 million [Doc. NE/M (90)1]. Most of the contracting parties followed that recommendation.

30. Section 31 paragraph 1 Atomic Energy Act (footnote 18).

billion under U.S. legislation.[31] The U.S. is a party to the Convention on Supplementary Compensation which is not yet in force.

In the discussion between opponents to and promoters of unlimited liability, the opponents say: since unlimited liability cannot entirely be covered, it does not make any difference whether you limit or do not limit liability. Unlimited liability may be appraised as being more or less a "fake" because unlimited coverage does not exist and because, consequently, the money available is – just as under limited liability – only that amount which is covered by a financial security. This argument, however, is not entirely correct. If, in the case of unlimited liability, the means of the mandatory financial security are exhausted, victims still have access to the other assets of the operator. This certainly is an enhancement of the position of victims since more compensation money is available.

Liability amounts are designed to cover a risk. Consequently, their size ought to be fixed by taking into account that risk. However, it appears that the risk is not the basis of the existing liability amounts. They are rather established at an amount to correspond to the insurance coverage available at the market. It is felt that this approach is a corollary of the conventions' principle that the liability of the operator has to be covered in full (congruence principle).[32]

If we look into the recent history of technical law, we recognise another reason why legislators opt for a limitation of liability in amount. This concept has always been introduced when a new branch of industry, like railways or motorcars, had to be promoted. Limiting the liability is a subsidy for the respective industry.[33] There may have been good reasons for such subsidy at the beginning of the commercial use of nuclear power, but today there are major doubts as to whether those reasons are still valid.[34] Nuclear industry is mature now and can do without that kind of promotion.

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31. See reference in footnote 28.

32. Articles 10(a) 1960 and 2004 PC, VII(1)(a) 1963 and 1997 VC, 5(1)(a) Annex CSC.

33. See in particular Michael G. Faure/Karine Fiore, An Economic Analysis of the Nuclear Liability Subsidy, in: Pace Environmental Law Review Vol. 26 (Summer 2009) No. 2, pp. 419 *et seq*. See also Pelzer (footnote 27), pp. 348-350.

34. See on this issue Norbert Pelzer, Begrenzte und unbegrenzte Haftung im deutschen Atomrecht, Baden-Baden 1982, pp. 34 *et seq*.

It follows that the current limitations of the operator's liability amount are neither based on the risk to be covered nor are they necessary to promote the use of nuclear energy. They are arbitrary and cannot be justified. The plea for unlimited liability is convincing.[35]

3.4. Summary

The increased liability amounts under the revised conventions are certainly a major progress as compared to the partly ridiculously low liability limits under the unrevised conventions or under the respective national implementing legislation. Minimum amounts of SDR 300 million under the revised Vienna system and under the Convention for Supplementary Compensation and EUR 700 million under the revised Paris system respectively are considerable amounts of money. The concept of minimum amounts, now endorsed by all of the conventions, leaves states the discretion to increase those amounts as they deem necessary. Moreover, unlimited liability is now an expressly agreed option under the conventions.

4. The concept of nuclear damage

4.1. The need for clearly defining compensable nuclear damage

The Chernobyl accident provided a clear picture of which kind of nuclear damage is likely to occur if a major nuclear accident happens. In addition to personal injury, damage to the environment and damage to property were suffered. Cattle were prevented from grazing, playgrounds had to be decontaminated, dairy products and crops could not be sold, the tourist industry lost out on turnover. In light of this experience, states reconsidered the concept of damage to be compensated.

The 1960 Paris Convention does not contain an express definition of nuclear damage. The extent of damage to be compensated can be taken from Article 3 of the convention, which states that the operator of a nuclear installation shall be liable for damage to or loss of life of any person and for damage to or loss of any property. The express definition in Article I(1)(k) of the 1963 Vienna Convention is identical to the concept of damage in the Paris Convention. Both conventions also provide for an option to include into the

35. As for the coverage of unlimited liability, the conventions stipulate that it must not be less than the minimum amounts required if liability is limited, *i.e.*, EUR 700 million under the 2004 Paris Convention and SDR 300 million under the 1997 Vienna Convention and under the Convention on Supplementary Compensation.

damage to be compensated such damage which arises out of, or results from, other ionizing radiation emitted by any other source of radiation inside a nuclear installation.

Regarding one point, however, the 1963 Vienna Convention differs from the 1960 Paris Convention. It also covers any other loss or damage so arising or resulting if and to the extent that the law of the competent court so provides. This is an extremely far-reaching catch-all clause, which gives the competent judge discretion to include into the damage to be compensated a broad range of other heads of damage.

In the light of the Chernobyl experience, both definitions suffer from certain shortcomings: with regard to property damage and to damage to the environment, the definitions are too narrow, and with regard to the catch-all clause of the Vienna Convention, the definition is too far-reaching.

The revision exercises of both conventions aimed at extending the original definitions in particular with a view to including environmental damage and such types of economic loss which perhaps were not covered by the old versions. On the other hand, the drafters aimed at restricting the extent of compensable damage in order to give the judge clear guidance, in particular, in order to enable him to use the limited amounts of compensation available in a reasonable way. This objective of extending and at the same time restricting the concept of damage was of course most difficult to achieve and triggered lengthy discussions during the revision exercises.[36] The outcome of the efforts is acceptable, and the drafters more or less achieved their objective. It should also be mentioned that the new definitions of the conventions are, with only one exception, identical which, regarding the Paris and the Vienna Conventions, is particularly helpful for the application and the smooth functioning of the Joint Protocol.[37]

36. For the Vienna Convention cf. Explanatory Texts (footnote 24), pp. 33 *et seq*.

37. See on the revised concepts of nuclear damage *e.g.* Vedran Soljan, The New Definition of Nuclear Damage in the 1997 Protocol to Amend the 1963 Vienna Convention on Civil Liability for Nuclear Damage, in: Budapest Symposium (footnote 9), pp. 59 *et seq*.; Fiona Wagstaff, The Concept of Nuclear Damage in the revised Paris Convention, in: Norbert Pelzer (ed.), Die Internationalisierung des Atomrechts / Internationalizing Atomic Energy Law, Tagungsbericht der AIDN/INLA-Regionaltagung in Celle 2004, Baden-Baden 2005, pp. 197 *et seq*.

4.2. The new heads of damage

The different types of nuclear damage to be compensated shall be dealt with point by point. Article 1(a)(vii) of the 2004 Paris Convention, Article I(1)(k) 1997 of the Vienna Convention and Article I(f) of the Convention on Supplementary Compensation read as follows:

> "Nuclear damage" means
>
> (i) loss of life or personal injury;
>
> (ii) loss of or damage to property;

Insofar, the old and the new versions of the conventions are identical. What is new follows in the subsequent sub-paragraphs. The quoted articles continue as follows:

> *and each of the following to the extent determined by the law of the competent court,*

This chapeau sentence was from the very beginning subject to doubts and discussion. People feel that its rationale cannot clearly be identified. It was said that the chapeau states what is anyway obvious, namely that the competent court defines the extent of damage to be compensated. That, of course, is correct (Articles 11 of the 2004 PC, VIII(1) of the 1997 VC, 11 of the Annex CSC). But the objective of the qualifier is not to confirm the rights of the competent court but to give a strict rule to national implementing legislation: states are not free to exclude any of the following heads of damage from compensation. National law is only allowed to determine the extent of damage to be compensated. Quite correctly it was argued that this can be taken from the absence of the words "if and" before the words "to the extent".[38]

> *(iii) economic loss arriving from loss or damage referred to in sub-paragraph (i) or (ii), insofar as not included in those sub-paragraphs, if incurred by a person entitled to claim in respect of such loss or damage;*

This sub-paragraph covers economic loss which is directly linked to loss of life or personal injury or to loss of, or damage to, property. Example: If I, due to personal injury, lose my job, the economic consequences of losing my job will be compensated.

38. Wagstaff, *op. cit.* (footnote 37), p. 201. See Wagstaff also regarding the following text.

(iv) the costs of measures of reinstatement of impaired environment, unless such impairment is insignificant, if such measures are actually taken or to be taken, and insofar as not included in sub-paragraph (ii);

This head of damage is the result of a compromise between those states that required full compensation of any damage to the environment and those delegations who had doubts as to whether it was possible to define the concept of environment in a way that it could be used in a legal text. They argued that the concept was too vague for using it in the definition of nuclear damage. Therefore compensation under the conventions is restricted to the costs of measures of reinstatement of the impaired environment. That means the environmental damage may be expressed in terms of money. If for instance a certain species of birds or other animals disappeared as a consequence of a nuclear incident, and the state decided to buy those animals in another country and to bring them back to the damaged environment, such costs would be compensable. The concept of "measures of reinstatement" is expressly defined in the conventions, and it means any reasonable measures which have been approved by the competent authority of the state where the measures were taken. By this definition, the judge has a clear yardstick as to whether he can accept the costs of measures of reinstatement as a compensable damage: he uses the test of reasonableness and seeks confirmation that the measures have been approved by the competent state authority.

(v) loss of income deriving from an economic interest in any use or enjoyment of the environment, incurred as a result of a significant impairment of that environment, and insofar as not included in sub-paragraph (ii);

This sub paragraph covers another type of economic damage, namely the economic consequences of a significant impairment of the environment. A famous example given during the negotiations was the hotel at the beach which is losing customers due to the fact that the beach is contaminated.[39]

(vi) the costs of preventive measures, and further loss or damage caused by such measures;

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39. Wagstaff, *op. cit.* (footnote 37) in her interpretation refers to elements of the international oil pollution liability, which provide for useful parallels. Actually, the heads of damage in the revised conventions are more or less identical to the concept of damage developed in other international instruments on environmental liability as, e.g., in the Lugano Convention or in the Liability Protocol to the Basel Convention.

In the original versions of the conventions, preventive measures could only be compensated as a means to minimise the damage after the nuclear incident had occurred. The new definition also provides compensation for preventive measures which are taken prior to the incident or which prevent the occurrence of the incident. This certainly is a most reasonable and necessary provision. The concept of "preventive measures" is defined in the conventions. It means any reasonable measures taken by any person after a nuclear incident or an event creating a grave and imminent threat of nuclear damage has occurred to prevent or minimise nuclear damage referred to in the previous sub-paragraphs, subject to any approval of the competent authority required by the law of the state where the measures are taken.[40]

The definition contains two qualifiers. The first qualifier is that the measures have to be reasonable; the test of reasonability is subject to a court decision, the court may decide what is reasonable. The second qualifier allows the state to require an approval by a state authority for the measures as prerequisite for compensation; on the other hand, if there is no such requirement under national law, the conventions do not prevent compensation for reasonable preventive measures without the approval of the authority.

Finally, only in the 1997 Vienna Convention and in the Convention on Supplementary Compensation but not in the 2004 Paris Convention, there is a further type of nuclear damage, which reads as follows:

> *(vii) any other economic loss, other than any caused by the impairment of the environment, if permitted by the general law on civil liability of the competent court…*

This head of damage apparently is meant as a catch-all clause. The drafters of the revision of the Paris Convention did not accept it, for the simple reason that they could not find any convincing case which needed to be covered and which would only be covered by this head of damage. Actually, this head of damage is broadening the concept of damage in a way which does not match the limited amounts of compensation available. It gives the competent court under the general law on civil liability a very extensive discretion which might jeopardise one of the conventions' objectives, namely the harmonisation of nuclear liability law among the contracting parties.

40. This language follows the text of the 2004 Paris Convention. For systematic reasons, it differs from the language of the 1997 Vienna Convention and the Convention on Supplementary Compensation. There is, however, no difference in substance. Cf. Article 1(a)(ix) of the 2004 PC on the one hand, and Articles I(1)(n) of the 1997 VC and I(h) of the CSC on the other hand.

4.3. Summary

The revised concept of nuclear damage is well balanced. It takes into account the lessons learnt by Chernobyl and transformed them into a legal concept which gives clear guidance to the operator liable, to the victims and to the competent court.

5. Limitation of liability in time

The reference extinction or prescription period under the 1960 Paris and the 1963 Vienna Conventions is ten years from the nuclear incident. This figure originates from the fact that the insurance industry is not prepared to insure risks for a longer period than ten years; they say beyond that time risks cannot be calculated.

In particular with regard to personal injury, the period of ten years was disputed from the very beginning. It is well known that the ionization of human cells may take a very long time until damage becomes evident. Ten years is too short a period for barring compensation in those cases. The revised versions of both conventions therefore prolong the prescription or extinction period for personal injury to thirty years from the nuclear incident.[41] With respect to other nuclear damage, the old period of ten years is maintained. Other damage will most probably become evident within that period. States are, however, free to establish longer periods, provided coverage is made available (Articles 8 of the 2004 PC, VI of the 1997 VC). This, however, does not apply to the Convention on Supplementary Compensation, which maintained the ten-year period for all types of nuclear damage (Article 9 of the Annex CSC).

There is no doubt that the thirty-year period, with regard to personal injury, is more adequate to the risk than the old period. However, establishing different periods for personal injury and other damage may create a problem when it comes to compensating damages. Judges will be reluctant to compensate other damage because they have to bear in mind that actions for personal injury might be brought within the next thirty years. The priority in the distribution of compensation given to claims in respect of personal injury established (only) under Article VIII(2) of the 1997 Vienna Convention adds complexity. It follows that either the legislator or the judge has to provide a

41. Insurers are still not ready to cover periods in excess of ten years. See, e.g., Sebastiaan M. S. Reitsma, Revised Nuclear Liability: A Challenge for Insurers, in: Norbert Pelzer (ed.) Bausteine eines globalen Atomrechtsystems / Elements of a Global Nuclear Law Regime, Tagungsbericht der AIDN/INLA-Regionaltagung in Goslar 2006, Baden-Baden 2007, pp. 217 *et seq.* (220-221).

mechanism to ensure that, on the one hand, at the end of the thirty-year period there is still money available to compensate personal injury and that, on the other hand, a possible delay in compensating nuclear damage other than personal injury does not entail unacceptable hardships.

6. Jurisdiction

Jurisdiction over actions brought in respect of compensation for nuclear damage shall lie with the state where the nuclear incident occurs. Where a nuclear incident occurs outside the territory of the contracting parties or where the place of the incident cannot be determined with certainty, jurisdiction shall lie with the courts of the installation state. Those general rules of both conventions have not been touched upon by the revision exercises (Articles 13 1960 and 2004 PC, XI 1963 and 1997 VCs; likewise Article XIII CSC). However, there are two amendments which are beneficial for bringing claims.

There is now an obligation for the contracting party whose courts have jurisdiction to ensure that only one single court is competent to rule on compensation for nuclear damage. This, without any doubt, means a major improvement. Under the unrevised conventions it was not excluded that within the state that has jurisdiction under the convention, a number of national courts were competent in accordance with the national legislation of that state (*e.g.* Germany). Such situation is not in line with the conventions' concept to concentrate lawsuits. For that reason several national legislations already had determined a single competent court without being obliged to do so by the conventions (e.g. France, the Netherlands).[42]

The second amendment deals with jurisdiction in respect of nuclear incidents occurring in the so called Exclusive Economic Zone of the sea. If a nuclear incident occurs in that zone, the courts of the coastal state shall have jurisdiction. This provision is in particular meant to address the concerns of coastal states with regard to maritime shipments of nuclear material through their waters.[43]

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42. There is a respective OECD/NEA Steering Committee Recommendation of 3 October 1990 [NE/M(90)2].

43. See, e.g., Andrea Gioia, Maritime Zones and the New Provisions on Jurisdiction in the 1997 Vienna Protocol and in the 1997 Convention on Supplementary Compensation, in: *Nuclear Law Bulletin* No. 63 (1999/1), pp. 25 *et seq*. See also Explanatory Texts (footnote 24), pp. 55 *et seq.*

7. International supplementary compensation for nuclear damage

7.1. Obligations under public international law

In Section 3.1 it has been pointed out that in cases of nuclear damage beyond a certain magnitude, the installation state has to step in and to compensate if the means of the operator are exhausted. This obligation of the state is self-explanatory with regard to damage suffered by its citizens and residents. Does this rule also apply to damage occurred in the territory of another state? And does there exist an obligation of the installation state to compensate foreign citizens at all?

It is a generally accepted principle of public international law that potentially hazardous activities carried out in the territory of one state must not have significant detrimental effects on the territories of other states. The respective state has to take the necessary measures to prevent such damage. This rule was developed *inter alia* in the famous Trail Smelter Arbitration[44] and has been confirmed in a great number of decisions and other international acts. If nevertheless damage in another state occurs, the respective state of origin is liable to pay compensation under public international law.[45] It follows that nuclear incidents which cause damage in another state do not only have consequences with regard to civil liability but there may also be public international law liability of the installation state or the incident state. All conventions expressly acknowledge, and do not affect, rights and obligations under the general rules of public international law (Annex II of the 1960 PC, Articles 16bis of the 2004 PC, XVIII of the 1963 and 1997 VCs, XV of the CSC).

Consequently, under international customary law there is an obligation of the states to compensate cross-border nuclear damage originating from nuclear incidents in their territory. Without prejudice to this public international law obligation, a number of states entered into treaty obligations aiming at complementing the private law compensation to be provided by the operator liable by public funds.

44. RIAA Vol. 3 p. 1905.

45. There is ample literature available on this issue. On a general overview with further references see the textbooks on public international law, as, *e.g.*, Malcolm N. Shaw, International Law, 5th ed., Cambridge 2003, pp.760 *et seq*.

7.2. *International instruments on supplemental compensation*

There are two international instruments on supplementary funding, namely the 1963 and 2004 Brussels Supplementary Convention,[46] which is accessory to the Paris Convention and thus a regional instrument, and the 1997 Convention on Supplementary Compensation for Nuclear Damage,[47] which is "free-standing" and designed to establish a global regime.

7.2.1. Brussels Supplementary Convention

The 1963 Brussels Supplementary Convention complements, and is accessory to, the Paris Convention. Only parties to the Paris Convention may adhere to the Brussels Supplementary Convention (Article 19 of the 1963 BSC). It provides for three-tier compensation: At least SDR 5 million have to be provided by operator's funds in accordance with the Paris Convention; between that amount and SDR 175 million additional compensation has to be paid out of funds of the installation state; between that amount and SDR 300 million out of international funds to be supplied jointly by all contracting parties. The total amount under the unrevised Brussels Convention therefore is SDR 300 million (Article 3 of the 1963 BSC).

The 2004 revision did not change the general concept and the three tier compensation system. The three-tier system now reads as follows (Article 3 of the 2004 BSC):

- up to an amount of at least EUR 700 million, compensation has to be paid out of funds provided by the operator liable;
- between that amount and EUR 1 200 million compensation has to be paid out of public funds to be made available by the installation state;
- between EUR 1 200 million and EUR 1 500 million out of public funds to be made available by the entirety of the contracting parties according to a certain formula which is laid down in Article 12.

The revision of the convention therefore results in a considerable increase of the amounts available to compensate damage. In particular, the international third tier has been more than doubled from SDR 125 million (equals approximately EUR 135 million) to EUR 300 million.

46. Footnotes 6, 16.

47. Footnote 12.

Under the 1963 Brussels Convention, the third – the international – tier is a "closed" tier. It does not vary with the number of contracting parties. This has been changed. The third tier is now partly open-ended: in case of accession by a state it will be increased [Articles 3(b)(iii), 12bis of the 2004 BSC]. There is no decrease of the amount in case the number of parties decreases. This amendment is an additional improvement to the benefit of victims. The total amount of compensation thus achieved will be more than EUR 1 500 million.[48]

There is another improvement which shall encourage parties to increase the operator's liability and coverage amounts to the benefit of victims.

The 1963 Brussels Convention created difficulties for those contracting parties that required the operator to provide a financial security higher than the first two tiers of the convention. Such parties were running the risk to be excluded fully or partly from the benefits of the third tier. This applied particularly to Germany, which requires the operator to maintain coverage up to EUR 2.5 billion, an amount which is even beyond the total Brussels amount. In order to mitigate such situation, the OECD Council in 1992 issued a recommendation that contracting parties shall not invoke Article 3 of the Brussels Supplementary Convention in cases where the amount of insurance or other financial security of the operator is higher than the second tier (SDR 175 million) of the 1963 Brussels Supplementary Convention.[49] As a consequence of the recommendation, the third tier will be mobilised when the amount made available by the operator – in the German case EUR 2.5 billion – is exhausted. The third tier is "deferred".

Although the deferment solution ensures that contracting parties with high operator's amounts will not totally be excluded from the benefit of the third tier, it nevertheless quite obviously penalises states that offer high financial securities. In order to change this, the contracting parties agreed on a new Article 9(c) of the convention, which stipulates that the third tier has to be made available once the amount of compensation reaches the total of the amounts referred to in the first two tiers of the compensation system, irrespective of whether funds to be provided by the operator remain available

48. Although the 2004 Brussels Supplementary Convention will have two additional parties as compared to the 1963 Convention, namely Slovenia and Switzerland, this increase of parties will not entail an increase of the third tier. Both states are signatories to the revised convention and, consequently, ratify it. The increase under Article 12bis only applies in case of accession.

49. OECD Council Recommendation of 26 November 1992 [Doc. C(92)166/Final]. See also OECD/NEA Docs. NEA/LEG/DOC(97)7, NEA/NLC/DOC(2005)2.

or whether the liability of the operator is not limited in amount. That means in terms of figures: when the damage reaches the amount of tiers one and two, namely EUR 700 million plus EUR 500 million, that is EUR 1 200 million, the third tier has to be made available. If that money is exhausted and there is still private money available provided by the operator liable, the private money can be used for additional compensation. It follows that the third tier will be mobilised at the same time for all contracting parties, irrespective of the amounts made available by the operator and the installation state. In the German case this would result in a total amount of coverage of the operator's unlimited liability of EUR 2.8 billion.[50]

7.2.2. Convention on Supplementary Compensation

The Convention on Supplementary Compensation[51] breaks new ground. Unlike the Brussels Supplementary Convention, it is not an instrument accessory to a certain international liability convention, but it may be used to complement either the Paris Convention or the Vienna Convention or national nuclear liability legislation which conforms to the principles of nuclear liability as set out in the Annex to the Convention on Supplementary Compensation. It is a "free-standing" instrument (see Article II).

Article III CSC establishes a two-tier compensation scheme:

- the installation state shall ensure the availability of SDR 300 million or a greater amount to be specified to the depository prior to the nuclear incident;

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50. According to the "Recommendation on the Application of the Reciprocity Principle to Nuclear Damage Compensation Funds" (Annex III to the Final Act of the Diplomatic Conference on the Revision of the Paris and the Brussels Conventions, Paris 12 February 2004, not yet officially published) parties to the Brussels Supplementary Convention may distribute compensation amounts beyond EUR 1 500 million (= the maximum amount under the convention) – in defined cases – on the basis of reciprocity.

51. On this convention see the contributions to Session 2 of the Budapest Symposium (footnote 9), pp.161 *et seq*. by Boulanenkov, McRae, McIntosh, Brown, McCauley and Park. Furthermore: Ben McRae, The Compensation Convention: A Path to a Global Regime for Dealing with Legal Liability and Compensation for Nuclear Damage, in: *Nuclear Law Bulletin* No. 61 (1998/1), pp. 25 *et seq*.; Norbert Pelzer, Das Übereinkommen vom 12. September 1997 über ergänzende Entschädigung für nuklearen Schaden, in: atw – Atomwirtschaft Vol. 53 (2008), pp. 328 *et seq*. See also the references in footnote 23.

- beyond that amount, the contracting parties shall make available public funds according to the formula specified in Article IV.

While the SDR 300 million under the first tier, the operator's tier, shall be distributed without discrimination among all victims [Article III paragraph 2(a)], there is a special rule on allocating the funds of the international second tier [Article III (2)(b)]. Article XI(1) stipulates that 50% of the second tier shall also be made available without discrimination for compensation in and outside the territory of the installation state. The other 50% of this tier shall exclusively be made available to compensate claims for nuclear damage suffered outside the territory of the installation state to the extent that such claims are uncompensated under the first 50% of the second tier.

This is a new and most interesting approach, which clearly aims at securing compensation of victims outside the territory of the installation state. The rationale behind this concept is that compensation of victims inside the installation state is first and foremost a task of that state. Moreover, since it is probable that major nuclear damage will be suffered in the vicinity of the installation, major proportions of the compensation money will be consumed by victims in the territory of the installation state. Therefore international money shall at least to a considerable proportion be kept aside to compensate the victims outside the territory of the installation state.[52] If, however, a contracting party provides a compensation amount of not less than SDR 600 million, it is assumed that there is enough money available to compensate victims inside and outside the territory of the installation state and there is no

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52. At the negotiations of the CSC, there was considerable opposition against this provision. See Explanatory Texts (footnote 24), pp. 80 *et seq*. Delegates said that a victim is a victim and there should be no discrimination among victims. On the other hand, it is true that the installation state poses the nuclear risk and is responsible for the safe operation of the installation. Already for that reason, it carries higher responsibility and has to contribute first and foremost to compensating victims. But does this not also apply to certain transport scenarios? If a nuclear incident occurs in the course of transportation of nuclear material in the territory of a contracting party other than the installation state, we face the same situation. The incident state has licensed the transportation in its territory and consequently carries responsibility for the safety of the transport. Most of the nuclear damage will be suffered close to the place of the incident and the victims in its vicinity will consume major proportions of the compensation money. Of course, there is only remote probability that the potential size of transport damage will require second tier money, but this possibility cannot be excluded. Does this scenario not also warrant a 50% rule? Even if one should agree to the underlying concept of the provision, it is, obviously, not well balanced. See also Pelzer (footnote 51), p. 330.

need for the 50% rule; the amount of both tiers shall be distributed without any discrimination [Article XI(2)].

The international tier is not a fixed amount in terms of figures, but it is open-ended. The amount available under this provision depends on the number of states participating in the convention. According to Article IV, the contribution to be paid by the contracting parties shall be calculated on the basis of rather a complex formula.[53] The more states, in particular states with nuclear installations, adhere to the system, the higher will be the international tier. If all nuclear states of the world adopted this convention, then an amount of approximately SDR 350 million would be available. However, this is not a realistic prospect, since a number of states including major nuclear states have already expressed their view that they are not very interested in that convention, which is already shown by the low number of signatories (13) and parties (4).[54]

The reason why the Convention on Supplementary Compensation for Nuclear Damage is of political interest is that the United States claim that this convention be the only international nuclear liability convention they could adhere to. Domestic legal and political reasons would prevent the U.S. from adopting any of the other instruments. It is true that the instrument contains a so called grandfather clause (Article 2 Annex CSC) which allows the U.S. to maintain their national nuclear liability legislation – which not entirely conforms to the nuclear liability principles of the conventions – without any change. The grandfather clause renders the convention an instrument which is contradictory in itself. While Paragraph 2 of the Preamble stresses that the contracting parties are "desirous of establishing a worldwide liability regime", the grandfather clause jeopardises the achievement of that goal through creating a loophole allowing the U.S. – representing with 104 nuclear power plants almost one quarter of the world's nuclear capacity – to evade international liability harmonisation which is the basis of a worldwide regime.

7.3. Summary

The establishment of binding treaty obligations on international supplementary compensation for damages caused by nuclear installations located in the territory of another state requires specific justification. Why should national tax

53. The IAEA developed and published an "Online Calculator" to determine the contributions of parties under Article IV of the convention; see the IAEA website at http://ola.iaea.org/CSCND/Calculate.asp.

54. On this issue see in particular Touitou-Durand (footnote 23), p. 274 and *passim*.

money be used for that purpose? The underlying concept of the two supplementary funding conventions is solidarity among states.[55] Such solidarity develops if there is a risk community which in the first place means a region where each state is mutually exposed to the nuclear risk originating from another state of the region. In those cases international funding is in the best interest of the entire region. Given this concept, it is not difficult to understand that the Brussels regional regime is an undisputed success, while the global regime of the Convention on Supplementary Compensation lacks adhering states. At worldwide level mutual risk sharing is remote only, and therefore a worldwide risk community does not exist.

8. Concluding appraisal

8.1. Progress

The results of this contribution which aims at appraising the main features of the revised and modernised international nuclear liability regime could be summarised by stating: there is major progress but there is also standstill which means: in certain fields there is no progress.

In identifying the progress one could borrow from the headings used by Julia Schwartz in one of her articles:[56]

- More victims will be entitled to compensation due to the extension of the territorial scope of the nuclear liability conventions by the Joint Protocol and by the express provisions of the territorial scope articles in the conventions.

- Victims will have access to larger amounts of compensation under both the basic liability conventions and the conventions on supplementary compensation.

- Victims may claim compensation for a wider range of damage suffered due to the new concept of nuclear damage.

- Victims will have more time within which to make their claims due to the prolonged prescription or extinction periods.

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55. Dussart Desart (footnote 17), p. 26.

56. Julia Schwartz, Liability and Compensation for Nuclear Damage: The Revision of the Paris Convention and the Brussels Supplementary Convention, in: NEA News 2003 – No. 21.1, pp. 8 *et seq*.

- The special concerns of coastal states are recognised by granting them jurisdiction for nuclear incidents occurring in their Exclusive Economic Zones.

This is in brief the outcome of the revision exercises performed from 1987 to 2004. It is a story of success, in particular if one takes into account that a great number of states with different legal traditions and with diverging economic interests took part.

Hence, there is progress. But there is standstill, too.

8.2. Standstill

Minimal progress which is close to standstill, unfortunately, has to be identified regarding the adherence to the international nuclear liability regime. Today, only some sixty states issued either national nuclear liability acts or became party to one of the nuclear liability conventions. All of the other states do not have special nuclear liability legislation.[57] There is no global nuclear liability regime; there is only a patchwork regime. As a consequence of this situation, victims and persons liable still have to overcome the uncertainties of private international law if international nuclear damage occurs. In Europe, nearly all states are party either to the Paris or to the Vienna Convention, but since not all of them adhere to the Joint Protocol, the general rules of the laws of conflict still may complicate compensation in Europe.[58] Nuclear states like Canada, China, India, Iran, Israel, Japan, both Koreas and South Africa are not yet party to any of the conventions, and as long as the Convention on Supplementary Compensation does not attract significantly more than the current four states, the adherence of the United States to that convention does not have any practical relevance.

57. A comprehensive overview of the current status of ratifications of the Conventions is provided by Julia A. Schwartz, Great Expectations: Where Do We Stand with the Revised Nuclear Liability Conventions? in: Pelzer (ed.), Europäisches Atomhaftungsrecht (footnote 23), pp. 43 *et seq.*

58. It has, however, to be stressed that even the conventions do not entirely eliminate private international law problems; see Ulrich Magnus, Probleme des internationalen Atomhaftungsrechts, in: Dietmar Baetge *et al.* (eds.), Die richtige Ordnung. Festschrift für Jan Kropholler zum 70. Geburtstag, Tübingen 2008, pp. 595 *et seq*. (609-610); in greater detail: Norbert Pelzer, Conflict of Laws Issues under the International Nuclear Liability Conventions, in: Jürgen F. Baur *et al*. (eds.), Festschrift zum 70. Geburtstag von Gunther Kühne, Frankfurt a.M. 2009, pp. 789 *et seq*.

Even if one accepts that a globally unified nuclear liability regime most probably is not achievable[59] and that adherence to the international regime by a number of states perhaps is "not even wanted",[60] there is nevertheless the urgent need to strive for harmonisation in larger geographical regions which qualify for establishing a risk community. The recent initiative of the Commission of the European Union to prepare for establishing a unified nuclear liability regime within the EU member states is therefore most welcome.[61] If a catastrophic nuclear accident occurred today in one of the non-contracting nuclear states, victims would have to revisit the "Chernobyl situation": albeit there is an adequate international nuclear liability regime available, it cannot be applied because the accident state is not a party to it.

The second matter of concern is the size of liability and compensation amounts. This seems to be a paradox statement because earlier the larger amounts of compensation to which victims under the revised regime have access were expressly commended as progress. Of course, the new minimum amounts under the 2004 Paris Convention of EUR 700 million and under the 1997 Vienna Convention or the Convention on Supplementary Compensation of SDR 300 million are an enhancement, and the total amount under the Brussels Supplementary Convention of EUR 1 500 million is a remarkable enhancement. But this holds only true as compared to the amounts under the unrevised conventions, the improvement is relative. But there is only minor progress if the amounts are considered from the point of view of the potential hazards involved in nuclear energy.

In Section 3 of this contribution, the problems of liability amounts are analysed. Although any civil liability regime *per se* implies limits with regard

59. See the critical assessments by Pelzer, On Global Treaty Relations (footnote 23) and Vanda Lamm, The Unification of Nuclear Liability Law within the EU member states from the Viewpoint of a Party to the Vienna Convention, in Pelzer (ed.), Europäisches Atomhaftungsrecht (footnote 23), pp. 213 *et seq.* (219).

60. Touitou-Durand (footnote 23), p. 272.

61. European Commission DG TREN (ed.), Legal Study for the Accession of Euratom to the Paris Convention on Third Party Liability in the Field of Nuclear Energy, Final Report (TREN/CC/01-2005): Cf. also: Evelyne Ameye, Legal Study on Nuclear Third Party Liability for DG TREN of the European Commission, in: Pelzer (ed.), Europäisches Atomhaftungsrecht (footnote 23) pp. 157 *et seq.* On the substantial issues of the current European situation see Patrick Reyners, Liability Problems Associated with the Current Patchwork Nuclear Liability Regime within the EU states, *ibidem* pp. 43 *et seq.*

to the compensation of damage of an extreme magnitude, liability amounts have nevertheless to correspond to a reasonable extent to the risk to be covered. Also the new compensation amounts do not fully meet this requirement and are still a result of the political – not legal – dogma that nuclear liability has to be limited to an amount which can be covered by insurance. Hence, liability amounts are fixed at amounts which correspond to the insurance capacity available in the respective state. This approach renders legislators hostage of the insurance industry. There are additional means of coverage, though, which states should consider[62] with a view to increasing the amounts or to introducing unlimited liability with a coverage limited at the highest amount economically acceptable. Those other options of providing financial security include state coverage against a fee. As a consequence of the dependence of legislators on the capacity of the insurance industry, a delay of ratification of the revised conventions can be observed because the insurers are reluctant to cover the increased amounts and some of the new heads of damage.[63]

It has also been said that poorer states could not afford higher amounts than those agreed upon in the revised conventions, and even those amounts would meet difficulties,[64] a statement which is confirmed in a thorough study by Jakub Handrlica.[65] But there are doubts as to whether such line of argumentation can be accepted. States that embark on a nuclear programme

62. See Julia Schwartz, Alternative Financial Security for the Coverage of Nuclear Third Party Liability Risks, in: INLA/AIDN (ed.), Nuclear Inter Jura 2007 Proceedings, Bruxelles 2008, pp. 381 *et seq.*; Norbert Pelzer, International Pooling of Operators' Funds: An Option to Increase the Amount of Financial Security to Cover Nuclear Liability?, in: *Nuclear Law Bulletin* No. 79 (2007/1), pp. 37 *et seq.*; Simon Caroll, Perspective on the Pros and Cons of a Pooling-type Approach to Nuclear Third Party Liability, in: *Nuclear Law Bulletin* No. 81 (2008/1), pp. 75 *et seq*.

63. See Mark Tetley, Revised Paris and Vienna Conventions – Challenges for Nuclear Insurers, in: Nuclear Law Bulletin No. 77 (2006/1), pp. 27 *et seq.* On the other hand, the insurers also point out that international harmonisation of nuclear liability facilitates the increase of coverage amounts. Cf. Dirk Harbrücker, Trägt die EU-weite Haftungsharmonisierung zur Verbesserung der Deckungs-kapazitäten bei? in: Pelzer (ed.), Europäisches Atomhaftungsrecht (footnote 23), pp. 251 *et seq.* Harbrücker also concludes that, with only two exceptions, the EU member states that are Party to the Paris Convention do not have difficulties to obtain coverage of the 2004 Paris amounts (*ibidem* p. 256).

64. Lamm, *op. cit.* (footnote 59), pp. 218 *et seq*.

65. Jakub Handrlica, Aktuelle Entwicklungen des Atomhaftungsrechts in der Tschechischen Republik und in der Slowakischen Republik, in: Pelzer (ed.), Europäisches Atomhaftungsrecht (footnote 23) pp. 123 *et seq.*

carry responsibility for ensuring risk adequate compensation in the event of a nuclear incident even of a catastrophic nature. They can anyway not evade unlimited state liability under public international law through establishing low civil liability limits.

Insurance of Nuclear Risks

*by Sebastiaan M.S. Reitsma and Mark G. Tetley**

It may seem strange to have a section on insurance amongst the many legal papers brought together to celebrate the 10th anniversary of the International School of Nuclear Law. However, insurance is an essential lubricant in the machine of private commerce and its role in the development of both the civil nuclear industry and its legal arrangements has been critical. Also, looking to the future, with ever greater involvement of private capital in the renewed growth of the nuclear industry, insurance will be required to help provide greater financial certainty for those building, financing, operating and co-existing with a new generation of nuclear facilities.

Insurance is all about rectifying the financial *status quo* following an unforeseen accident, whether it is helping victims of a severe nuclear accident or simply providing the funds to repair a motor vehicle accidentally damaged. The most important feature of insurance is the ability to call on the balance sheet of an unaffected entity, once an accident has occurred. This transfer of financial risk to a specialist third party whose sole objective is to handle claims and compensate for loss – the insurance company – ensures that both the buyer of insurance and, just as important, those he is liable to are assured of swift compensation.

This article will examine the close relationship between the development of the civil nuclear industry, its insurance arrangements and, in particular, how

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the insurers assisted with the creation of the nuclear liability regimes that exist today.

First, however, it is important to understand a few basic principles of insurance and to look at some history.

What is insurance?

Insurance is a precaution against a possible unwanted outcome; thus, both in life and in business, it's a way of managing risk.

Almost everyone uses insurance to protect against the possibility of loss, usually financial. When we buy an insurance policy, we transfer our risk to someone else in exchange for a payment or premium; then, if we suffer a loss, the insurance re-instates all or part of our financial loss.

Without insurance, we could not run businesses or drive cars, own homes or operate nuclear power stations because the potential risks would be too great. Insurance gives us the peace of mind and security we need to lead our lives.

There are a few key principles that form the basis for most contracts of insurance. It is important to understand these and several other concepts of insurance before looking at the application of insurance to nuclear liability.

- **Uberrimae Fidei or utmost good faith:** it is essential for a contract of insurance that all known material facts about the risks to be assumed by the insurer are disclosed prior to the insurance being taken out. If a claim occurs and it is discovered that some of the key facts relating to the subject insured were not disclosed, the policy can be cancelled. However, legislation only requires those facts that a reasonable person would be expected to know to be disclosed.
- **Insurable interest:** it is generally not possible for someone to insure something that is not theirs; it would indeed seem strange to insure someone else's house or car. This interest in whatever is to be insured is called insurable interest and is an essential part of any contract, so that the "owner" of something stands to lose financially if it is damaged.
- **Fortuity:** whatever accident that befalls the thing insured must be fortuitous which is why insurers refuse life insurance to those knowingly suffering terminal diseases because their death is a certainty.
- **Indemnity:** indemnity means that a financial amount is actually payable to the person who is the beneficiary of the insurance.

- **Subrogation:** in the event that a claim occurs under the policy of insurance, subrogation allows the insurer to assume the rights of any recovery once that claim is paid. The insurer is able to step into the shoes of the person who made the claim and perhaps pursue some other party who may have been responsible for causing the loss. Any recovery will be due back to the insurers.

Some of these concepts and terms are referred to elsewhere in this paper.

Nuclear insurance history

Radiation exposure was known to be damaging to the skin as early as the late 19th Century, following Röntgen's discovery of X-rays. This knowledge spurred the development of safety standards that resulted in the foundation of the International Commission on Radiological Protection (ICRP) in 1928; this body survives to this day and has contributed enormously to the development of acceptable levels of radiation for those involved in the nuclear industry. However, during the war years, government scientists in several countries turned away from developing peaceful uses for nuclear energy and focused on the development of nuclear weapons; consequently, much of the nuclear sector's development during this period took place in the hands of the state. After the Second World War, although governments in nuclear countries maintained their involvement in nuclear technology, the desire to see industrial use of nuclear energy meant that increasing private sector involvement was inevitable. In the United Kingdom during the early 1950s work commenced on what was to become the world's first commercial nuclear power station. The government of the time set up a statutory corporation which was intended to take nuclear power production out of government hands. Elsewhere, the recognition of the impact of the commercial development of nuclear energy on the private sector was also becoming clear, especially in the United States and Western Europe. For most countries, this required consideration of liability and statutory controls of radiation exposure to workers.

Meanwhile, insurers had been aware of the risks posed by radiation since the 1920s, when radioisotopes and X-rays began to be used in industrial processes; the risks associated were viewed generally without concern, as the scale of application was small. It was not until the nuclear bombs were dropped on Hiroshima and Nagasaki and the post-war nuclear weapon tests of the late 1940s that insurers' eyes were opened to the wider implications of nuclear explosions. In several European countries, insurance markets began to concentrate on what a nuclear explosion could mean to insurers despite some in the scientific community playing down the possible outcomes of a nuclear accident. Some markets unilaterally began to exclude "radioactive contamination" from homeowner insurance policies and by 1950, several European countries had such exclusions. However, these exclusions did not catch on everywhere and it was only in 1953, when an article in the *Economist* magazine highlighted the likely private sector involvement in the nuclear industry on both sides of the Atlantic, that nuclear became more of a concern for insurers. In particular in the United States and the United Kingdom, it was becoming clear that insurers were going to have to consider providing insurance to the nuclear industry if nuclear power was to be developed commercially. Insurance trade associations began to form committees to consider the risks with the preliminary conclusions being that radioactive contamination should be excluded from general insurance polices, that the insurance associations should manage special underwriting entities to accept these risks and that liability and compensation should be limited. However, there was still no definitive study on the risks posed by nuclear power generation and how insurers should deal with these risks.

In 1957, a committee of insurers in the United Kingdom prepared such a report that analysed the insurance requirements and problems associated with nuclear power, which was still well before any of the nuclear third party liability conventions existed. Notwithstanding the peaceful use of radioactivity, it was recognised at this early stage that a catastrophic loss could occur which could cause the escape of radioactive material into the atmosphere and cause nuclear damage to the site and its surrounding area. Reading this report today, many of the conclusions reached by insurers are still highly relevant. The catastrophic potential of any nuclear accident was noted in the report and this meant that from the earliest stages of the nuclear industry's development, the insurance market was heavily involved in the parallel creation of legislation and insurance policies. Insurers have remained an essential party to the development of the nuclear industry and the nuclear third party liability regimes.

With insurers playing such a key role in the early days of the nuclear industry's development, the insurance industry itself had to design and implement structures and processes to deal with the new hazard, the most important of these being the insurance pool.

Introduction to insurance pools

In order to calculate the premium accurately, the insurer needs to know how many of the risks he covers are likely to be exposed to loss. This may not just be the consequences of loss at a single location, it may also be an accumulation of losses arising from the same consequence through the aggregation of multiple policies.

Insurance contracts can be concluded to cover the perils involved in all kinds of occurrences. Frequently insured perils are, amongst others, loss of life, fire, storm, theft, transport and various liabilities, inclusive of nuclear liability. For the latter a special vehicle is used – an insurance pool.

A pool is essentially a group of insurance companies jointly participating up to a fixed proportion in the insurance of a particular risk or class of business.

This is known as "co-insurance" which is where a number of insurers collectively insure a certain risk, the sum of their individual shares equalling 100%. An associated term is "re-insurance" which is where an insurer or a co-insurer might decide to only keep a percentage of the risk for his own account and cede the remaining percentage to one or more other insurers, called re-insurers, for which he pays a certain premium; basically the insurer takes out insurance for part of the assumed risk himself.

Before going into the concept of nuclear insurance in a more detailed fashion, we shall address the reason why nuclear insurance pools were established in the first place. With the knowledge that radiation resulting from a nuclear accident could cause widespread damage, we have already seen that insurance markets all over the world decided to protect their solvency by the exclusion of radioactive contamination from those classes of business where the risk of such exposure was considered uninsurable. However, in order to provide for alternative cover to the nuclear industry, in many countries insurers agreed to co-operate for this particular risk by forming pools. Although the concept of a pool has already been explained before, the understanding of the existence of nuclear insurance pools will no doubt benefit from some further explanation of their use.

Pools are commonly formed for a number of reasons: first, when the consequences of the hazards concerned are unknown but the number of risks is low, the development of specific know-how at individual insurance companies would be too costly. It therefore makes sense to build up jointly the knowledge needed to estimate the insurance exposure involved. The pooling mechanism is also employed where the risk in question requires an amount of insurance which could not possibly be provided by the individual means of a single insurer. Furthermore, it is applied where the risk presents some particularly hazardous aspect which would render acceptance by conventional methods difficult if not impossible. All these characteristics are problems underlying the insurance of nuclear risks. It is therefore clear that the pooling mechanism has proven to be a very suitable vehicle to serve the cover requirements of this particularly sensitive industrial sector.

Pools' modes of operation

The operation of nuclear insurance pools varies depending on their constitutions and procedures, reflecting the various legal, economic and market conditions and practices in their domestic territory. In some countries for instance, individual pool members have decided to abstain from direct acceptance of nuclear risks and leave it to a third party to act, in effect, as their joint agent. In other countries, a member company may be empowered to accept nuclear business, within clearly defined parameters, on behalf of all members of the pool.

Furthermore, some pools were formed merely to provide capacity to enhance the worldwide market by the re-insurance of nuclear risks in other territories. These pools, which in view of the growing capacity for nuclear risks in the worldwide insurance market, have withdrawn from that market in recent years, could be found in countries not operating commercial nuclear power stations themselves. Others prefer to limit their activities to the insurance of their national nuclear installations, relying on re-insurance support from foreign pools without themselves offering re-insurance capacity to other pools. The constitutions of yet another group of pools prevent them from taking re-insurance from other pools; in these cases, national risks are co-insured with a limited number of other pools, which in their turn buy re-insurance from the international pool market. However, by far the largest part of the 27 nuclear insurance pools operating worldwide today have been formed both to insure nuclear risks in their national markets and at the same time to provide re-insurance cover to their counterparts in other countries.

Fundamental principles of pools

Despite the differences in their modes of operation, nuclear insurance pools operate on the basis of a number of fundamental principles which are common to all of them.

One of them is that the pools deploy the maximum insurance capacity for nuclear risks on a market-wide basis. All or at least the vast majority of the non-life insurance companies of a national insurance market participate in the domestic pool.

Apart from this, the nuclear pooling mechanism provides maximum security to insured parties through controlled membership and the security implied in a spread of risk through a worldwide commitment of pool members. Moreover, with some incidental exceptions, the security is enhanced by the automatic acceptance of a defaulting pool member's exposure by the remaining pool members.

A key objective that permits the concentration of nuclear risks in a pool is to ensure that all pool members only commit for a net retention, which means no recourse to individual company re-insurance protection is permitted. At the same time, re-insurance is arranged with the other nuclear pools throughout the world. Through this mechanism, insurers participating in national pools can be certain that their commitment is limited to the amount of their participation in the pool and that, following the same nuclear incident, no accumulation via other channels can occur. These factors have resulted in a greater commitment of individual pool members to nuclear risks than would be the case if they felt a substantial uncertainty as regards their own exposure following a significant loss. Moreover, the pooling mechanism has induced many individual pool members to make a greater commitment to nuclear insurance than they normally make in respect of other first-class industrial risks. Furthermore, the pooling mechanism enables an efficient claims regulation on a scale which no doubt will be unprecedented in the case of a nuclear catastrophe; in some cases even governments have entered into claims settlements agreements with pools. These enable them to utilise the pools' claims regulation organisation for claims settlements pertaining to government guarantees in addition to insurance covers. This is explained in more detail later on in this article.

The mechanism has also resulted in cost efficiency, both at a national and an international level. Nationally, the concentration of knowledge and experience in the field of insurance of nuclear business in one body has, of course, lead to an economy of costs. At the international level re-insurance between national markets is conducted on a direct basis which means that there is no intervention of intermediaries. Within the international pooling mechanism, both the relevant re-insurance market and the insurance products are well known and easily accessible. Apart from providing a forum for the rapid interchange of professional information, this obviates the intervention of brokers (intermediaries between the insured and the insurer) and facilitates the rapid deployment of the maximum available secure capacity worldwide; as a result expenses are kept to a minimum.

Pools' subject of insurance

It has been explained already that a number of fundamental principles are common to nuclear insurance pools in all countries, and that these do not preclude pools throughout the world from adopting different modes of operation.

An example of operational differences between pools relates to the subject of insurance cover which they provide. Most of them do not, for instance, insure radioisotopes or nuclides which are used for industrial, agricultural and medical purposes. They argue that it is not necessary to insure the risk in the pooling system as it cannot entail an unforeseeable catastrophe; a few, however, do include such risks on the grounds that all nuclear risks, however insignificant, should be treated in the same way.

Contrary to this, cover for nuclear power stations is offered by all pools without exception. Although it is sometimes argued that catastrophic accidents at nuclear installations other than nuclear power stations can hardly happen, we know that they can. A case in point is an accident at a Japanese uranium conversion facility which occurred at the end of 1999 and resulted in considerable losses to both the installation itself and third parties. Almost all pools therefore see it as their task to provide cover for these installations. Apart from nuclear power stations, they also insure uranium conversion facilities, fuel manufacturing factories, reprocessing facilities and facilities for the storage of nuclear waste. Thus, including guarantees for transports of nuclear substances between nuclear installations, nuclear insurance responds to the full definition of a nuclear installation in the international liability conventions.

Alternative risk financing

Although the conventions oblige the operator to have and maintain private insurance cover or some other form of financial security, initially only the private insurance industry was prepared to provide financial protection at an affordable price. However recently, insurers, operators and governments have investigated alternative forms of financial security other than pure risk transfer insurance. These alternatives fall mainly into two categories:

> **Risk retention:** various nuclear industry-owned groups have developed since the late 1970s which provide insurance backed by the utilities themselves. These entities seek limited re-insurance in the conventional insurance market to enhance their insurance capacity, but they have generally only provided physical damage insurance. One such entity has been established to provide third party liability insurance, but with limited financial resources and access to only restricted re-insurance capacity, the amount of insurance it can offer is limited, both in time and the number of losses payable. Therefore, these shortcomings prevent the entity from fully satisfying the obligations imposed by the liability conventions on operators, where effective financial security is required for each and every site at all times.

> **Other financial instruments:** apart from self or mutual insurance, the nuclear industry itself has sought (and the insurance industry has offered) other financial instruments as a means of fulfilling its liability obligations. However, in general, risk transfer based insurance has proven beyond any doubt the cheapest method open to operators to meet their obligations.

An advantage for the operator of these industry owned risk retention vehicles is that since they are generally owned by the utility itself, they can accept the full scope of an operator's legal obligations. A limited number of the liability obligations are difficult for traditional insurers to accept as the focus is on maintaining solvency not generating electricity. However, we should also recognise that if the operator of a nuclear power installation had retained the risk itself (so called self or – in case of a number of operators collectively retaining their risks – mutual insurance), following a loss its share price would plummet, the sector share values would fall and its assets as well as its credit rating may be worthless. It may not be in a proper position to handle independently claims from third party victims, let alone fund them. Therefore, the substantial claims settlement infrastructure of the insurance industry, with its independent attitude, is also of benefit to the victims of nuclear accidents. Generally speaking, so far operators largely seem to share the above opinion, as self and mutual insurance of their statutory liability has remained limited to a fraction of their overall financial security.

Types of insurance

There are two major types of insurance relevant to the nuclear sector: first, a physical damage policy will cover all the operator's assets on the nuclear facility against various types of actual damage and in some cases loss of operating income that may result. This article is primarily concerned with the second type of insurance, which is the nuclear third party liability policy. The liability insurance covers all aspects of off-site nuclear damage suffered by people, businesses and other property off the nuclear site that arises as a result of nuclear damage originating from the insured nuclear facility. The extent of off-site nuclear damage will depend upon many factors including the exact location of the plant, the weather at the time of the accident and the number of large population centres nearby. This type of insurance is critical to the nuclear operator who has a strict liability to compensate victims of any nuclear accidents and often requires insurance before a construction and operating licence can be obtained.

The risk faced by nuclear insurers on both their third party liability and physical damage policies is mostly of a catastrophic nature, that is to say the accident is likely to be severe and have widespread consequences. Insurers model a maximum loss assuming a full payment of the site material damage (property) policy and widespread off-site radioactive contamination causing many thousands or even hundreds of thousands of claims to be made against the operator; this would lead to exhaustion of the third party liability insurance policy limit. It is to the remote possibility of this event that insurers commit their capital. However, insuring the nuclear industry is very different to insuring other businesses; there are very few other single risks that could produce such a severe loss from a single site, perhaps some chemical or oil facilities are the only comparable risks in the world. Much more importantly, as has been described above, insurance works on the basis of insurers assessing many hundreds of thousands of risks and using the loss experience from a wide sample of risks to come up with a realistic premium. The nuclear industry does not have a large number of risks; there are around 500 sites in the world and certainly not all of these are insured. The premium produced is very small (between USD 550 and 650 million globally), hence insurers are faced with very little data on which to base premium and a relatively small portfolio of risks to insure. There is a substantial amount of theoretical loss data available from the nuclear industry (for example some of the site probabilistic safety analysis studies required for nuclear site licensing), and these have proved to be very useful to insurers. However, the result of the dearth of real data is that much of the modelling and premium assessment is done on an actuarial and theoretical basis. This makes many insurers reluctant to commit their capital to nuclear risks.

How do insurers work out the premium?

Through analysis of a large number of events, insurers are able to use actuarial techniques to calculate the frequency, cost and other consequences of most events for which insurance is sought. From this analysis insurers are able to work out the likelihood and severity of any occurrence, thus calculating the loss that could be payable and then the premium which is the cash consideration paid to the insurer by the business concerned to transfer the risk to the insurance company. It is immediately obvious that insuring motor cars, with millions of cars and an abundance of data is very different to insuring moon landings or nuclear power plants, where actuarial data is much scarcer. For insurance where data is scarce, insurers must supplement the data obtained through operating history with some theoretical models on loss likelihood and internal capital use models. Knowledge of the financial cost of events is very useful for insurers when calculating premium.

In order to calculate the premium accurately, the insurer also needs to know exactly how much is likely to be exposed to loss. This may not just be the consequence of a single item, but an accumulation of losses through the aggregation of multiple policies arising from the same consequence. Hence, certainty of this exposure is vital for an insurer and knowledge of the quantum of possible loss is a vital component of the premium calculation.

The application of insurance principles to those in the nuclear liability conventions

Armed with some knowledge of insurance and its basic principles, how do these apply to nuclear insurance which, as we have described, is an unusual type of insurance? The principles of insurance apply equally to nuclear as to motor insurance, with some differences of emphasis. First, the requirement to provide financial security is essential to ensure there are funds to pay any claims. This requirement is also the foundation for the insurance principle of insurable interest where the operator's obligation to provide security by way of insurance is what becomes the object of the insurance. It should be noted that the scope of nuclear damage also includes damage caused by terrorism (as the conventions only exclude war damage), thus this exposure is included in the insurable compensation. Following the terrorist attacks in the United States in 2001, terrorism insurance for nuclear facilities has a much higher profile today (see *supra*); nevertheless most nuclear plants are designed to resist most external events.

Channelling of liability is achieved in the insurance sector by the application of a radioactive contamination exclusion clause to most non-life insurance policies, that is to say, most policies issued to business, people and homes outside of a nuclear plant. If you look closely at the famous insurance policy small print, this exclusion is almost certain to be found. By excluding this exposure from all "normal" insurance policies, insurers are able to offer the nuclear site operator nuclear liability insurance that provides cover for any liability arising from the site's obligations to third parties (everyone outside the nuclear site), safe in the knowledge that the only liability the insurer faces from a nuclear accident that causes off-site damage will be channelled back to the operator's nuclear liability policy. In this way, no exposure will arise from any other policies issued for homes, motor cars or factories in the surrounding area and the insurer is able to quantify with some precision his final loss outcome from the event. Without this exclusion, the claims made and financial cost could be enormous and involve polices spread across continents, a situation which would threaten the insurers' balance sheets.

In the same way, in most countries contractors and suppliers to the nuclear operator have exclusions clauses or "hold harmless" agreements that also steer liability back to the operator. However, in the United States (described later) the situation is different as in some circumstances contractors can be liable. In the normal course of events, subrogation would allow insurers to step into the shoes of an operator who suffers a loss and to try to recover damages from others, such as contractors working on the site, who could have caused the accident. In the nuclear field, subrogation is waived as the operator's liability is strict (see below), and contractors, too, have the exclusions on their insurance policies. All these arrangements result in one source of exposure and one point of claim and this is vital to ensuring private insurance market participation in nuclear insurance – it gives insurers control over exposure and financial loss and any victims of an accident certainty of how and from who to claim.

We already know that nuclear operators have **strict liability**. Recognising the complexity of operating a nuclear installation and that damage could be widespread, the operator's liability was made strict and absolute from an early stage of the industry's development; the operator can have no defence and must always compensate regardless of fault or negligence. This strict liability formed part of the "bargain" struck in the early days of the industry, where in return for strict and total liability, the operator was given financial and time limitations to his exposure. The introduction of the radioactive contamination exclusion clauses across most non-nuclear insurance policies emphasises the need for liability to attach to someone, and the imposition of strict liability means this someone is always the nuclear site operator.

With the **financial limit** to operators' liability as the other part of the bargain, the operator has a known financial exposure to a nuclear accident and, as demonstrated above, this limit coupled with the radioactive contamination exclusion, is also vital for insurers who can then calculate the cost of an event and compare this with the premium. This is the indemnity and if there was no certainty in this respect, it would be impossible to calculate the premium or the capital requirement against an unlimited exposure, and insurers would not have been able to provide insurance.

The other critical exposure limiting safeguard is the **time limit**. Currently, all nuclear claims need to be made to insurers within 10 years of an occurrence because beyond this period, increasing uncertainty as to the origin of any claims makes determining the cause difficult. With the incidence of many everyday diseases increasing as we age, there is a threat to nuclear operators and insurers alike from people assuming that, for example, a cancer is the result of living near to a nuclear facility. From the insurers' perspective, an additional consideration is that the longer the period of time from any occurrence, the more likely it is that individual insurer's commitments may be harder to enforce over time through company consolidation, insolvency or closure; thus for the victims, a shorter time period gives a greater assurance of a reliable claims payout. Currently nuclear pools provide almost all the cover required by the liability conventions; however, 10 years is the maximum time limit available from the private insurance market, notwithstanding the fact that some nuclear legislation now incorporates longer periods during which a claim can be made.

Other provisions in the conventions provide further comfort and certainty for both operators and insurers, thus ensuring that the modern scheme for financial compensation is fully available for all nuclear sites. For example, clarity with respect to applicable definitions and jurisdiction is essential in any contract, no less so in nuclear insurance. After all, the most likely time that any contract is revisited is when there is some claim to be made; in this situation, the benefit of clear terms and definitions is essential for both sides. In the case of nuclear liability, it is important to remember that following a large nuclear accident, a quick and clear route to compensation will be essential for suffering victims.

Insurers' major loss experience

The 1957 analysis of the nuclear risk prepared by a committee of insurers in the United Kingdom attracted a good deal of attention from the media. The introduction noted that nuclear fission involved unfamiliar hazards, it also noted that "the magnitude of the values at risk […] confined to a relatively small compass, together with the extent of the third party risk involved in the production of atomic energy necessitate new approaches by the (insurance) market if adequate insurance cover is to be provided".[1] The scope and depth of this report, which was widely distributed, guaranteed insurers an important role in the late 1950s as the United States of America, the United Kingdom and other European governments were developing nuclear legislation. For example, in the United Kingdom the first Act of Parliament that provided for both liability to be channelled to the operator and a fixed amount of compensation to be available was called the Nuclear Installations (Licensing and Insurance) Act. This demonstrates the close co-operation provided by insurance markets in that country during the development of the nuclear legal liability framework. Also note that some of the underlying principles of either the Vienna or the Paris Convention were already part of some of the earlier legislation in the United Kingdom, the United States of America, Germany and Sweden; indeed, it is fair to say that many of the principles that have been incorporated into the conventions arose directly as a result of the concerns of the insurance market at the time.

1. BI(AE)C Advisory Committee Report, April 1957 Ch. 1, paragraph 2.

Since the first nuclear pools were formed in the 1950s, the insurance industry has developed products as the nuclear sector has demanded and as products have developed in the general insurance market. Greater market capacity for nuclear insurance has developed over the decades too, although the recent spectre of large scale terrorism has dampened insurers' enthusiasm somewhat.

Despite insurers' many comments bemoaning losses, the reality is that claims (whilst unwelcome) do provide insurers with an important learning experience. This is no less true of the nuclear sector. Many smaller losses, notably the two events at Three Mile Island and Chernobyl, have helped insurers to improve their products on offer and to understand the complexities of the nuclear sector. In particular, these events have helped to shape insurers' response to a large nuclear event.

The reactor explosion at Chernobyl demonstrated how quickly radioactive contamination can spread following a severe accident. Although Chernobyl was not insured, it is estimated that the eventual economic cost of the Chernobyl accident was in excess of USD 50 billion. There were over 100 000 evacuations with people requiring re-housing and eventually over 600 000 people were involved in the recovery operation. Radioactive contamination spread right across Europe and caused severe disruption to food supplies and food consumption over a wide area, reaching as far west as France and the United Kingdom. Ultimately, it is difficult to assess how many people will suffer as a direct consequence of the accident and in fact both the incidence of cancer and final number of deaths were relatively low. However, the accident marked a low point in the fortunes of the nuclear industry and it is still cited today by nuclear opponents as an unacceptable consequence of nuclear power.

On the other hand, the accident at the Three Mile Island nuclear power station in 1979 caused relatively little damage outside of the plant. Both accidents were the result of human error and resulted in a core melt, but in the case of Three Mile Island this was fortunately contained by the solid containment structure built around the reactor. Much of what went on after the accident was precautionary, including 11 000 evacuations and the payments of hardship money by insurers to people disrupted by the accident. However, this event was insured and has proved to be the largest insurance claim paid to a nuclear operator, both the physical damage policy covering the plant itself and the third party liability policy were affected, with the former being a total loss.

These two accidents represent the total experience in the world today of a major nuclear reactor failure; it should be noted that today's new reactor designs make the consequences of off-site accidents much less widespread than before and certainly nowhere near the scale of the accident at Chernobyl. With good safety barriers, the total effects of the accident may well be contained to within a five or ten mile radius of the plant. However, the necessary financial and physical infrastructure needs to be in place just in case such an accident does happen again. It is for this eventuality that nuclear insurers need to maintain at all times funds sufficient to provide immediate compensation for victims of a catastrophic accident.

Risk selection

We have discovered already that the accident at Chernobyl was not insured. Why was this? Insurers must select risks carefully to protect their balance sheets; it is thus wrong to assume that every nuclear plant is automatically insurable. Certain conditions must be satisfied before nuclear insurers can take on a new third party liability risk; the most important of these are as follows:

- The legal arrangements must be adequate, for example the national law must follow the principles of one of the international nuclear liability conventions.
- The site itself must be technically acceptable and independently well regulated.
- There must be a domestic insurance industry capable of claims handling and of sufficient solvency level to act as a reliable local representative for the international insurance markets.
- The local economy needs to be largely free and able to trade internationally without hindrance.

If the site meets these criteria, underwriters commence an assessment of the likelihood and severity of a liability loss using some form of rating model. These models enable all the factors relevant to the risk, such as its location, type of nuclear reactor or use, natural hazards exposure and population densities around the site to be assessed. With this information, steps toward setting a premium are taken. Modelling is very common in the insurance industry, particularly in relation to catastrophic events such as nuclear, windstorms or earthquake, where the frequency is not as great as in other classes of insurance.

Had insurance been required back in 1986, Chernobyl would have failed the insurability test because there was no local private insurance market in existence at the time, the plant was technically unsound and the national legislation was insufficiently developed to accommodate insurers’ demands.

Why are insurers comfortable with nuclear risks?

Insurers have provided insurance for nuclear sites for more than 50 years and the private insurance market in that time has contributed much to the development of the nuclear industry. Why has this support for insurers been forthcoming? It would be easy to imagine, particularly in the wake of the atomic bombs in Japan, that consideration of a nuclear risk would be inconceivable for many insurers and the perception of the risk would be too poor for them to persuade their shareholders to participate. However, the key principles of the international conventions adopted into national law and ultimately into the insurance policies have enabled the private market to participate in the insurance of nuclear risks. The financial certainty that results from a sure knowledge of the *amount* that you can lose, *when* you can lose it, *who* is being paid and exactly *what is being paid for* is absolutely essential for insurance.

Following the legal disputes over insurance coverage that followed the World Trade Centre attacks in New York in 2001, insurers realised more than ever that having certainty in the contract is absolutely vital. At that stage, some policies were still not completed despite the insurance being on risk. After the loss, there was a high profile court case that had to decide on the interpretation of what was actually insured and since then, there has been a greater determination amongst all insurance companies and markets in the world to improve this “contract certainty”. In addition, the same attack caused insurers to become more aware of the potential of accumulation of exposure from multiple businesses involved in the same event. Both these problems were understood at the earliest stages of the nuclear insurance development, and the principles of the nuclear conventions and insurance arrangements are consistent with all the current trends in regulatory development in the insurance market. Ultimately, should insurers ever have to pay out a claim for a third party liability event at a nuclear power station, the amount will be known as insurers are able to place a cap on the maximum financial commitment they will have to make. One last point why the insurance market has been attracted to underwriting nuclear risks is that, as already described, there have been very few severe nuclear accidents, with only one insured total loss at the Three Mile Island site.

Therefore there has been some profit for insurers in insuring nuclear third party liability, although the funds accumulated over time could be exhausted in the event of a major nuclear accident today. In addition, to provide the required capital to support nuclear insurance, insurers demand a certain price for that capital allocated, regardless of the loss history.

What happens in non-convention countries?

Not all countries are signatories to the nuclear liability conventions; yet to attract private insurance market participation we have seen that the nuclear legislation needs to reflect the convention principles, such as channelling of liability, financial and temporal limitation and clear definitions. Here are two examples of countries with substantial nuclear sectors which are outside the current convention regimes.

United States of America: today, the U.S. operates about a quarter of the active nuclear power plants in the world, so its activities in this field are of global importance to the nuclear industry. In 1954, Section 170 of the original Atomic Energy Act set out certain provisions regarding indemnification and limitation of liability. However, in 1957 an amendment to this law was introduced by two members of Congress named Price and Anderson; the eponymous Price Anderson Act thus became the primary U.S. nuclear liability legislation. This act requires the operator to provide funds of sufficient means to meet his financial obligations by way of insurance. Liability is not channelled to the operator as such, but the operator's financial funds must provide for both the operator and any suppliers of goods and services to the operator. In effect it covers the personal liability of all those who may have some responsibility for a nuclear incident, hence liability is absolute to the site and is economically channelled to the site, its operator and his insurance. In this way, liability is still channelled for the benefit of the victims and there is little material difference with the channelling arrangements under the conventions.

In 1975, a secondary layer of financial protection was provided by the nuclear industry in excess of the insurance arrangements. A so called "retrospective premium payment" provided for an obligation for each site operator to pay an additional amount of money towards compensating victims, should a severe accident occur. If this layer of financial protection is exhausted, the U.S. Government will step in and pay any additional amount. Together the nuclear industry and insurers provide today over USD 11.9 billion as initial compensation.

The operator's liability is not entirely strict, but if the regulator declares an "extraordinary nuclear occurrence", the liability of the licensee does become absolute. The insurance for the U.S. third party liability policy is limited to liability for bodily injury and off-site property damage caused by nuclear material at the defined location and currently the indemnity limit is USD 375 million, which also includes costs and expenses (unlike the conventions). At present, the U.S. policy does not cover environmental clean-up costs arising from any governmental decree, order or directive, the only exceptions to this exclusion are clean-up costs which result from an "extraordinary nuclear occurrence" or a transportation incident as defined.

The Price Anderson Act is valid for a fixed time period and requires renewal; in August 2005, the act was renewed again by the U.S. Congress and is now valid until 2025.

In August 2006, the U.S. Senate consented to the ratification of the Convention on Supplementary Compensation for Nuclear Damage (CSC); this decision by the U.S. to join for the first time an international nuclear liability convention represents a major milestone and arguably brings the world closer to a more harmonised global nuclear liability system. The instrument of ratification was deposited at the IAEA on 28 May 2008.

Japan: the nuclear sector in Japan is also a significant force globally, with 54 reactors now operating in the country and a nuclear component supply sector very active elsewhere. The relevant law in Japan is Law No. 148 (as amended) dating from 1961 which largely conforms to the international conventions. The operator's liability is strict, absolute and has no financial limit, although he is required to provide financial security through insurance, cash deposits or the equivalent up to YEN 120 billion (approximately USD 1.3 billion as at June 2010). Given the seismically active nature of the Japanese archipelago, the government provides an indemnity to nuclear operators for all earthquake and volcanic eruption events; this means that insurers and operators are in the fortunate position of having these natural disasters excluded. With the Japanese liability arrangements broadly following the principles of the conventions, insurers provide the full coverage required by law.

Both Japan and the U.S. illustrate that liability arrangements are not of a wholly consistent standard globally. With this lack of true harmonisation, insurers have had to adapt their product to the national market conditions where the conventions do not apply. However, wherever insurers do offer financial security in support of a national nuclear industry, the objective is to ensure that the general principles of liability already outlined are supported by the national legislation and in turn by the local insurance market; without these, the provision of financial security by the international market is difficult.

Vienna and Paris Convention revisions and insurance

Having investigated the major aspects and principles of the original nuclear liability conventions, it is appropriate to look at the revisions to the conventions that were agreed in 1997 (for the Vienna Convention) and 2004 (for the Paris Convention and Brussels Supplementary Convention).

The key objective of the participating governments was to update both conventions by offering more compensation to more people for a wider range of nuclear damage. Some of these updates have created problems for the insurance markets. In particular, insurers are concerned about two aspects: the introduction of environmental damage and the extension of the time limitation.

Environmental damage: insurers in all sectors of the market (not just nuclear) are currently reluctant to offer insurance for some aspects of environmental damage, in particular biodiversity damage, as there is relatively little experience anywhere as to how loss patterns might develop. In addition, an increasingly litigious and compensation seeking culture and a poor history with pollution insurance claims in certain jurisdictions make providing such compensation very uncertain for insurers. In the nuclear liability conventions, extending the scope of nuclear damage to include damage to the environment is a material change from the original texts and represents a step into the unknown and a significant loss of certainty – a feature of the early legislation that attracted insurers to nuclear activities. Full environmental liability insurance is now available, but in small amounts and in less complex industries, without long and sometime dubious environmental track records. With no data for more hazardous and poorly perceived industries (such as nuclear), setting a premium for an uncertain type of loss is difficult, thus hitherto insurers have been extremely reluctant to commit to this less clearly defined head of damage. However, experience and knowledge should grow and if insurers are able to limit coverage to accidental damage or damage above a certain contamination threshold, these and other similar restrictions will probably permit limited cover to be offered soon.

Extension of the time limitation: the reasons why insurers struggle to set a premium for any exposure that arises more than 10 years after an event has already been described. Hitherto, longer periods to make a claim have been applied sporadically around the world, for example as regards claims relating to bodily injury and death; many countries already have a 30 year period during which it is possible to make a claim. However, these countries also legislate that any claims beyond 10 years are to be made to government, which pushes the possible societal aspect of claims onto the state. With the entry into force of the revisions, the prescription period with respect to loss of life and personal injury will become 30 years. Hence insurers will need to co-operate with governments to ensure that adequate cover is provided and a balance of risk between the obvious compensation required as a result of an accident and the more general claims of a litigious society is found.

Other developments relating to the revision of the conventions: Japan currently requires operators to provide the highest limit globally at approximately USD 1.3 billion at today's exchange rate. This amount is within the current capacity of the global insurance market; however, it is the wide international variation in limits that is more of a problem. In China, the current limit is a mere USD 45 million, yet nuclear insurance pool members will need to have available sufficient capital to cover the highest of these indemnity limits, that of Japan. This wide range of indemnity limits reduces both capital utilisation and the return on capital, which can make insurers more reluctant to commit to this type of insurance. Therefore, providing for such widely varying and relatively few limits for nuclear third party liability is a challenge. It would be easier for insurers if every country insisted on having a limit of USD 1.3 billion because insurers would then be assured that the capital required would be well utilised, instead of the current situation with great variation in limits. The revision of the Paris Convention has provided for a new limit of EUR 700 million (approximately USD 860 million as at June 2010); this is an important first step in harmonising the amounts of indemnity available, and this aspect is welcomed by insurers, even though providing such a limit may be a challenge in some countries, particularly those that are deemed to be more at risk from terrorism.

A frequently asked question is whether these revisions mark progress towards legal harmonisation; you may recall that such harmonisation is a key objective of the conventions. The short answer is "yes", but there is still some way to go as more than half of the world's reactors are still outside the liability convention system. The recent adoption of the CSC by the United States may be a sign that might encourage other nations outside the system join at least one convention soon. However, it should be noted that from the insurer's point of view, the scope of the CSC has equally troublesome aspects since it is also based on the revised Paris/Vienna regimes' liability language.

Nuclear new build and decommissioning

The nuclear industry has been transformed in recent years from a largely state owned industry to one where private capital is routinely supporting nuclear operators in decommissioning, extending the life or, in particular, building new nuclear facilities. A consequence of these more complex ownership structures has been a greater focus on clarifying the rights and responsibilities of the various parties, especially where there is an involvement of financiers or other entities whose knowledge of the nuclear industry is not as good. Given that most new build and all decommissioning is currently occurring adjacent to or on existing nuclear sites, these facilities have seen the arrival of industrial consortia with multiple owners on or nearby their sites. This development presents a new challenge for nuclear insurers who hitherto have rarely had to contend with more than one operator per nuclear site. If there was a serious nuclear accident on an existing nuclear site either during operation or decommissioning, even after the introduction of higher liability limits by the revised conventions, the liability arrangements will be wholly inadequate to cover an adjacent new nuclear build site that may contain two new nuclear power plants with a value of perhaps USD 10 billion when completed. Insurers therefore need to make financiers of new nuclear projects aware of the relatively limited compensation available from the liability arrangements. After exhaustion of the insured security amounts, accident victims will most probably be compensated ahead of financiers for political reasons by the government, which is why supplementary insurance may be required for some construction projects. These supplementary financial requirements may be beyond the nuclear insurance market's capacity, but if and when the demand for such insurance becomes clear, insurers will seek to supply what is required.

Decommissioning activities also provide challenges for insurers because the work undertaken when demolishing a nuclear facility present different risks to insurers; the rigorous controls exercised during the operational years of a plant are often relaxed which changes the risk profile. Care also has to be exercised when working alongside parts of the nuclear site that may remain operational.

Once a site has been closed down, the third party liability insurance arrangements will need to continue until the site has had its operating licence removed although some of this period may require a lower financial security limit, given the lower hazard.

Thus, both new build and decommissioning require continued vigilance and support by the insurers to ensure that any third parties in the surrounding area continue to have adequate compensation available, whatever activity is occurring on the nuclear site.

Insurance of terrorism exposure

The scale of the attacks on targets in the United States on 11 September 2001 and on other terrorist targets more recently has redefined the public's perception of terrorism. For insurers, the resultant accumulation of possible claims was unforeseeable, incalculable and threatened the solvency of many insurance companies. As a result, the worldwide insurance industry has limited its exposure to future claims caused by acts of terrorism.

What is terrorism? The concept of "terrorism" is simply defined as the *use of violence or the threat thereof to achieve political, religious, ethnic, ideological or comparable goals*. Victims understand terrorism to consist of carefully and covertly planned illegal acts of violence *against the existing political and societal order that shock the public at large or at least part thereof*. Terrorism differs from common violent crime by its explicit intention to impact the public and/or *to influence a government or government organisations*. The characteristics, printed above in italics, have found their way into most insurance contracts; use by insurers of these definitions serves to either fully exclude terrorism or, more frequently, to limit insurers' exposure to the threat of terrorist acts.

Terrorism and nuclear insurance: the risk of terrorist attacks was, until recently, usually not explicitly excluded from nuclear insurance policies. Insurers of the nuclear industry have always had to reckon with the possibility that an accident could cause catastrophic damage. There has always been a latent threat of attacks by opponents of nuclear energy and in this respect the threat of terrorism cannot be considered to be a totally new phenomenon to insurers. What is new, or at least not thought of as a realistic scenario so far, is the risk of a simultaneous series of terrorist attacks on several nuclear installations, all resulting in a total loss under both material damage and liability covers. Owing to the international intertwinement of the pooling mechanism and depending on the number of targets attacked simultaneously, this could not only threaten the continuation of the pool or pools concerned but also of the entire mechanism. This threat is enhanced by the fact that nuclear installations are considered to rank among possible targets of terrorism. Therefore, following developments in the non-nuclear insurance market, nuclear insurers also had to reconsider their exposure to nuclear terrorism.

Nuclear material damage insurance: the notable changes to physical damage policies made were a limitation of the availability of indemnity limits for terrorism exposures; in some countries the risk was even excluded from such contracts altogether. This development was observed in practically all states where no specific market-wide terrorism insurance scheme existed. In those states where schemes were established already, often with state support (notably France, South Africa, Spain and the United Kingdom), these schemes were adjusted to include the nuclear insurance market.

Nuclear third party liability insurance and conventions: the relation between international liability conventions and nuclear insurance rendered the situation as regards nuclear third party liability cover more complicated. In both the original and revised Paris and Vienna Conventions the operator, and indirectly the insurer, are exempted from liability for nuclear damage caused by a nuclear incident directly due to an "act of armed conflict, hostilities, civil war, or insurrection". In the *Exposé des Motifs* to the original Paris Convention, reference is made to "a nuclear incident directly due to certain disturbances of an international character such as acts of armed conflict and hostilities, of a political nature such as war and insurrection […] which are the responsibility of the nation as a whole". Although some differences in opinion amongst the contracting parties to the convention existed as to whether the exemption should be considered to include international terrorism, the prevailing opinion is that such inclusion cannot be assumed. Thus, the exclusion of war and warlike events, which is universal in all insurance contracts could not be expected to include the new concept of terrorism under nuclear third party liability policies, notwithstanding the scale of these new terrorism attacks. Furthermore, the pre-existing market-wide schemes mentioned above never included liability insurance; as a result the availability of nuclear third party liability insurance is not as universal as in physical damage insurance.

The state of the art for nuclear terrorism: whether availability of capacity permits the inclusion of terrorism up to the amount equalling the statutory insurance limit in any country depends on a number of conditions which vary per state. Apart from a few exceptions in countries which either are considered to be exceptionally exposed to terrorism or have introduced an above average statutory insurance limit, terrorism is still included for the majority of cases under nuclear third party liability policies. This largely relates to the fact that statutory liability limits in the national legislation of the countries concerned are still relatively modest. However, once the statutory liability financial limits under the revised international nuclear liability conventions and national legislation are increased, some pools may be faced with a shortage of terrorism insurance capacity. Furthermore, the terrorism capacity that does exist is volatile; a large terrorist attack, which does not necessarily need to be a nuclear one, could result in a withdrawal of insurers' capital to support terrorism insurance from the market.

The insurance industry is certainly willing and able to bear its share of the responsibility. However, it also aims to protect its long term solvency and continuity, thus avoiding disruption to the international economy that would be caused should it collapse. There are good reasons why the state has an interest in maintaining the insurability of international terrorist attacks in the future. An important one is that democratic states have the self-imposed constitutional responsibility of ensuring public safety and order; if it is unable to fulfil this duty in its entirety it should at least contribute to the ensuing costs. It would appear that this point is acknowledged by governments in those countries where state participation in covering terrorism risks has already been introduced.

Nuclear transport and liability

Before considering nuclear transport liability, it is worth reflecting on the vital role of transport in the nuclear fuel cycle: every part of the cycle is linked by transportation and all of these journeys require insurance and some require special arrangements, similar to the insurance for nuclear installations. This section will focus on the problems specific to the provision of insurance for nuclear third party liability during transportation that have often resulted in a lower commitment by insurers, despite the actuarial risk being much lower than that of an operating nuclear plant.

The first difficulty with nuclear transport in the eyes of the insurer are the low premium volumes, particularly when set against the relatively high limit of indemnity required. Journeys often last a few days only and the exposure is low, so premiums are low too, yet insurers are aware that substantial payments could be made in the event of a loss and this mismatch discourages insurers – they are simply unable to obtain the necessary return on the capital required. Secondly, there is flexibility in some legislation as to the identity of the operator; some transport companies are able to assume liability in agreement with the relevant operator. To establish clear, single responsibility for the journey is essential to the insurer and there must be no doubt where legal responsibility lies and yet this is not always clear. Thirdly, the process for arranging liability insurance is cumbersome and bureaucratic. Many regimes require certificates of financial security (CoFs) before a shipment can move; these are provided by insurers but require official counter-signature, thus establishing all the necessary details can sometimes delay the journey. This process could be improved with more use of electronic media, but bureaucratic requirements often prevent this. Finally, a further issue is that more contentious environmental claims are likely, following the revision of the convention regime, and insurers may withdraw cover from nuclear third party liability without some amendments.

One further unique feature of the nuclear transport liability market is "forum shopping"; some operators, aware of the current disparity in financial security limits required by different countries, seek to ensure that the operator with the lowest limit will be deemed to retain the title over the material for as long as possible, thus paying the lowest insurance premium for the longest time possible. This gives insurers two difficulties: it reduces the already inadequate premium received and it leaves potential victims unfairly under-insured. However, the revised Paris Convention, once in force, will put an end to this by introducing a common liability limit.

Insurers' responsibilities in nuclear liability

Although the frequency of major nuclear accidents has been extremely low, insurers nevertheless have felt an obligation to have in place the necessary infrastructure and planning to deal with a major nuclear incident. Such an interest in planning is not done just for altruistic motives, it is also done for financial ones as it is the insurers' capital that in almost every jurisdiction is the first money to be called on in the event of a major accident, and it is the nuclear pool managers job to safeguard that capital and to make sure that any payments made are valid and totally justifiable. All mature insurance markets have built up a complex, independent and efficient infrastructure for the handling of severe claims of a catastrophic nature. A myriad of different professionals are ready to act upon a catastrophic occurrence to ensure that members' capital is preserved, but also to ensure that any victims of any accident are swiftly and justifiably compensated. This infrastructure will be particularly important in an accident of the severity of a major nuclear incident with off-site implications. A large third party liability claim will require the mobilisation of the sort of resources that are only available to a nuclear pool that has a wide membership from the insurance market of its whole country and possibly region, and is able to provide call centres, adjustments facilities, claims handling and file storage areas. In addition, many nuclear pools have put in place bilateral cross-border claims handling agreements so that an accident that spreads across borders can be handled co-operatively between nuclear pools. Insurers can provide a total claims handling service and the value of this is often underestimated as no major loss has occurred recently, but it is not just insurers who will benefit from this. Governments should also consider that by having this infrastructure available they may also benefit politically from having any nuclear catastrophe efficiently and fairly handled. Insurers take this responsibility to provide such a service very seriously and handling a large accident will require considerable commitment and co-operation from the majority of insurance market participants in a region to provide victims with fair, efficient and independent compensation.

Conclusion

Insurance plays an essential but discreet part of everyday life for almost everyone on the planet; this role applies equally to the nuclear industry, although the amount at risk is undoubtedly on a larger scale. We hope this article has demonstrated the unique relationship that has developed over the past fifty years between the nuclear industry and the global insurance markets as a result of co-operation and mutual understanding. Recently, the introduction of revised language in the nuclear liability conventions has challenged the basis of this relationship through the introduction of new heads of damage; some aspects of these changes have proved difficult for the insurance market to underwrite. However, there are grounds to end this article on a note of optimism. The insurance market is one of the purest markets in existence with very little state intervention at any level; as such, the market reacts to changes in profitability, the investment climate, capital costs and changes in legal frameworks very quickly. Although most insurers are today unable to provide sufficient support for the revised conventions' new, wider heads of damage, the market will move to provide cover as circumstances are always changing. From early rejection of the new heads of damage, the market is beginning to see more flexibility from some governments in ensuring tighter definitions for aspects of the revised conventions, whilst the insurers themselves are beginning to understand environmental cover better, and some will seek opportunities in the sector. More immediately, insurers will be happier about providing capital for the new heads of damage if some kind of a threshold was introduced that, for example, defined clearly the onset of nuclear damage to the environment; there are signs that some governments intend to make such clear definitions.

Insurers are therefore encouraged by the responses the market is developing to react to the revisions, with assistance from governments and the nuclear industry. The insurance cover adopted will encourage a rejuvenation of the relationship that has existed between the stakeholders for so long, thus allowing the insurance market to remain a partner of the nuclear industry, perhaps for the next fifty years and beyond.

Nuclear Liability Case Study: The Channel of the Three Fates

by Norbert Pelzer

Following the nuclear liability section, we invite you to reflect on the problems outlined in the case study. Those who draft and submit a solution of the case to isnl@nea.fr will receive a sketch solution provided by Dr. Norbert Pelzer.

Full Power Company (FPC) is the leading electricity generating company in New Build Country. It operates coal- and oil-fired power plants, hydroelectric plants and nuclear power plants. Although there is a strong opposition to nuclear power in the country, the government intends to replace the power plants based on oil and coal with nuclear plants. New Build Country's direct neighbour is Scientina. Scientina does not pursue a commercial nuclear power programme. On its territory only one hydroelectric plant is being operated, and it imports electricity from New Build Country. However, Scientina's nuclear research centre "Hahn-Fermi Institute" (HFI) is world famous. HFI operates a research reactor with a thermal power of 10 Megawatt. All of the nuclear power plants operated in New Build Country are developed by HFI, and HFI currently is working on the construction of a new and inherently safe reactor type for New Build Country.

The Channel of the Three Fates was built in 1760 when New Build Country and Scientina still formed one single state ruled by a King. The channel should provide a short and secure connection from the King's main palace – today part of New Build's capital Megapolis – and from his summer palace – today part of a holiday resort in Scientina – to the sea. When the Kingdom split into two states, the channel became part of the border between them. In a Treaty of 1885, the two states agreed that “the state border shall be marked in the middle of the channel”. They also agreed to jointly administer the channel, to jointly bear its costs of maintenance and to establish a Joint Channel Police Force.

For many years, FPC shipped its spent nuclear fuels to the reprocessing facility New Fuel and More (NFM) in Supply Country. They transported the fuels by railway to one of New Build Country’s harbours and then by boat to Supply Country. The anti-nuclear opposition always used the transports to organise demonstrations against the use of nuclear power. Since, however, peaceful demonstrations did not lead to a change of the pro-nuclear policy of the government, the opponents planned to prevent the upcoming shipment of spent fuel by blocking the railway tracks and to use violence, if necessary. The government therefore decided to ship the fuels, during the night and without informing the media, via the channel to the port. As the channel is narrow and not suitable for sea-going ships, the five Castor containers were loaded on five barges, which left Megapolis at intervals of thirty minutes each. The government of Scientina agreed to the procedure and used this opportunity to also ship radioactive waste from HFI to Supply Country. The waste drums were loaded on a small boat which filtered into the convoy directly behind the first barge. The convoy was protected by three boats of the Joint Channel Police Force, one boat at the head of the convoy, one at the rear and one behind the second barge.

Despite the secrecy, the opponents received information of the transport and reacted immediately. By using a diversionary tactic, they succeeded in separating the first police boat from the first barge. They then attacked and boarded the first barge, manoeuvred it sideways across, damaged the helm and thus blocked the channel. They likewise boarded the small boat from Scientina and started throwing the waste drums overboard assuming that this would not do any harm to the environment because the drums were durable and securely closed.

Meanwhile, both the first and the second police boat approached the scene. Since the police could not immediately stop the jettison of the drums, they fired their guns. A number of bullets hit the drums, and liquid radioactive waste was released into the channel. When the attackers recognised this, they gave up and were arrested. As it turned out that it was technically impossible to repair the damaged helm of the barge quickly, the competent authorities of both states decided to unload the barge and the boat and to store the Castor container and the waste drums provisionally at the site of HFI which was nearest. Some of the drums thrown into the channel could not be recovered during the night and were only found a week later. The rest of the convoy returned to Megapolis.

When the international terrorist group AQ learnt that at the site of HFI a Castor container with spent nuclear fuel was stored outside an adequate shelter, they thought this was an opportunity for a most effective and spectacular attack. From a nearby hill they fired two anti-tank guided missiles at the container. The container was destroyed and its highly radioactive content was dispersed inside and outside the site of HFI.

The events caused the following damage:

- Three of the opponents to nuclear energy who had boarded the Scientina boat claim radiation health damage because radioactive liquids from the damaged waste drums were spilt all over them. Residents of both New Build Country and Scientina claim compensation because they, due to the radioactive contamination of the water of the channel, cannot any longer enjoy cost free swimming in the channel but have to use expensive swimming pools.

- As a consequence of firing missiles at the Castor container, personnel of HFI and persons outside the site were killed or injured; damage to buildings occurred. Due to the dispersed radioactive material, personal injury was suffered. Victims claim compensation for damage to their property and for personal injury.

- Vegetables and fruits could not be sold. Wholesalers and retailers claim compensation for loss of profit.

- Tourists left the region. Hotels and travel agencies lost turnover. They claim compensation for loss of profit.

Who is liable for the damage? Which court or courts are competent to hear claims?

Both New Build Country and Scientina are Contracting Parties to the 1997 Vienna convention on Civil Liability for Nuclear Damage; they implemented the Convention properly at the national level. Supply Country signed and ratified the 1997 Convention on Supplementary Compensation for Nuclear Damage which is not yet in force; it enacted national nuclear liability legislation conforming to the annex to that convention.

FPC has a permanent contract with NFM on the reprocessing of spent nuclear fuel. Its liability clause reads: “NFM assumes liability for nuclear damage caused by the spent fuel in the course of carriage to, and in, Supply

Country, including storage incidental to the carriage, after the spent fuel has left the territory of New Build Country. In supplement to this provision the Nuclear Liability Act of Supply Country shall apply”. HFI concludes ad hoc contracts with NFM whenever a transport is due; for this transport a contract was not yet concluded.

Useful information

Fundamental Concepts of Nuclear Law

Safety	Safety is the primary requisite for the use of nuclear energy and the applications of ionizing radiation.[i] Priority is to be given to nuclear safety when engaging in activities related to nuclear installations.[ii] Legal controls should reflect the hierarchy of risk associated with various nuclear activities and facilities.
Security	Special legal measures are required to prevent the theft, misuse or sabotage of nuclear materials and facilities.
Responsibility	The prime responsibility lies with the operator or licensee who has been granted the authority to conduct specific activities related to nuclear energy or ionising radiation.[iii]
Permission	As a consequence of the special risks associated with nuclear technology, nuclear law generally requires that prior authorisation be obtained for activities involving fissionable material and radioisotopes.[iv]
Continuous control	The regulatory body must retain a continuing ability to monitor activities which have been authorised so as to assure that they are being conducted safely and securely and in accordance with the terms of the authorisation.[v]
Compensation	The operator of a nuclear installation is generally held both strictly and exclusively liable for nuclear damage suffered by third parties as a result of a nuclear accident occurring at its installation or in the course of transporting nuclear substances to or from its installation.[vi]
Sustainable development	Environmental law instruments have identified the duty for each generation not to impose undue burdens on future generations which has implications in the nuclear field because of the very long-lived character of some fissile materials and sources of ionising radiation.[vii]

Compliance	To the extent a state adheres to regional and global, bilateral and multilateral instruments, its national nuclear law must reflect the obligations that they contain.
Independence	Nuclear legislation must ensure the establishment of a regulatory authority which is not subject to interference from entities concerned with the promotion or utilisation of nuclear energy.[viii]
Transparency	Public understanding of and confidence in nuclear technology require that the public and interested bodies be provided with the fullest possible information concerning the risks and benefits of nuclear energy.
International co-operation	Users of nuclear technology and nuclear regulators need to maintain close relationships with counterparts in other states and in relevant international organisations, since the potential for transboundary impacts requires harmonised policies and co-operative programmes, and lessons learnt in one country may benefit others.

i. Article 1, Convention on Nuclear Safety; Article 1, Joint Convention.
ii. Article 10, Convention on Nuclear Safety.
iii. Article 9, Convention on Nuclear Safety; Article 21 (1), Joint Convention.
iv. Article 7(2)(ii), Convention on Nuclear Safety; Article 19 (2)(ii) and (iii), Joint Convention.
v. Article 7(2)(iii), Convention on Nuclear Safety, Article 19 (2)(iv), Joint Convention.
vi. These principles are fundamental to all international nuclear liability conventions.
vii. Article 1(ii), Article 4 (vi) and (vii), Joint Convention.
viii. Article 8(2), Convention on Nuclear Safety; Article 20(2), Joint Convention.

Source: Stoiber, C., Baer, A., Pelzer, N., Tonhauser, W., Handbook on Nuclear Law, IAEA, Vienna, 2003.

List of International Legal Instruments

International legal instruments governing safety, radiological protection and emergency response

Instrument	Purpose	Year of adoption
Convention on Early Notification of a Nuclear Accident (Early Notification Convention)	Creates a system for notifying the IAEA/neighbouring countries of a nuclear accident with potential transboundary consequences.	1986
Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Assistance Convention)	Sets up a framework for prompt assistance and support for nuclear accidents or radiological emergencies.	1986
Council Directive 89/618/EURATOM	Requires the general public to be informed of health protection measures and other steps to be taken in the event of a radiological emergency.	1989
Convention on Nuclear Safety (Nuclear Safety Convention)	An incentive convention* that aims to maintain a high level of safety at operating nuclear power plants (NPPs) by setting international benchmarks for nuclear safety practices and regulations.	1994
Council Directive 96/29/EURATOM	Sets out basic safety standards for protecting the health of workers and of the general public from the dangers of ionising radiation.	1996

Instrument	Purpose	Year of adoption
Council Directive 2003/122/EURATOM	Governs the control of high-activity, sealed radioactive sources and orphan sources.	2003
Council Directive 2009/71/EURATOM	Establishes a Community framework for the safety of nuclear installations	2009

* An "incentive convention" is one which is not intended to ensure that its parties comply with their obligations thereunder by means of controls and sanctions, but rather on the basis of their common interest in achieving the stated goals of the convention. Will is developed and promoted through regular meetings of the parties. In the case of the Convention on Nuclear Safety, parties are required to submit reports on the implementation of their obligations for "peer review" at such meetings.

International legal instruments governing spent nuclear fuel and radioactive waste management

Instrument	Purpose	Year of adoption
Council Regulation (EURATOM) No. 1493/93	Governs shipments of radioactive substances between European Union member states.	1993
Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Joint Convention)	An incentive convention that aims to achieve and maintain a high level of safety through the enhancement of national measures and international co-operation.	1997
Council Directive 2006/117/EURATOM	Addresses the supervision and control of shipments of radioactive waste and spent fuel.	2006

International legal instruments governing environmental protection applicable to nuclear energy field

Instrument	Purpose	Year of adoption
Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention)	Obliges states and grants the public rights in the three areas of the convention (access to information, public participation and access to justice).	1998
Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention)	It lays down the general obligation of states to notify and consult each other on all major projects under consideration that are likely to have a significant adverse environmental impact across boundaries.	1991
Protocol on Strategic Environmental Assessment (Kiev Protocol)	Requires states to evaluate the consequences of their plans and programmes, and, to the extent appropriate, policies and legislation that are likely to have significant environmental effects.	2003*

* Not yet in force.

International legal instruments governing liability and compensation for nuclear damage

Instrument	Purpose	Year of adoption
Paris Convention on Third Party Liability in the Field of Nuclear Energy	Establishes a nuclear liability and compensation regime to compensate victims of a nuclear accident (open to OECD member countries as of right and non-member countries with the consent of all convention states).	1960
Brussels Convention Supplementary to the Paris Convention	Establishes a scheme to provide compensation supplementary to that required by the Paris Convention (open only to Paris Convention states).	1963
Vienna Convention on Civil Liability for Nuclear Damage	Establishes a nuclear liability and compensation regime similar to that provided for under the Paris Convention (open to any state).	1963
Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention	Acts as a bridge between the Paris and Vienna Conventions, effectively extending the benefits provided by one convention to victims in countries which have joined the other convention.	1988
Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage	Improves the original regime by requiring that more money be made available to compensate more victims for a broader range of damages.	1997
Protocol to Amend the Paris Convention on Nuclear Third Party Liability	Improves the existing regime by requiring that more money be made available to compensate more victims for a broader range of damages.	2004*
Protocol to Amend the Brussels Convention Supplementary to the Paris Convention	Improves the existing regime by requiring that significantly more compensation be made available to supplement that which is to be provided under the Paris Convention.	2004*
Convention on Supplementary Compensation for Nuclear Damage	Provides for a global liability and compensation scheme which may supplement that called for under the Paris Convention, the Vienna Convention or Annex State legislation as defined by this Convention on Supplementary Compensation.	1997*

* Not yet in force.

Number of contracting parties/states to the major international instruments in the nuclear field (as of July 2010)

International instrument	Contracting parties/states
Treaty on the Non-Proliferation of Nuclear Weapons	191
Comprehensive Nuclear-Test-Ban Treaty	153
International Convention for the Suppression of Acts of Nuclear Terrorism	67
Convention on the Physical Protection of Nuclear Material	143
Amendment to the Convention on the Physical Protection of Nuclear Material	39
Convention on Nuclear Safety	70
Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	56
Convention on Early Notification of a Nuclear Accident	108
Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	105
Vienna Convention on Civil Liability for Nuclear Damage	36
Protocol to Amend the 1963 Vienna Convention on Civil Liability for Nuclear Damage	5
Convention on Supplementary Compensation for Nuclear Damage	4
Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention	26
Paris Convention on Third Party Liability in the Field of Nuclear Energy	15
Brussels Convention Supplementary to the Paris Convention	12

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International Nuclear Law: History, Evolution and Outlook

This publication commemorates the International School of Nuclear Law which is celebrating its 10th anniversary in 2010. The purpose of the publication is to provide an overview of the international nuclear law instruments, their background, content and development over the years and to present an outlook on future needs in the field of international nuclear law. Renowned experts in the nuclear law field have contributed scholarly papers on the various aspects of international nuclear law, including international institutions, protection against ionising radiation, nuclear safety, non-proliferation of nuclear weapons and safeguards, nuclear security, transport of nuclear material and fuel, management of spent fuel and radioactive waste, liability, compensation and insurance for nuclear damages, environmental protection and international trade in nuclear material and equipment. This publication is dedicated to the school's 500+ alumni from all around the world.

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