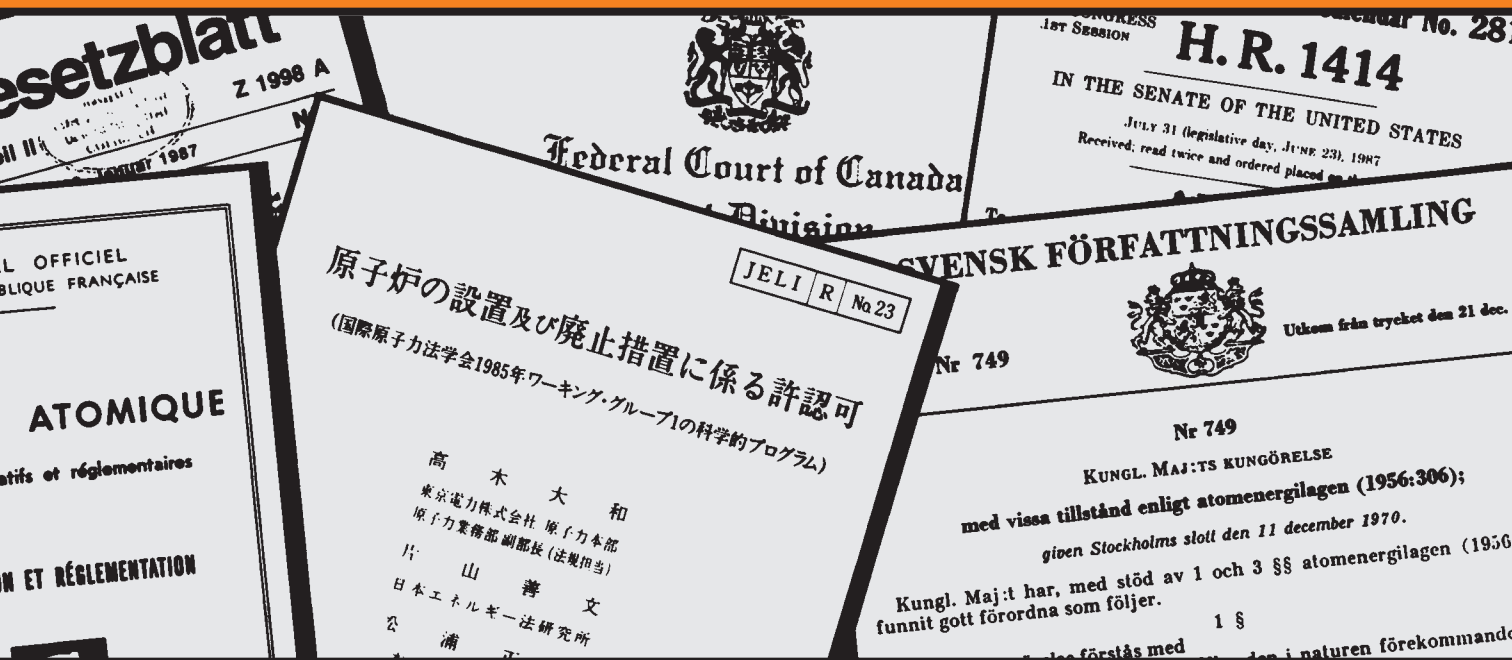




NUCLEAR LAW



BULLETIN 63/JUNE 1999

NUCLEAR ENERGY AGENCY



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NUCLEAR LAW BULLETIN No. 63

Contents

Detailed Table of Contents

Articles

Case Law and Administrative Decisions

National Legislative and Regulatory Activities

Agreements

Bibliography and News Briefs

List of Correspondents

Supplement

June 1999
Nuclear Energy Agency
Organisation for Economic Co-operation and Development

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This is achieved by:

- *encouraging harmonization of national regulatory policies and practices, with particular reference to the safety of nuclear installations, protection of man against ionising radiation and preservation of the environment, radioactive waste management, and nuclear third party liability and insurance;*
- *assessing the contribution of nuclear power to the overall energy supply by keeping under review the technical and economic aspects of nuclear power growth and forecasting demand and supply for the different phases of the nuclear fuel cycle;*
- *developing exchanges of scientific and technical information particularly through participation in common services;*
- *setting up international research and development programmes and joint undertakings.*

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DETAILED TABLE OF CONTENTS

	Page
ARTICLES	
Limitation of Third Party Nuclear Liability: Causes, Implications and Future Possibilities, by Marcus Radetzki	7
Maritime Zones and the New Provisions on Jurisdiction in the 1997 Vienna Protocol and in the 1997 on Convention Supplementary Compensation, by Andrea Gioia.....	25
CASE LAW	
<i>FRANCE</i>	
French Case law in the Medical Field concerning Ionising Radiation, by Jean Hébert.....	39
<i>UNITED STATES</i>	
Litigation relating to the DOE's obligation under the NWPA to commence acceptance of spent fuel by 31 January 1998 (1999).....	53
Waste Isolation Pilot Plant (1999)	56
ADMINISTRATIVE DECISIONS	
<i>CANADA</i>	
Response of the Canadian Government to the Nuclear Fuel Waste Management and Disposal Concept Environmental Assessment Panel (1998).....	57
<i>SWITZERLAND</i>	
Leipstadt Nuclear Power Plant: Increase in nominal thermal power from 3 138 to 3 600 MW (1998)	59
Mühleberg Nuclear Power Plant: Extension of operating license	59
Change of direction in energy policy: planned closure of existing Swiss nuclear power plants (1998).....	60
NATIONAL LEGISLATIVE AND REGULATORY ACTIVITIES	
<i>ARGENTINA</i>	
Decree on the Implementation of the Law on Nuclear Activities and on the Privatisation of the Nuclear Sector (1998).....	61
Law on Radioactive Waste Management (1998)	62
<i>ARMENIA</i>	
Law for the Safe Utilisation of Atomic Energy for Peaceful Purposes (1999).....	62
<i>AUSTRALIA</i>	
Radiation Protection and Nuclear Safety Act (1998)	64
<i>AUSTRIA</i>	
Law on Third Party Liability for Nuclear Damage (1998).....	65
<i>BOSNIA & HERZOGOVINA</i>	
Law on Radiation Protection and Radiation Safety (1999).....	65
<i>BRAZIL</i>	
Law on the Levying of a Tax in respect of the Licensing and Control of Radioactive Materials and Nuclear Installations (1998)	65
Resolution of the Secretary for Strategic Affairs concerning the Protection System for the Brazilian Nuclear Power Programme – SIPRON (1998).....	66

<i>CROATIA</i>	
Act on Liability for Nuclear Damage (1998)	66
<i>FINLAND</i>	
Decree on Liability Amount (1998)	69
<i>FRANCE</i>	
Decrees concerning the protection of workers against the dangers of ionising radiation (1998)	70
Decision concerning official maximum limits for radioactive contamination by radon (1998)	70
Orders modifying the ADR and RID Orders on transport of dangerous goods by road and rail (1998)	70
Order concerning the nomination and professional qualifications of safety officers for transport of dangerous goods by road, rail or inland waterway (1998)	71
<i>GERMANY</i>	
Amendment to the Act Concerning the Carriage of Dangerous Goods (1998)	71
Amendments to Annexes A and B to the ADR Agreement (1998)	71
Amendments to the Ordinances on the Carriage of Dangerous Goods (1998)	72
Ordinance on the Shipment of Radioactive Waste (1998)	72
Fourth Ordinance implementing the Preventive Radiation Protection Act (1998)	72
Implementation of EU Directives on Electromagnetic Compatibility (1998)	72
Amendments to the Foreign Trade Ordinance (1998)	73
Act to implement the Comprehensive Nuclear Test-Ban Treaty (1998)	73
Act to implement the 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes (1998)	73
<i>INDONESIA</i>	
Decrees on the National Energy Control Board and the National Nuclear Energy Agency (1998) ...	74
<i>ITALY</i>	
Decree on the Reorganisation of the National Committee for Research and Development of Nuclear and Alternative Energies – ENEA (1999)	75
Community Law implementing European Directives (1998)	75
<i>JAPAN</i>	
Law on Compensation for Nuclear Damage (1999)	76
<i>LITHUANIA</i>	
Law on Radiation Protection (1999)	76
<i>POLAND</i>	
New Criminal Code (1998)	76
<i>PORTUGAL</i>	
Decree-Law setting up the Commission for Radiological Protection and Nuclear Safety (1998)	77
<i>SLOVENIA</i>	
Decree establishing the Amount of Operator’s Liability and the corresponding Amount of Insurance for Nuclear Damage (1998)	78
<i>SPAIN</i>	
Law establishing the National Energy Commission (1998)	78
Regulation on the transport of dangerous goods by road (1997)	79
Regulation concerning the Almarez nuclear power plant (1997)	79
<i>SWEDEN</i>	
The Environmental Code (1999)	79
<i>UKRAINE</i>	
Presidential Decree on the Reorganisation of the Nuclear Control Structures (1999)	82
Law on Basic Principles governing the Further Operation and Decommissioning of Chernobyl (1998)	82
Decree concerning Ratification of the 1998 Joint Protocol relating to the Application of the Vienna Convention and the Paris Convention (1999)	83
Resolution on Indemnifying Participants in the Shelter Implementation Plan (SIP) against Civil Liability for Nuclear Damage (1999)	83

<i>UNITED STATES</i>	
Bill to amend the Nuclear Waste Policy Act of 1982 (1999).....	83
Recommendations concerning amendments to the Price-Anderson legislation (1999).....	85

BILATERAL AGREEMENTS

AUSTRALIA – USA

Arrangement concerning R&D in Nuclear Material Control, Accountancy, Verification, Physical Protection, Advance Containment and Surveillance Technologies for International Safeguards (1998)	87
---	----

GERMANY – RUSSIAN FEDERATION

Agreement on Nuclear Liability in connection with Deliveries from the Federal Republic of Germany for Nuclear Installations in the Russian Federation (1998)	87
--	----

JAPAN – UNITED KINGDOM

Agreement for Co-operation in the Peaceful Uses of Nuclear Energy (1998)	87
--	----

MULTILATERAL AGREEMENTS

Agreement for Co-operation in the field of Transport of Nuclear Materials between the Czech Republic and the Russian Federation across the Territory of Slovakia and the Territory of Ukraine (1998)	89
Declaration of Principles regarding a Multilateral Nuclear Environmental Programme in the Russian Federation (1999).....	89
Convention on Nuclear Safety: First Review Meeting (1999).....	89
Status of Nuclear Conventions (1999)	90
Status of the Comprehensive Nuclear-Test Ban Treaty (1999).....	91

TEXTS

Declaration of Principles regarding a Multilateral Nuclear Environmental Programme in the Russian Federation (MNEPR) (1999).....	95
Summary Report from the First Review Meeting of the Contracting Parties to the Convention on Nuclear Safety (1999).....	97
Russian Federation – Germany: Agreement on Nuclear Liability in connection with Deliveries from the Federal Republic of Germany for Nuclear Installations in the Russian Federation.....	105

BIBLIOGRAPHY AND NEWS BRIEFS

NEA, INLA, Netherlands, Uruguay	111
---------------------------------------	-----

LIST OF CORRESPONDENTS	117
-------------------------------------	-----

SUPPLEMENT

Austria

Atomic Liability Act (1999)

Croatia

Act on Liability for Nuclear Damage (1998)

Limitation of Third Party Nuclear Liability: Causes, Implications and Future Possibilities

by Marcus Radetzki*

1. Introduction

This paper deals with the third party liability of the nuclear power generation industry. It has several purposes. One is to clarify the distinctive features of nuclear liability as compared with traditional liability in tort (parts 2 and 3). The paper devotes particular interest to one such feature, namely the express liability limitation from which the nuclear power generation industry benefits. The causes and implications of this feature are discussed (part 4). One important implication of the current order is that the top risk¹ of the nuclear power generation industry is explicitly or implicitly transferred to governments. This risk transfer can be regarded as a subsidy to the nuclear power generation industry. Subsidisations counteract efficiency. Therefore, the possibilities of neutralising or abolishing the subsidy are explored (part 5).²

2. The liability of the nuclear power generation industry³

The issue of third party liability in the field of nuclear energy is regulated by a number of international conventions. The following sections provide brief summaries of the relevant articles of these conventions.

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1. i.e the top layer of damage compensation.
2. The deliberations in this part of the paper mainly concern the countries that were members of the OECD in the early 1990s.
3. All values presented in this part have been converted into US dollars.

2.1 *Conventions on Third Party Liability*

According to the Paris Convention on Third Party Liability for Nuclear Damage (1960), signed by 14 states, e.g. Belgium, France, Germany, Italy, the Netherlands, Spain, Sweden and the United Kingdom, liability for damage to or loss of life and damage to or loss of all property (with few exceptions) caused by a nuclear accident is channelled to the operator of the nuclear plant in question (the operator).⁴ The liability is strict, i.e. irrespective of fault,⁵ and is limited to \$ 22 million. This amount may be increased or decreased by each one of the states bound by the convention. In fixing the amount, the possibility of obtaining insurance coverage or other financial security is to be taken into consideration. The amount may never be lower than \$ 7 million.⁶ The liability is to be covered by insurance or other financial security held by the nuclear operator.⁷

The Paris Convention has been supplemented by the Brussels Convention Supplementary to the Paris Convention (1963), signed by a large majority of the states bound by the Paris Convention. Compared to the Paris Convention, the Brussels Convention is more specific about compensation payments. The states agree that compensation for nuclear accidents is to be provided in three steps. The first step consists of the liability of the operator under the terms of the Paris Convention, to be covered by insurance or financial guarantees. In the event that compensation is not sufficient, the liability of the installation state⁸ is incurred up to \$ 254 million (including the amount provided in the first step). If this amount is not sufficient to cover the damages, all states bound by the Brussels Convention are jointly liable, according to a particular formula, up to a grand total amount of \$ 435 million. This is the third step of compensation under the terms of the Convention.⁹

Some 30 states around the world, several of which are states of former socialist Eastern Europe, have signed the Vienna Convention on Civil Liability for Nuclear Damage (1963), the basic principles of which are the same as those of the Paris Convention, i.e. (a) strict liability; (b) liability channelled to the operator; (c) limitations on the amount of liability; (d) compulsory insurance or financial security covering liability etc.¹⁰ However, the Vienna Convention makes possible an even further limitation of liability than the Paris Convention. The operator's liability is to amount to at least \$ 5 million.¹¹ Since 1988, Paris and Vienna Conventions are linked together by a Joint Protocol signed by most of the Vienna states.¹² According to the Protocol, the applicability of each convention is extended to states bound by the other convention.

In September 1997, further steps were taken in order to improve the liability regime for nuclear damage. The Protocol to Amend the Vienna Convention (1997) was adopted, as well as the Convention on Supplementary Compensation (1997). According to the Protocol, the liability of the

4. The liability of any other subject is thus excluded.

5. Article 3.

6. Article 7.

7. Article 10.

8. i.e. the state in which the nuclear plant is situated.

9. Article 3. See also Protocols (1982).

10. See de La Fayette (1992) p. 9; also Lopuski (1993) p. 189-210. The full titles are listed in the bibliography at the end of this article.

11. Higher amounts and even unlimited liability may be imposed by individual states.

12. Joint Protocol on the Application of the Vienna Convention and the Paris Convention (1988).

nuclear operator may be limited by the installation state, either to not less than \$ 400 million; or to not less than \$ 200 million provided that in excess of that amount and up to at least \$ 400 million, public funds are made available by the installation state to compensate nuclear damage; or, for a maximum of 15 years, to a transitional amount of not less than \$ 130 million. An amount lower than \$ 130 million may however be established, provided that funds are made available by the installation state to compensate nuclear damage between that lesser amount and \$ 130 million.¹³ According to the Convention on Supplementary Compensation, which is an instrument to which all states may adhere regardless of whether they are parties to any existing nuclear liability convention, the installation state is to ensure the availability of at least \$ 400 million for compensation in respect of nuclear damage. However, for a maximum of 10 years, a transitional amount of at least \$ 200 million is accepted. In addition to and beyond the amount thus made available, the installation state shall make available public funds according to a particular formula specified by the Convention.¹⁴ It remains to be seen, however, to what extent these new instruments will be signed.

2.2 *National regulations*

These conventions and protocols constitute a framework to which the regulations of each signatory state must conform. Within this framework, the national regulations differ substantially. To illustrate, the following paragraphs describe briefly the situation in Germany and Sweden. In addition, the situation in the USA, not bound by any international convention on nuclear third party liability, is described.

German nuclear operators bear third party liability that by far exceeds the requirements of the Paris and Brussels Conventions. The operator is strictly liable for the first \$ 330 million. Up to \$ 132 million, the liability is guaranteed by mandatory liability insurance. Damages between \$ 132 million and \$ 330 million are guaranteed by a mutual risk sharing agreement between German nuclear operators. The state guarantees compensation for damage between \$ 330 million and \$ 660 million. In addition, each operator has unlimited liability for damage within Germany over and above \$ 660 million.¹⁵

Swedish nuclear operators are strictly liable for third party damage up to \$ 254 million. The liability is guaranteed by mandatory insurance. For damages beyond this sum and up to \$ 435 million, the state is liable jointly with other States Party to the Brussels Supplementary Convention. If these amounts are insufficient to fully cover the damages, the issue of further compensation from the state is to be determined by law. Hence, the sums of such compensation have not been determined.¹⁶

US nuclear operators bear strict liability for damage up to \$ 200 million. The liability is guaranteed by mandatory insurance. Damage beyond this amount is covered by a risk sharing pool in which all owners of nuclear reactors are members. In the early 1990s the maximum compensation

13. Article 7.

14. Article 3.

15. See Danglemaier (1993) p. 427-430. It may be questioned whether the unlimited liability of the nuclear operator is in accordance with the Paris Convention which stipulates that the amount of such liability is to be restricted (Article 7).

16. See Atomskador (1996) p. 3-4.

provided by the pool was about \$ 7.6 billion¹⁷ (more recently, the total has been increased to close to \$ 9 billion). For damages exceeding this amount plus the amount covered by insurance, Congress is committed to providing additional funds.¹⁸

3. The liability of the nuclear power generation industry compared with traditional liability in tort

Traditional tort liability is based on fault. Any subject may be liable. Liability is unlimited and liability insurance is voluntary. The above sections have illustrated that the liability of the nuclear power generation industry in most countries deviates from all these features. Nuclear liability is strict, channelled to the operator, limited and finally, liability insurance or equivalent financial security is mandatory. There is no doubt that these deviations affect victims as well as the nuclear power generation industry.

Traditional tort liability compensation presupposes not only that a certain act caused harm, but also that the harm is due to fault. The fault requirement limits the scope of liability. Strict liability irrespective of fault thus makes the liability regime more stringent. It strengthens the reparative function of the liability, i.e. the provision of compensation to victims¹⁹ and thus imposes a burden on the subject liable, i.e. the nuclear power generation industry.

In traditional tort law there are no restrictions with regard to the identity of the subject liable. The channelling of liability to one particular subject thus reduces the possibilities of damage reparation. If, however, the channelling of liability to some specified subject is combined with the imposition of strict liability and compulsory insurance, as is most often the case, the negative effect on reparation will usually be small.²⁰ The channelling of nuclear liability has important implications for the nuclear power generation industry. Without such channelling, the suppliers of goods and services to that industry would be at risk of incurring liability for the potentially catastrophic harm caused by a defect in products or services delivered. Hence, if these suppliers were not exempted from liability, they too would have to insure against nuclear liability. Nuclear damage would then be doubly insured. Consequently, the costs of the nuclear power generation industry would be raised.²¹

In the case of unlimited liability, the victim is to be compensated in order to render him as well off as if the damage had not occurred. If the liability is limited, however, damage in excess of the limitation will not be compensated. It would thus seem that by limiting the liability, the reparative function of tort law is watered down. In many instances, however, this is not the case. In practice, unlimited liability does not exist. Liability is always limited to the amount of coverage provided by existing liability insurance plus the net worth of the subject liable. The two together will often prove severely inadequate for full compensation of catastrophic damage. In practice, therefore, liability will be limited in such cases. It follows that a formal limitation of liability at a level above the sum total of liability insurance and the net worth of the liable subject will have no impact on the actual

17. At this time, about 115 nuclear reactors were members of the pool. Thus, the maximum contribution by each member was \$ 67 million.

18. See Marrone (1993) p. 376-377.

19. See Hellner (1995) p. 169.

20. See Dufwa (1993) p. 1810.

21. See Nordenson (1968) p. 34-35.

compensation payments. The nuclear liability limitation, which is set at a level acceptable to insurers, is however below this level. In principle, it thus imposes a constraint on the reparative function of the liability. In practice, this effect is moderated by the fact that the governments have explicitly or implicitly assumed liability for nuclear damage above the liability limitation. There is no doubt that the liability limitation benefits the nuclear industry.²² Without the limitation, the nuclear operator would face a risk of bankruptcy in the event of a severe accident. The limited liability removes that risk (provided that insurance is available and obtained), and thus reduces the cost of raising capital.

Whether or not liability insurance is compulsory does not influence tort liability as such. However, since liability insurance increases the capacity of the nuclear operator to actually fulfil his obligation, compulsory liability insurance promotes the reparative function of the liability. At the same time, it clearly limits the freedom of action of each nuclear operator.²³ Thereby, the duty to insure against liability or to provide equivalent financial security, clearly imposes a burden on the nuclear power generation industry as a whole.

4. The limited liability of the nuclear power generation industry

4.1 Causes

The most distinctive controversial feature of nuclear liability is the liability limitation.²⁴ The motive for this feature originates in the fact that the nuclear power generation industry under the current regime has a duty to insure or to provide some equivalent financial security for its third party liability.

The nuclear power generation industry involves small risks for very large (catastrophic) damage. A catastrophic event can be defined as a core meltdown followed by lethal radioactive releases, leading to several mortalities. The statistical probability for such an event taking place within the OECD area, where about 350 reactors are operating, has been assessed with the help of systematic probabilistic safety assessments (PSA) as one in between 350 and 6000 calendar years, with potential damage costs from below \$ 1 billion up to tens of billions of dollars, reaching \$ 100 billion in very exceptional cases (one in more than a million years).²⁵

The insured amounts for industrial catastrophes seldom exceed the \$ 500 million level, and in the rare cases that they do, the marginal insurance premium rises at an accelerating rate, to a level far above any reasonable assessment of the expected damage cost that the insurers would have to cover.²⁶ In order to explain the unwillingness to insure industrial catastrophe risks the insurance

22. See Westerlund (1994) p. 691 and Wetterstein (1990) p. 105.

23. More specifically, it is the operator's freedom to choose whether or not to engage in particular contractual relations that is reduced.

24. The liability limitation has been the target of much criticism in the literature, e.g. by Faure & Van den Bergh (1990) p. 241-254; Westerlund (1994) 685-707 and Wetterstein (1990) p. 96-106.

25. These numbers represent a summary of the state of the art, as reflected in concurrent literature. See Radetzki & Radetzki (1997) p. 367-370.

26. See Bohman (1979) p. 188. An example is the insurance of the first jetliners. Because of uncertainty about the accidents to which these vehicles might be prone, insurers initially charged a premium eight times higher than that which with hindsight proved sufficient. See Skogh (1996) p. 6-7.

industry refers to the fact that insurance presupposes an unequivocal ability of insurers to cover insurance claims. An extensive legislative regulation with the aim of assuring that the capital reserve of insurers is adequate for covering the claims that may arise has been established in most industrialised countries. It is held that this regulation causes a capacity constraint, on each insurer individually, and on the insurance industry as a whole.²⁷ Two arguments are said to justify this attitude: first, that large industrial catastrophes constitute non-actuarial risks, not well suited for the insurance industry; and second, that the insurance industry lacks the capital needed to cover claims over and above the sums currently insured.

4.1.1 Nuclear liability represents a non-actuarial risk

Traditional insurance involves a transfer of risk at a price fixed ex ante²⁸ and thus presupposes that a premium corresponding to the risk taken can be calculated. This requires that two conditions are met. It must be possible to calculate the expected loss, i.e. the probability of insured damage multiplied by the estimated size of damage. These probabilities are best obtained from empirical experience. When no such experience is available, insurers must rely on assessments. However, such assessments are deemed to be more or less unreliable resulting in a greater degree of uncertainty.²⁹ In addition, the law of large numbers must be applicable. Hence, the similar but not correlated risks covered must be manifold. The larger the number of such risks, the closer the real damage cost will approach the underlying probability.

The insurance industry repeatedly claims that capacity constraints often emerge because one or both of the conditions are not met. If the expected loss cannot be determined with confidence, there is a situation of uncertainty, and the risk is non-actuarial. Examples are risks related to new products or processes.³⁰ If the number of similar risks is too low, the law of large numbers is not applicable. Such risks, too, are not actuarial. Examples are risks connected with heavily concentrated activity. In none of these cases can the capital that needs to be reserved for each risk be fully determined. Hence, the risks cannot be priced with confidence. The insurers normally resolve this dilemma by behaving in a risk-averse manner, venturing only a small sum of money on the uncalculable risk.³¹

4.1.2 The capital resources available to the insurance industry are inadequate for the insurance of nuclear catastrophes

Another main argument for the unwillingness to assume nuclear catastrophe risks is that the insurance industry lacks the capital needed for such undertakings. In 1995, the market value of capital and surplus held by the insurers and reinsurers of property and casualty in the US was assessed at some \$ 230 billion.³² The amount could be twice as large for the OECD area as a whole. This capital

27. See Skogh (1995) p. 329.

28. However, a two-step premium charge in the context of environmental liability insurance has been suggested by Abraham (1988) p. 981-982.

29. See Faure & Van den Bergh (1990) p. 247; Tyran & Zweifel (1993) p. 433 and Wetterstein (1990) p. 121.

30. See Skogh (1996) p. 5.

31. See Abraham (1988) p. 947; Hogarth & Kunreuther (1992) p. 36; Kunreuther (1989) p. 319; Tyran & Zweifel (1993) p. 433.

32. See Lewis (1996) p. 13.

supports all property-casualty lines, of which only a fraction relates to losses from catastrophe-related claims. Assessments for the US suggest that an event leading to insured losses of \$ 5 billion or more would lead to several insolvencies in the insurance industry,³³ while a disaster costing \$ 20 billion and above would risk the impairment of the entire insurance system.³⁴ Similar consequences are likely to hold valid for the OECD area as a whole.

However, the capital resources of the insurance industry do not constitute a capacity constraint in an absolute sense. The legislative regulation of the insurance industry has been structured to assure the ability of the insurers to pay the claims that may arise. So long as the payment of claims is assured by a sufficient capital base, it is ordinarily free to insure in whatever way it likes. Hence, provided that additional capital is procured, the insurance industry is at liberty to venture into more sizeable risks, for which there is an insurance demand. The equity capital and reserves of insurers and reinsurers constitute the ultimate buffer for excessive unanticipated losses. However, a guiding principle in the insurance industry is that the premium income from each insurance class should suffice for the coverage of claims in all normal circumstances. Difficulties emerge when this principle is put against the theoretical insurance needs of the nuclear industry. Let us assume, hypothetically, that there is an established actuarial likelihood of 0.3% per year of a catastrophe occurring in one of the 350 reactors in the OECD area, with damage costs of \$ 20 billion that the nuclear industry would like to cover by insurance. The annual net actuarial premium works out at \$ 60 million, i.e. 0.3% of \$ 20 billion. But since the catastrophe could occur the following year, the insurers would immediately need a \$ 20 billion reserve on standby in order to meet the legislative requirements for solvency. Adherence to the standard principle that the premium from each insurance class provide the necessary reserves, would imply raising the initial annual insurance premium 300-fold, which is not practicable.³⁵ With this background, the unwillingness of the insurance industry to insure third party liability related to nuclear accidents in excess of a few hundred million dollars is understandable, although unsatisfactory.

4.1.3 Conclusion

Due to the fact that nuclear liability constitutes a non actuarial risk and that insurers lack the capital needed to insure nuclear catastrophes, there is an obvious discrepancy between the social need for, and the availability of insurance for nuclear catastrophes. Given that the nuclear power generation industry under prevailing regulatory regimes has a duty to insure for its third party liability, it is quite clear that it would not be able to operate if its liability was not limited. Hence, the failure of the insurance market to provide sufficient risk coverage would seem to constitute a valid motive for the limitation of nuclear liability.³⁶ However, this motive alone appears to be weak indeed. Nothing exists

33. Cutler & Zeckhauser (1996) p. 2.

34. See Lewis (1996) p. 5. This may be an exaggeration. Hurricane Andrew in 1992 carried an insurance loss of \$ 18 billion, but did not impair the functioning of the insurance system as a whole.

35. Some difficulty in establishing an adequate capital buffer exclusively from premium income will always be there. In our example, this difficulty is exacerbated by the extremely low likelihood of catastrophe, and by the huge potential damage size. With potential damage of moderate size, it would be more practicable to shift resources from other insurance classes to cover claims, without seriously impairing the capital structure of the insurance firm as a whole.

36. In this respect, it would seem as if limited liability constitutes a price that victims have to pay for mandatory insurance, see Faure & Van den Bergh (1990) p. 245.

to prevent a combination of unlimited liability and a limited duty to insure.³⁷ In these circumstances, an additional reason behind the liability limitation from which the nuclear power generation industry benefits, appears to be an implicit political concord that this industry is desirable for society at large and therefore should be supported.³⁸

4.2 Implications

It has been made clear that the liability of the nuclear power generation industry for third party damage is limited by international conventions as well as national legislation to a level below the sum of existing liability insurance and the net worth of the subject liable. Excessive liability is explicitly or implicitly covered by governments. The possibility of accidents causing third party damage in excess of the limits cannot be excluded. In effect, there is a transfer of the top risk from the nuclear industry, either to governments who have assumed liability in excess of stipulated limitations or to the potentially uncompensated victims, in the event that the authorities refuse to face responsibility for catastrophe indemnification.³⁹ This transfer of risk can be regarded a subsidy to the nuclear power industry.

Proponents of market solutions might object, in principle, to such public support of private activities. More specifically, the subsidisation of the nuclear power generation industry distorts market competition. In addition it reduces the incentives for the nuclear power generation industry to undertake precautionary measures to avoid risk.⁴⁰ In both cases, the subsidy could be said to counter-act efficiency. In these circumstances, the possibilities of neutralising or abolishing the subsidy ought to be explored.

5. Other possibilities

5.1 Taxes or fees

One way to reduce the negative effects of the public subsidy given to the nuclear power generation industry is to allow governments impose special taxes or fees on the nuclear industry, corresponding to the cost that the government assumes.⁴¹ One major disadvantage with this solution is, however, that there is no market to determine the size of the tax or fee in question. In spite of the

37. See Wetterstein (1990) p. 103. In Germany such a combination of unlimited liability and a limited duty to insure or to provide equivalent financial security prevails (see above). In Sweden such an order has been suggested (see *Atomansvarighetslagen* (1997) p. 5-6).

38. See *Atomansvarighet* (1962) p. 26; Westerlund (1994) p. 691 and Wetterstein (1990) p. 105.

39. Theoretically all industries benefit from such a top risk transfer since, as mentioned above, liability is always limited to the amount of existing liability insurance plus the net worth of the subject liable. In the nuclear field, however, the express liability limitation at a level below this amount makes this risk transfer far more significant than it would be without legislative interference.

40. See Radetzki (1996) p. 245.

41. All economic activities, including the nuclear power generation industry, pay taxes. The tax income from the nuclear power generation industry probably exceeds many times the risk cost transferred. However, taxes are not normally bound to cover particular purposes, which would be the case with the fee now suggested.

PSA results referred to above⁴² there is a possibility that the nuclear power generation industry would be over-or under-charged for the top risk transfer. If so, efficiency would still not be achieved.

5.2 *Shifting the top risk to the nuclear power generation industry itself*

A more radical approach to promoting efficiency would be the establishment of new institutions permitting a shift of the top risk of the nuclear power generation industry to that industry itself. The industry would then be obliged to carry full responsibility for the third party damage that it might cause. The liability of nuclear operators would thus be unlimited while governments would be released from any responsibility in this field. In order not to compromise the situation of victims, liability insurance or some other financial guarantee would need to be mandatory up to an amount large enough to cover the full cost of any plausible nuclear catastrophe, say \$ 100 billion.⁴³ The following subsections aim at exploring the prospects of such private solutions under which the nuclear industry itself assumes a very large liability for catastrophe damage compensation. First, it will be investigated whether, and if so, under what conditions, the insurance industry could possibly be expected to assume a much greater responsibility in the future (5.2.1). Second, the possibilities for the nuclear industry to pool the large risks, and thus to extend the coverage for accident damage above the level provided by insurance, will be investigated (5.2.2). Third, some new financial instruments required for a fully-fledged private solution will be described (5.2.3). A concluding discussion on these private alternatives to cover nuclear catastrophe liability follows in (5.2.4).

5.2.1 *Can the insurance industry be expected to assume top nuclear risks in the future?*

As mentioned, the requirement that insurers maintain an unequivocal ability to cover claims does not imply an absolute limit to insurance capacity. The economic constraint on insurance capacity is directly related to the size of capital that needs to be reserved for claims payments. It is true that the cost of raising the capital needed by the insurer, whether in the form of equity or accumulated premium income, is bound to rise as the total is increased. The cost of capital will also depend on the prudence of the insurer. It could be that traditional insurers, assuming only calculable risks, will be able to obtain the capital needed for their operations at a lower cost than insurers who venture large amounts on non-actuarial risks. But so long as the insurer is not constrained by regulation of prices, he can always compensate his rising capital costs by charging more for the coverage he offers. At a sufficiently high price, any risk should appear to be attractive to the insurer, wiping out, in practice, the dividing line between insurance and gambling.⁴⁴ Hence, in the absence of price regulation, there is no absolute *economic* constraint on the capacity to insure. Therefore, in a strict sense, the term “limited insurance capacity” is a misnomer.

It is quite clear, however, that traditional insurance is not well suited to assume the full risks of nuclear catastrophes. Insurers are specialists in spreading actuarial risks, the outcomes of which can be predicted with reasonable certainty. In addition, the potential damage costs of industrial catastrophes are truly enormous, both in absolute amounts, and in relation to the insurance industry’s overall capital base. The insurers’ standard procedure of building up adequate reserves from current premium income for calamitous outcomes in each insurance class, is not practicable for large

42. See Radetzki & Radetzki (1997) p. 367-370.

43. As known, unlimited financial guarantees do not exist.

44. See Pfenningstorf (1988) p. 22.

industrial catastrophe risks because the probability of such events is extremely low. Given this, the insurance industry may find it hard to raise the capital needed to provide coverage for the top nuclear risks, even if it would be interested in doing so.

In conclusion, if insurance capacity is to be increased, business can no longer be limited to actuarial risks, and alternative methods of obtaining risk capital must be considered. Such changes to the traditional principles and attitudes of insurance business are quite unlikely in the near future. Hence, even though there is no absolute constraint on insurance capacity, the nuclear industry has to look elsewhere for coverage of catastrophe liabilities over and above a few hundred million dollars.

5.2.2 *Can the top risks of the nuclear power generation industry be covered by risk pools?*

As an alternative to insurance, non actuarial risks could be shared by those exposed to such risks. In contrast to insurance, such an arrangement does not presuppose ex ante pricing. If two or more parties agree about an ex post sharing of the cost of accidents caused by their activities, they simply have to pay the actual cost in the event of damage, with no fear of being overcharged. However, for a risk pool to be possible, each party to the agreement must consider the risks of the others as similar to the risk he is facing himself.⁴⁵ In cases of uncertainty, the extent of risks cannot be estimated with confidence. However, as long as there is no evidence that one party's risk is greater than another, the diversification of risks created by the risk pool has a potential to attract every risk averse risk bearer.⁴⁶ With time, the particular features of the risks created by each pool member might become clear. This does not imply the end of the pool, but merely that the terms of the risk-sharing agreement should be renegotiated.⁴⁷

In these circumstances it is by no means surprising that risk pooling has a long parentage, and that it is applied as a method for increasing the potential compensation provided in the event of nuclear accidents. As mentioned above, the US Price-Anderson Act (1957) requires the licensees of each of the 115 operating nuclear reactors to participate in a mutual risk pool. If the damage from a nuclear accident exceeds \$ 200 million, which is covered by regular mandatory insurance, each participant to the agreement is obliged to provide a pro-rata share of indemnity up to \$ 67 million per reactor. Thus, by way of mutual risk sharing, the financial compensation of third party damage in case of a nuclear accident is increased from \$ 200 million to \$ 7.6 billion⁴⁸ (the amounts have been raised recently to provide for a total close to \$ 9 billion).

45. For mutual risk sharing to be successful, several other conditions must be met as well. These are not dealt with here, but see for example Skogh (1996) p. 7-11.

46. See Skogh (1995) p. 331.

47. See Skogh (1996) p. 9-10. All this indicates that risk pooling, in the same manner as insurance, presupposes that risks are estimated ex ante. Risk pooling is based on an agreement to share risks that are considered similar. The issue whether or not to accept risk pooling, and if so, on what conditions, thus presupposes that the risks are compared ex ante. Note, however, that contrary to an insurance contract, a risk sharing agreement does not presuppose that each risk is determined and priced exactly. What is required is only that the relative size of each risk, compared to the other risks in the pool, can be estimated.

48. See Marrone (1993) p. 376-377. In Europe, German nuclear operators spread risk between themselves through a risk pool (see above). However, this co-operation is by no means as extensive as that in the US. Far more extensive is the risk pooling arrangement suggested by Faure & Skogh (1992) p. 508-510. The authors discuss the possibility for establishing a European convention that stipulates strict liability of nuclear plant owners far above the existing arrangements for guaranteed compensation. The scheme would limit the liability to \$ 100 billion.

Coverage of the non-actuarial risks posed by nuclear catastrophes requires the commitment of very large sums of money and may indeed be considered as a highly speculative business. This is why the insurance industry can resolve our problem only a small part of the way. Risk pooling by the risky industries themselves provides a substantial further step. However, given the net worth of these industries, risk pooling too is inadequate. The nuclear liability arrangements in the US give a realistic picture of the maximum that insurance and risk pooling combined can reasonably accomplish. In conclusion, the nuclear industry has once again to seek elsewhere in order to achieve full coverage of its potential catastrophe liability.

5.2.3 *Can top nuclear risks be transferred to financial markets?*

The following paragraphs explore the possibilities for setting aside sufficient resources for coverage of nuclear catastrophe damage by reliance on new financial instruments, to be placed in the international financial markets. The approach involves a transfer of the top risks to hedge funds, pension funds, and other institutions which manage diversified capital portfolios on a large scale. It is asserted that these institutions would be better able and therefore more willing than insurers to handle the very large extent of potential damage liabilities attached to the nuclear industry. This assertion is based on the observation that these institutions handle capital on an incomparably greater scale than insurers, and therefore are better able to absorb the risks. It has been noted above that the capital and surplus of insurers and reinsurers of property and casualty in the US recently have been assessed at some \$ 230 billion. Similar assessments suggest that the US capital market is 60-80 times larger, representing a total value in a range of US \$ 15 000 – 20 000 billion.⁴⁹ The numbers for the OECD area as a whole have not been assessed, but one may surmise that they are about twice as large.

The issue at hand is how to manage a permanent need to keep \$ 100 billion on standby in the OECD area for the compensation of damage from nuclear disasters without government interference. The amount corresponds to more than 20% of the current total capital of the insurance industry. Hence, setting aside such a sum would involve a substantial strain on this industry. On the capital market, however, where such a reserve would absorb only about 0.3% of total assets, there would be hardly any strain at all.

The institutional arrangements could take a variety of forms. One of many possibilities would be a nuclear catastrophe bond,⁵⁰ whose principal would be forfeited to the extent needed for damage compensation, in the event of a nuclear catastrophe with costs in excess of \$ 9 billion.⁵¹ The bond holders' risk of capital loss would need to be compensated through a coupon above the rates on

Each of the approximately 100 nuclear plants in OECD Europe would be obliged to join a mutual risk pooling agreement with a maximum liability of \$ 1 billion per plant. A critical issue is how the nuclear power operators could assure such a high level of liability obligation. It is suggested by the authors that a small part of the liability might be obtained by pushing the insurance industry to make further engagements beyond those currently in force. However, the major part of the liability envisaged in the scheme would have to be reinsured by the national governments of each plant owner. Hence, since a large part of the compensation would still be guaranteed by states, presumably without charge, the nuclear power generation industry would be favoured by a state subsidy just as under the currently prevailing arrangements.

49. See Lewis (1996) p. 13-14 and CBOT Review (1996) p. 1.

50. Detailed proposals for how a natural catastrophe bond scheme could operate in the US have been made by Litzenberg, Beaglehole & Reynolds (1996) p. 76-86.

51. i.e. above the level that insurance and risk pooling arrangements could reasonably provide for.

risk-free bonds issued by the treasuries of major countries. The interest markup on the nuclear catastrophe bonds, above that carried by risk-free long-term papers, would have to be determined by a market assessment of the risk. If the extremely low probabilities of a large nuclear catastrophe derived from PSA analyses are to be believed, the markup for the nuclear catastrophe bonds in question would amount to a small fraction of one percent.⁵² In the end, however, the market would set the rate differential, and the need to do that would stimulate further efforts to determine the underlying risk.⁵³ In addition, in contrast to most other capital portfolio assets, nuclear catastrophe bonds would not fluctuate in line with shares and bonds, the main assets in most capital portfolios. Hence, a marginal addition of catastrophe bonds to the assets of a portfolio would enhance diversification and reduce its value fluctuations over the business cycle, a clearly desirable feature.

The issuer of nuclear catastrophe bonds could be a group of insurers of nuclear operations, desirous to expand their business into an unexploited but potentially remunerative area. The bonds could alternatively be launched by a pool of nuclear operators, or by an intergovernmental institution set up for the purpose.⁵⁴ The money received for the catastrophe bond issue could be placed in government bonds, with the annual difference between interest paid and received charged to the nuclear industry. With the capital safely invested in risk-free assets, the only risk carried by the catastrophe bond holder would be the damage claims after a sizeable nuclear disaster.

5.2.4 *Concluding discussion on private alternatives to cover nuclear catastrophe liability*

Through a combination of (a) insurance, covering the damage costs of smaller, actuarially calculable accidents; (b) sharing of risks for medium sized catastrophes through nuclear operator pools; and (c) the assurance of damage payments for the very large catastrophes through the issue of nuclear catastrophe bonds, it would, at least in theory, be possible to envisage private arrangements in which the nuclear power generation industry is adequately assured of the funds needed for even colossal (up to \$ 100 billion) catastrophe third party damage. Hence, it would indeed be possible to shift the third party liability of the nuclear power generation industry up to \$ 100 billion from governments to the industry itself without compromising the situation of victims. To avoid threats to the survival of the nuclear industry, however, such a shift must of course be introduced in a gradual manner, together with the expansion of risk pool arrangements and the launch of nuclear catastrophe bonds.

Substantial efforts would be needed to develop markets in which the new instruments could be traded. Attempts have been made, mainly in the US, to launch catastrophe bonds to provide security against natural disasters. So far, the success in marketing these instruments has been mixed,

52. In Radetzki & Radetzki (1997) p. 369, the third party cost of *all* nuclear accidents has been assessed in a range between a “realistic” level of US cents 0.01 per kWh, and a very cautious upper ceiling of US cents 0.1 per kWh. The average annual total for all OECD nuclear reactors works out at between US\$ 170 million and US\$ 1700 million. Only a small fraction of this total pertains to the very rare accidents with costs above US\$ 9 billion. If this fraction is one tenth, then the cost of the risk carried by the bondholders would amount to US\$ 17-170 million (\$ 0.05-0.5 million per reactor), equal to a 0.017-0.17% markup on the envisaged US\$ 100 billion bond issue.

53. In a private communication, Tomas Kåberger has suggested that the bond issue could be divided into tranches, with the first US\$ 10 billion tranche employed to cover damage costs in the range of US\$ 9-19 billion, the second in the \$ 19-29 billion, and so on. The interest markup above risk-free bonds would decline for the consecutive tranches, given that the need to use them for damage compensation would become increasingly rare.

54. Tyrán & Zweifel (1993) p. 436-438 have formulated a complex proposal for the institutional arrangements of such a scheme.

and illiquidity prevails in the markets where they are traded.⁵⁵ This may be a natural state of affairs at the present stage. Markets usually take time to develop.⁵⁶ To make the new instruments attractive, it is essential to clarify unambiguously the liability that the holders of the nuclear catastrophe bonds would have to cover. This is an important but complicated issue, since third party compensation claims after a nuclear catastrophe are bound to take a long time to settle and will undoubtedly involve many uncertain choices and value judgements.⁵⁷

A regime forcing the nuclear power generation industry to provide guarantees for compensation payments up to, say, \$ 100 billion, and the simultaneous development of liquid catastrophe bond markets would help setting an objective price for the top risks of this industry, and so settle a contentious debate, that has been raging for decades, on what these costs are.⁵⁸ Transfer of the top risk to the nuclear power generation industry would furthermore involve an internalisation of a cost that has so far been external. Those who object to the political decision that the state should handle the top risks of the nuclear power generation industry, ought to find full satisfaction in the proposed regime. The cost of the top risk (i.e. the spread between the risk-free interest rate and the interest rate paid to the catastrophe bond holders) would be dependent upon the valuation of the risk connected with the activity of particular nuclear plants. Incentives to undertake precautionary measures to reduce the cost, would thus be strengthened. If the transfer of the top risk to the nuclear power generation industry through the suggested arrangements were to involve costs making the industry non-viable, then that would be an important signal that the markets do not find the activity worthwhile. All this means that efficiency would be promoted, which is the important advantage of the proposed privatisation.

One major problem with this scheme, however, is that, the nuclear power generation industry is not alone in its potential of causing damage of colossal proportions. Several other industries suffer from a similar potential.⁵⁹ In theory, the third party liability of these industries is most often unlimited. However, with but few exceptions, there is no duty to insure. Hence, the liability of these industries is limited to the amount of liability insurance coverage, where such exists, plus the net worth of the subject liable. Damage over and above these sums would have to be compensated by governments or be left uncompensated. In effect, these industries, just as the nuclear power generation industry, benefit from a subsidy arising from a transfer of their top risks to governments or to victims. Consequently, if the nuclear power generation industry is forced to carry the full responsibility of third party damage up to, say \$ 100 billion, it would be disadvantaged in comparison with at least a handful of other risky industries. Hence, in order to provide a level playing field, all risky industries would have to be obliged to provide private guarantees for the third party damage they might cause.

But even if such steps were to be taken, the private solution sketched here would be far from completely private. In at least two respects market forces would have to yield to political considerations. The first issue concerns the identification of the risky industries which would be

55. See Cutler & Zeckhauser (1996) p. 27.

56. See CBOT Review (1996) p. 2 and Radetzki (1980) p. 76.

57. i.e. issues concerning causality between a nuclear accident and later events, e.g. diseases. See Skogh (1995) p. 322 and Ståhlberg (1994) p. 22-29.

58. See Tyran & Zweifel (1993) p. 438.

59. Examples are the hydropower, chemical, airline and oil transportation industries. See Radetzki & Radetzki (1997) p. 370-372.

required to provide far-reaching financial guarantees for damage coverage. Basically, all human activities carry a potential risk of causing damage of catastrophic proportions. All should therefore, in principle, be required to assure large financial means for damage compensation. In practice, such requirements on all activities are not feasible. Inclusion in the risky group would constitute a substantial disadvantage to an industry, given that no corresponding financial guarantee obligations are imposed on other industries. Classification of industries in this way therefore presupposes political decision making, and involves a deviation from a pure market solution. The second issue concerns the maximum financial guarantee to be assured by each risky industry. Since unlimited guarantees are not practicable, government involvement would be necessary to determine the maximum amount to be guaranteed, and to differentiate it across the risky industries. Finally, as mentioned, the \$ 100 billion total discussed in this paper, should be adequate for covering virtually all nuclear catastrophe costs. Nevertheless, catastrophe damage above that level cannot be entirely precluded. The cost of such damage would continue to rest with the government or victims and constitute a subsidy, albeit a far smaller one than under existing arrangements.

In conclusion, the privatisation of the top risk management outlined here has both advantages and drawbacks. These have been spelled out above. The introduction of the proposed scheme would require an extended period of time and involve a considerable effort. Without having tried it out in practice, it is not possible to make an unambiguous claim that it is superior to an arrangement where the government assumes the top risk and avoids subsidisation by compensating itself through fees or taxes.

6. A summary of findings

Compared to traditional tort liability, the third party liability of the nuclear power generation industry bears four distinctive features. It is strict, i.e. not conditional on fault. It is channelled to the operator. Hence, no other subject can be liable. A maximum amount of the liability is stipulated expressly. Liability insurance or some equivalent financial guarantee of the liability is mandatory.

The present paper has focused on the most controversial of these distinctive features, i.e. the express liability limitation, which implies a transfer of the top risk of this industry to either governments or to the damaged but potentially under-compensated third parties. This risk transfer can be regarded a subsidy to the nuclear power generation industry. Such a subsidy involves at least two undesirable consequences: it distorts competition; it also reduces the incentives to undertake precautionary measures to avoid risk.

One way to reduce the negative effects of the public subsidy given to the nuclear power generation industry would be to let governments impose special taxes or fees on the nuclear industry, corresponding to the external cost that catastrophes might involve. A more radical measure would be to shift the top risk to the industry itself. The liability of nuclear operators would then be unlimited while governments would be released from any responsibility in this field. In order to avoid a deterioration in the situation of victims, liability insurance or some equivalent financial guarantee would then need to be mandatory up to an amount large enough to cover the full cost of any plausible nuclear catastrophe, say \$ 100 billion. It has been shown that, in theory, it would be possible to envisage private arrangements in which the nuclear power generation industry is adequately assured of the funds needed for even colossal catastrophe third party damage. This could be accomplished through a combination of (a) insurance, covering the damage costs of smaller, actuarially calculable

accidents; (b) sharing of risks for medium sized catastrophes through nuclear operator pools; and (c) the assurance of damage payments for the very large catastrophes through the issue of nuclear catastrophe bonds.

A requirement that the nuclear industry itself provide guarantees for compensation payments up to, say, \$ 100 billion, and the simultaneous development of liquid nuclear catastrophe bond markets would help setting an objective price for the top risks, and so settle a contentious debate that has been raging for decades, on what these costs are. Transfer of the top risk to the nuclear power generation industry would, furthermore, involve an internalisation of a cost that has so far been external. Incentives to undertake precautionary measures to reduce the cost, would thus be strengthened. All this means that efficiency would be promoted, which is the important advantage of the outlined scheme.

The proposed privatisation of the top risk handling raises a set of other problems, however. A significant effort, involving considerable outlays, will be required to establish the new institutions and to test their operations in practice. Several complications are likely to arise in the process. A major problem with far reaching implications is that, beside the nuclear power generation industry, several other industries have the potential to cause damage of colossal size. Just as the nuclear power generation industry, these industries currently benefit from a subsidy consisting in that their top risks, too, are implicitly transferred to governments or to victims. Hence, if the nuclear power industry would have to carry the full responsibility of third party damage, this industry would be disadvantaged in comparison with at least a handful of other risky industries. Therefore, to provide a level playing field, all risky industries would have to be obliged to provide private guarantees for the third party damage they might cause. But even if such steps are taken, the solution sketched here would be far from completely private. Public authorities would have to single out the risky industries, and decide on the financial guarantee amounts required from each. Political distortions could easily creep into these decision processes.

The private solution would have to be tested in practice to determine whether its advantages outweigh its complications and the considerable launching effort. Until it has been tried out, it is hard to say whether it offers a solution to the liability problems that is superior to the one currently in force, supplemented with special fees to compensate the government for the cost of the transfer of top risk.

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Maritime Zones and The New Provisions on Jurisdiction in the 1997 Vienna Protocol and in the 1997 Convention on Supplementary Compensation

by Andrea Gioia*

1. The new provisions on jurisdiction in the 1997 conventions

Under Article XI of the 1963 Vienna Convention,¹ jurisdiction over all actions against the operator of a nuclear installation arising out of the same nuclear incident (including actions to establish rights to claim compensation and, if provided by the applicable law, direct actions against insurers or other guarantors), lies only with the competent court² of the State Party in whose “territory”, including its territorial sea,³ the nuclear incident occurs (the incident State). Where, however, the nuclear incident occurs outside the territory of a State Party (for example, in the course of maritime transport, on the high seas), or where it is not possible to determine with certainty the place of the nuclear incident (for example, where the incident is due to continuous radioactive contamination in the course of transport), jurisdiction lies only with the competent court of the State Party in whose territory the installation of the operator liable is situated (the installation State).

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1. *Convention on Civil Liability for Nuclear damage*, Vienna 21 May 1963. The Convention entered into force on 12 November 1977. On 23 April 1999, the following 32 States were party to the Convention: Argentina, Armenia, Belarus, Bolivia, Bosnia and Herzegovina, Brazil, Bulgaria, Cameroon, Chile, Croatia, Cuba, Czech Republic, Egypt, Estonia, Hungary, Latvia, Lebanon, Lithuania, Mexico, Niger, Peru, Philippines, Poland, Republic of Moldova, Romania, Slovakia, Slovenia, the Former Yugoslav Republic of Macedonia, Trinidad & Tobago, Ukraine, Uruguay, Yugoslavia. The Convention is open to all Members of the UN, the IAEA, or a UN specialised agency.
2. Article XI actually refers to “the courts” of the State in question, as is typical of most international conventions on civil jurisdiction. It is, however, understood that only one court should be competent in relation to the same nuclear incident, as is expressly stated in Article 12(4) of the 1997 amending Protocol (*infra*, note 10).
3. Unlike other conventions on civil liability, neither the 1963 Vienna Convention nor the 1960 Paris Convention, which will be referred to shortly, expressly state that a State’s “territory” includes its territorial sea. This notwithstanding, both conventions are generally interpreted to that effect: for the Paris Convention, see paragraph 7 of the *Exposé des motifs* approved, in its revised form, on 16 November 1982 by the OECD Council.

Similar provisions are made in Article 13 of the 1960 Paris Convention,⁴ which, indeed, served as a model for the 1963 Vienna Convention. For States party to the 1988 Joint Protocol,⁵ the court having jurisdiction under one Convention is also competent for actions deriving from nuclear damage suffered in the territory of Parties to the other. As for supplementary funding, no specific provisions on jurisdiction are set out in the 1963 Brussels Convention,⁶ which is designed to supplement the 1960 Paris Convention by increasing the amount of compensation for damage suffered in the parties' territory: since the Brussels Convention only applies if a court of a State Party has jurisdiction pursuant to the Paris Convention, no such specific provision was deemed necessary.

Against this background, the new provisions on jurisdiction are undoubtedly among the most interesting features of the two conventional instruments adopted by the diplomatic conference convened by IAEA in September 1997. In particular, while confirming the general rule that a court of the incident State has exclusive jurisdiction over actions concerning nuclear damage, Article XIII of the new Convention on Supplementary Compensation⁷ adds that, "where a nuclear incident occurs within the exclusive economic zone of a Contracting Party or, if such a zone has not been established, in an area not exceeding the limits of an exclusive economic zone, were one to be established by that Party", jurisdiction lies only with the competent court of that Party, *i.e.* the coastal State. Thus, for the purposes of Article XIII, the exclusive economic zone, or an area of equivalent extension, has been equated to the territorial sea.

Unlike the 1963 Brussels Convention, the new Convention on Supplementary Compensation is not only designed to increase the amount of compensation for nuclear damage, but also purports to create "a worldwide liability regime" and is open for ratification, or accession, by States party to either the 1963 Vienna Convention or the 1960 Paris Convention, as well as by States party to neither convention whose national legislation complies with the basic principles of both, as specified in an Annex. The negotiating States felt, therefore, that uniform provisions on jurisdiction should bind all States party to the new Convention, irrespective of whether or not they were also party to either the Vienna Convention or the Paris Convention. Article XIII of the new Convention is thus intended to

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4. *Convention on Third Party Liability in the Field of Nuclear Energy*, Paris 29 June 1960. The Convention entered into force on 1 April 1968, as amended by an Additional Protocol of 28 January 1964, and was later further amended by a Protocol of 16 November 1982. The following 14 States are party to the Convention: Belgium, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Turkey, United Kingdom. The Convention is open to Members of the OECD: other States may only accede to the Convention with the unanimous assent of all Parties.
 5. *Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention*, Vienna 21 September 1988. The Protocol entered into force on 27 April 1992. On 23 April 1999, the following 20 States were party to the Protocol: Bulgaria, Cameroon, Chile, Croatia, Czech Republic, Denmark, Egypt, Estonia, Finland, Hungary, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Romania, Slovakia, Slovenia, Sweden. The Protocol is open to all States party to either the Vienna Convention or the Paris Convention.
 6. *Convention Supplementary to the Paris Convention of 29 July 1960*, Brussels 31 January 1963. The Convention entered into force on 4 December 1974, as amended by an Additional Protocol of 28 January 1964, and was later further amended by a Protocol of 16 November 1982. The following 11 States are party to the Convention: Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Spain, Sweden, United Kingdom. The Convention is open to all Parties to the 1960 Paris Convention; however, a non-signatory State may only accede to the Convention with the unanimous assent of all Parties.
 7. *Convention on Supplementary Compensation for Nuclear Damage*, Vienna 12 September 1997. The Convention will remain open for signature by all States until its entry into force; it will enter into force on the 90th day following ratification or accession on the part of at least 5 States with a minimum of 400 000 MW of installed nuclear capacity. By 23 April 1999, the following 13 States had signed the Convention: Argentina, Australia, Czech Republic, Indonesia, Italy, Lebanon, Lithuania, Morocco, Peru, Philippines, Romania, Ukraine, United States. On the same date, only Romania had ratified the Convention.

replace, in relations between Parties thereto, Article XI of the Vienna Convention, Article 13 of the Paris Convention,⁸ as well as national legislation in force for States party to neither Convention.

It was felt, however, that the new provisions might cause some problems for States party to both the new Convention on Supplementary Compensation and either the Vienna or the Paris Convention, in their relations with other States party to either one of these latter but not party to the new Convention.⁹ A partial solution to these problems was the inclusion in the 1997 Protocol to Amend the Vienna Convention,¹⁰ adopted at the same time, of new provisions on jurisdiction, identical to those in Article XIII of the Convention on Supplementary Compensation, intended to amend Article XI of the 1963 Vienna Convention. The States party to the 1960 Paris Convention, which are currently discussing possible amendments to this latter convention, are expected to adopt, in their turn, corresponding new provisions on jurisdiction. But of course there is no guarantee that all Parties to the Vienna or Paris Conventions will eventually ratify, or accede to, the amending protocols; moreover, ratification of, or accession to, the new Convention on Supplementary Compensation will always be possible for States party to the original version of either the Vienna or the Paris Convention.¹¹ For this reason, it was felt necessary to insert in Article XIII of the Convention on Supplementary Compensation a proviso to the effect that, if the exercise of jurisdiction on the part of the coastal State is inconsistent with its obligations under either Article XI of the Vienna Convention or Article 13 of the Paris Convention, “jurisdiction shall be determined in accordance with those provisions”.¹²

2. Rationale and precedents

One of the distinguishing features of the international legal regime of civil liability for nuclear damage is precisely the choice of a single competent forum to deal with all actions arising out of the same nuclear incident. This solution is traditionally justified on various grounds, among which is the need for a single legal mechanism to ensure that the limitation on the operator’s liability is not exceeded, and the need to assure equitable distribution of compensation.¹³ But other international legal regimes of civil liability have opted for different solutions, which are arguably more advantageous to the victims of an incident causing damage. For example, the 1969 IMCO (now IMO) Convention on Civil Liability for Oil Pollution Damage (Oil Pollution Convention),¹⁴ which applies to damage caused

8. Article 30 of the 1969 Vienna Convention on the Law of Treaties deals with the “application of successive treaties relating to the same subject-matter”. Paragraph 3 states that “when all parties to the earlier treaty are parties also to the later treaty but the earlier treaty is not terminated or suspended in operation under article 59, the earlier treaty applies only to the extent that its provisions are compatible with those of the later treaty”. Under paragraph 4 (a), the same rule also applies “when the parties to the later treaty do not include all the parties to the earlier one”, as between States parties to both treaties.

9. Article 30(4) (b) of the 1969 Vienna Convention on the Law of Treaties states that: “When the parties to the later treaty do not include all the parties to the earlier one: (b) as between a (State) party to both treaties and a State party to only one of the treaties, the treaty to which both (States) are parties governs their mutual rights and obligations”.

10. *Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage*, Vienna 12 September 1997. The Protocol will remain open for signature by all States until its entry into force; it will enter into force three months after 5 States have ratified or acceded to it. By 23 April 1999, the following 14 States had signed the Protocol: Argentina, Belarus, Czech Republic, Hungary, Indonesia, Italy, Lebanon, Lithuania, Morocco, Peru, Philippines, Poland, Romania, Ukraine. By the same date, only Romania had ratified the Protocol.

11. See Article I (a) and (b) of the Convention.

12. On the implications of this proviso, see *infra*, paragraph 5.

13. See, for example, paragraph 54 of the *Exposé des motifs* attached to the 1960 Paris Convention (*supra*, note 3).

14. *International Convention on Civil Liability for Oil Pollution Damage*, Brussels 29 November 1969. The Convention entered into force on 19 June 1975. Amendments were adopted in 1984 and 1992, but they have not yet entered into force: see *infra*, note 23.

by pollution resulting from the escape or discharge of oil from ships, allows victims to bring their actions for compensation in the courts of *any* State Party or Parties where damage was suffered; only after the shipowner liable has constituted a fund for the total sum representing the limit of his liability with a court of any one of the States where damage was suffered, does this court become exclusively competent to determine all matters relating to the apportionment and distribution of the fund.¹⁵ A similar solution has been adopted in the 1996 IMO Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea (HNS Convention).¹⁶

As for the specific choices made in the nuclear liability conventions, the general rule that a court of the incident State has jurisdiction would not seem to cause major practical difficulties in the event of a minor incident where damage is mainly suffered in the territory of that State; on the other hand, in the event of a major nuclear incident causing damage in the territory of many States, sometimes at a considerable distance from the place of the incident, practical disadvantages for foreign victims having to bring their actions in the competent court of the incident State may be considerable. Disadvantages would be even more obvious in the event of an incident occurring in the course of transport outside the territory, or territorial sea, of a State Party to the applicable convention: in such a case, all victims would have to bring their actions in the competent court of the installation State, which might be at an even greater distance. Such practical disadvantages were, indeed, envisaged by the drafters of the nuclear liability conventions, but the conclusion was eventually reached that it was impossible “to find another solution which would enable the victims to refer to their national courts and which would at the same time secure unity of jurisdiction”.¹⁷

The author of this article shares the view that, at least in the case of a major nuclear incident causing transboundary damage, the competence of an international tribunal applying specific rules of procedure would be more appropriate than jurisdiction of national courts.¹⁸ Proposals to such effect were, indeed, put forward by some States within the IAEA Standing Committee on Liability for Nuclear Damage during negotiations on the revision of the Vienna Convention,¹⁹ but such proposals were unfortunately opposed by most “nuclear” States and were eventually dropped.

Seen in this context, the new provisions on jurisdiction in the 1997 Vienna Protocol and in the Convention on Supplementary Compensation can be regarded as a minor, but important, step forward towards better protection of victims of nuclear incidents, in particular where such incidents occur in the course of maritime transport. In fact, by equating a Party’s exclusive economic zone (which has a maximum breadth of two hundred nautical miles) to its territorial sea (whose maximum breadth is a mere twelve nautical miles), these provisions will allow victims to bring their actions in their national court in many more cases, thus avoiding the need to refer to a court of the installation State.

15. See Article IX of the Oil Pollution Convention.

16. *International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea*, London, 3 May 1996. The Convention (which does not apply to damage caused by radioactive material “of class 7 either in the International Maritime Dangerous Goods Code, as amended, or in appendix B of the Code of Safe Practice for Solid Bulk Cargoes, as amended”) will not enter into force until eighteen months after at least 12 States, including 4 States with at least 2 million units of gross tonnage, have expressed their consent to be bound by it. Articles 38 and 39 relate to jurisdiction.

17. *Exposé des motifs* attached to the 1960 Paris Convention (*supra*, note 3), paragraph 55.

18. In this sense, see, for example: Lopuski, *Liability for Nuclear Damage. An International Perspective*, Warsaw, 1993, at p. 67.

19. See, in particular, proposals by Austria and the Netherlands during the second, third, fourth and sixth sessions of the Standing Committee.

From a different point of view, the new provisions on jurisdiction also seem, to some extent, a natural consequence of the new provisions on so-called “geographical scope” which have also been inserted in the 1997 conventions.

Whereas the 1960 Paris Convention and the 1963 Brussels Convention supplementary thereto only cover damage suffered in the territory of States Parties,²⁰ the 1963 Vienna Convention does not expressly address the issue and is generally interpreted as allowing each Party freely to decide whether or not to cover damage suffered outside the territory of other Parties. On the other hand, the 1997 Protocol to Amend the Vienna Convention expressly covers damage “wherever suffered”, but only as a matter of principle: the legislation of the installation State will in fact be allowed to exclude damage suffered in the “territory” or “in any maritime zones established by a non-contracting State in accordance with the international law of the sea”, except where such State has no nuclear installations in its “territory” or “maritime zones”, or where it affords equivalent reciprocal benefits.²¹ Thus, damage suffered in the “territory” or “maritime zones” of all States Parties, as well as damage suffered on the high seas, will always be covered. As for the 1997 Convention on Supplementary Compensation, the fund thereby established in order to increase the amount of compensation will always be reserved to cover damage suffered in the “territory” or “in or above the exclusive economic zone or continental shelf of a Contracting Party in connection with the exploitation or the exploration of the natural resources of that exclusive economic zone or continental shelf”.²²

Thus, the new conventions take into account the changes which have taken place in the international law of the sea in recent times. It seems clear that, once it is accepted that the civil liability regime must cover not only damage suffered in the territorial sea, but also in other “maritime zones” established by a coastal State in accordance with the law of the sea, it would be unreasonable to allow the victims to refer to the competent court of the coastal State if an incident occurs in its territorial sea, but ask them to bring their actions in a court of the installation State if the incident occurs in such other “maritime zones”.

The reason why the drafters of the 1997 conventions chose the exclusive economic zone, as opposed to other “maritime zones”, in order to widen the scope of the coastal State’s civil jurisdiction will be made clearer, it is hoped, by a brief reference to the new law of the sea in the next paragraph. However, it may be interesting to point out right away that the solution adopted in the 1997 conventions is part of a wider trend to equate the exclusive economic zone to the territorial sea for the purpose of determining which court, or courts, have jurisdiction for actions originating from industrial incidents occurring in the course of dangerous activities and having transboundary effects.

For example, the 1969 Oil Pollution Convention was recently amended in order to cover damage caused in the exclusive economic zone of a State Party and, in that context, jurisdiction for actions for compensation was granted to the courts of any State Party within whose exclusive

20. See Article 2 of the 1960 Paris Convention, which, however, allows the legislation of the installation State to cover damage suffered in the territory of third States. As for the 1963 Brussels Convention, Article 2 makes it clear that the Convention only covers damage suffered in a Party’s territory. However, damage suffered on the high seas is also covered, provided it is suffered on board a ship or aircraft registered in a Party’s territory or by a Party’s national.

21. See Article 3 of the Protocol.

22. See Article V of the Convention. Like the 1963 Brussels Convention, the Convention also covers damage suffered “in or above maritime areas beyond the territorial sea of a Contracting Party” (including the high seas but excluding third States’ territorial waters) by a Party’s national or on board a ship or aircraft registered in a Party’s territory; in addition, the Convention also covers damage suffered “on or by an artificial island, installation or structure under the jurisdiction of a Contracting Party”.

economic zone damage is suffered.²³ Similarly, the 1996 HNS Convention covers damage by contamination of the environment caused in the exclusive economic zone of a State Party, and then provides that actions for compensation may be brought against the shipowner only in the courts of any State Party where such damage was caused.²⁴

3. The international law of the sea and maritime zones beyond a State's territory

As stated above, the new provisions on jurisdiction in the 1997 conventions take into account the changes which have recently occurred in the international law of the sea and which are reflected in the 1982 United Nations Convention on the Law of the Sea²⁵ (LOS Convention). The new law of the sea no longer allows for a strict alternative between the territorial sea, which is considered as part of the coastal State's territory,²⁶ and the high seas, considered as being open to all nations and encompassing all parts of the sea that are not included in the territorial or internal waters of any coastal State.²⁷ On the contrary, one of the characteristics of the new law of the sea is precisely that the territorial sea is no longer the only form in which the power of the coastal State is manifested over sea areas: whereas the outer limit of the territorial sea²⁸ is still considered as marking the seaward frontier of coastal States, it is now generally recognised that such States can exercise specialised rights beyond their territorial sea within certain maritime zones which are situated between the territorial sea and the high seas.²⁹

23. See Articles 3 and 8 of the *Protocol to Amend the International Convention on Civil Liability for Oil Pollution Damage*, adopted in London on 25 May 1984. When it became clear that this Protocol would probably never enter into force because of the difficulty to meet its entry into force requirements, similar provisions were inserted in a new amending Protocol, adopted in London on 27 November 1992. The 1992 Protocol will enter into force twelve months after ratification or accession on the part of 10 States including 4 States with at least 1 million units of gross tanker tonnage.

24. See Articles 3 and 38(1) of the HNS Convention.

25. *United Nations Convention on the Law of the Sea*, Montego Bay 10 December 1982. The Convention entered into force on 16 November 1994 after the adoption, on 29 July 1994, of an agreement relating to the application of its Part XI, which entered into force on 28 July 1996 (but which was provisionally applicable as from the date of the entry into force of the LOS Convention). Article 311 specifies that the Convention is designed to replace, as between Parties, the four Geneva Conventions of 29 April 1958: the Convention on the Territorial Sea and the Contiguous Zone, the Convention on the High Seas, the Convention on Fishing and Conservation of the Living Resources of the High Seas, and the Convention on the Continental Shelf.

26. See Article 1 (1) of the 1958 Geneva Convention on the Territorial Sea and the Contiguous Zone and Article 2 (1) of the 1982 LOS Convention. The territorial sea is measured from the low-water line along the coast or from straight baselines which the coastal State is allowed to draw in specific cases: in such cases, the waters lying inside the baselines are called "internal waters" and, like territorial waters, are subject to the coastal State's territorial sovereignty.

27. See Articles 1 and 2 of the 1958 Geneva Convention on the High Seas.

28. Article 3 of the LOS Convention states that the outer limit of the territorial sea cannot extend further than twelve nautical miles from the baselines. Before 1982, the maximum breadth of the territorial sea was controversial both in State practice and in the legal literature, since the 1958 Geneva Convention on the Territorial Sea and the Contiguous Zone had not expressly laid down a limit.

29. It is significant that the LOS Convention no longer defines the high seas as encompassing all parts of the sea that are not included in a State's internal or territorial waters: under Article 86, Part VII of the Convention, relating to the high seas, applies to "all parts of the sea that are not included in the exclusive economic zone, in the territorial sea or in the internal waters of a State...".

The oldest of such zones is the *contiguous zone*, which has a maximum breadth of twenty-four miles measured from the baselines of the territorial sea;³⁰ this is a zone where the coastal State can exercise the control necessary to prevent and punish infringements of its customs, fiscal, immigration or sanitary laws and regulations, committed, or about to be committed, “within its territory or territorial sea”.³¹ The contiguous zone, which is optional and only exists if the coastal State has expressly proclaimed it, is not very relevant for the purposes of the international regime of civil liability for nuclear damage: it is significant that neither the 1960 Paris Convention nor the 1963 Vienna Convention made any reference to it despite the fact that its existence had been recognised long before their adoption and had been “codified” in the 1958 Geneva Convention on the Territorial Sea and the Contiguous Zone.

Surprisingly enough, during negotiations within the IAEA Standing Committee on Liability for Nuclear Damage, Spain insisted on the need to cover damage suffered in a Party’s contiguous zone and/or to exclude damage suffered in the contiguous zones of third States,³² whereas most other States simply wanted to refer to the continental shelf and to the exclusive economic zone.³³ A compromise was eventually reached whereby Article 3 of the 1997 Vienna Protocol ambiguously refers to damage suffered in the “maritime zones” established “in accordance with the international law of the sea”,³⁴ whereas Article V of the 1997 Convention on Supplementary Compensation only covers damage suffered “in or above the exclusive economic zone ... or on the continental shelf of a Contracting Party in connection with the exploitation or the exploration of the natural resources” of such zones.³⁵

30. See Article 33 (2) of the LOS Convention. Under Article 24 (2) of the 1958 Geneva Convention on the Territorial Sea and the Contiguous Zone, the maximum breadth of the zone was twelve miles from the baselines of the territorial sea. Since, however, twelve miles is now the maximum breadth of the territorial sea, the LOS Convention allows a coastal State to extend its contiguous zone to a further twelve miles from the outer limit of its territorial sea.

31. See Article 24 (1) of the 1958 Geneva Convention on the Territorial Sea and the Contiguous Zone and Article 33 (1) of the LOS Convention.

32. A proposal to that effect was first presented in 1995, during the thirteenth session of the Standing Committee, but received virtually no support. The Spanish delegation seemed to attach much importance to the fact that, unlike the 1958 Convention, the LOS Convention no longer defines the contiguous zone as an area of the high seas. But that surely follows from the fact that the LOS Convention allows a coastal State to claim an exclusive economic zone and in no way implies a change in the nature of the coastal State’s rights in the contiguous zone. Indeed, if the coastal State had no exclusive economic zone, its contiguous zone would still form part of the high seas: this seems to follow from the definition of the high seas in Article 86 of the LOS Convention.

33. See the original text of the Draft Protocol in *IAEA Doc. SCNL/13/INF.3*, at p. 61.

34. As stated above (paragraph 2), Article 3 provides that the Protocol applies to damage wherever suffered, but that the legislation of the installation State can, upon certain conditions, exclude damage suffered in the territory, or “maritime zones”, of a third State. This solution, which was adopted without giving much thought to its implications, seems rather unsatisfactory to this writer. In fact, on the one hand, damage suffered in a Party’s “maritime zones” or on the high seas will always be covered, irrespective of whether it is suffered by a Party’s national or on board a ship registered in a Party’s territory; on the other hand, if the legislation of the installation State confines itself to excluding damage suffered “in any maritime zones” established by third States “in accordance with the international law of the sea”, coverage of damage suffered beyond those States’ territorial waters will depend on whether or not each of them has claimed an exclusive economic zone. In other words, if a third State has not claimed an exclusive economic zone damage suffered beyond its territorial waters will be covered, whereas such damage will not be covered if that State has claimed an exclusive economic zone, even if suffered by a Party’s national or on board a ship registered in a Party’s territory.

35. As stated above (note 22), the Convention also covers damage suffered by a Party’s national or on board a ship or aircraft registered in a Party’s territory, irrespective of whether such damage is suffered in a Party’s “maritime zones”, on the high seas, or in a third State’s “maritime zones” (excluding its territorial sea); in addition, it covers damage suffered on or by an artificial island or structure under a Party’s jurisdiction.

This writer finds it difficult to understand precisely what kinds of damage suffered in the contiguous zone Spain wanted to refer to.³⁶ On the other hand, coverage of damage suffered in a Party's exclusive economic zone or on its continental shelf seems entirely justified in light of the nature of the coastal State's rights in or over such zones.

The *continental shelf* is not actually a sea area since it comprises the sea-bed and subsoil of the submarine areas extending beyond a State's territorial sea and does not affect the legal status of the superadjacent waters. The coastal State enjoys "sovereign rights" over its continental shelf for the purpose of exploring it and exploiting its natural resources, including so-called "sedentary fisheries".³⁷ It is only natural, therefore, that damage suffered in connection with the exploration or exploitation of a Party's continental shelf should be covered by a uniform regime of civil liability for nuclear damage, even if suffered by third States' nationals or on board a ship or aircraft registered in a third State.

The same is true for the *exclusive economic zone*, which is an area beyond and adjacent to the territorial sea where the coastal State enjoys a complex of "rights, jurisdiction and duties", among which are "sovereign rights" for the purpose of "exploring and exploiting, conserving and managing the natural resources of the waters superadjacent to the sea-bed and of the sea-bed and its subsoil".³⁸

Whereas rights over the continental shelf do not depend on occupation or on any express proclamation,³⁹ the exclusive economic zone, like the contiguous zone, is optional and its existence depends on an actual claim. If a coastal State has claimed an exclusive economic zone, its rights over the continental shelf are, to some extent, absorbed by its rights in the exclusive economic zone.⁴⁰ If, on the other hand, the coastal State has not claimed an exclusive economic zone, the waters above its continental shelf remain subject to the regime of the high seas.⁴¹

This brief, and necessarily superficial, description of the specialised zones which exist, or may exist, between a State's territorial sea and the high seas also seems to shed some light on the reasons behind the choice of the exclusive economic zone made by the drafters of the 1997 Vienna Protocol and the Convention on Supplementary Compensation in order to extend the coastal State's civil jurisdiction in case of nuclear incidents occurring in the course of maritime transport. In fact, the

36. In fact, in the context of the original Draft Protocol (*supra*, note 33), coverage of damage suffered in a Party's contiguous zone by a Party's national or on board a ship registered in a Party's territory would have been assured anyway. Similarly, the exclusion of damage suffered in third States' contiguous zones would have resulted from the exclusion of damage suffered in their exclusive economic zones. It is true that, if a third State had no exclusive economic zone, damage suffered in its contiguous zone by a Party's national or on board a ship registered in a Party's territory would have been covered, but that seemed reasonable since, in such a case, the contiguous zone could still be defined as an area of the high seas: see *supra*, note 32. As for the Convention on Supplementary Compensation, if a Party has no exclusive economic zone but has a contiguous zone, damage suffered therein by a Party's national or on board a ship or aircraft registered in a Party's territory would be covered under Article V (1) (b).

37. See Articles 1, 2 and 3 of the 1958 Geneva Convention on the Continental Shelf and Articles 76 to 78 of the LOS Convention.

38. See Articles 55 and 56 of the LOS Convention. Under Articles 60 and 80 of the LOS Convention, a coastal State also enjoys the exclusive right to construct or authorise and regulate the construction, operation and use of artificial islands, installations and structures within its exclusive economic zone or on its continental shelf; under Article 56, it enjoys "jurisdiction" with regard to the establishment and use of such islands, installations or structures. Understandably therefore, Article V (1) (b) of the Convention on Supplementary Compensation covers damage suffered "on or by an artificial island, installation or structure under the jurisdiction of a Contracting Party".

39. See Article 2 (3) of the 1958 Geneva Convention on the Continental Shelf and Article 77 (3) of the LOS Convention.

40. This is only partly true since the continental shelf may actually extend beyond the outer limit of the exclusive economic zone: see Article 76 of the LOS Convention, and *infra*, note 42.

41. This follows from Articles 78 and 86 of the LOS Convention.

choice of the contiguous zone would have extended the coastal State's jurisdiction to a mere twenty-four miles from the baselines of its territorial sea, and would have made little sense anyway. As for the continental shelf, this is not really a sea area since the superadjacent waters are either part of the high seas or of the coastal State's exclusive economic zone. In addition, the width of the continental shelf, as a legal concept, depends to some extent on the extension of that part of the sea-bed which can reasonably be considered as the "natural prolongation" of the coastal State's land territory.⁴²

The exclusive economic zone, whose maximum breadth is two hundred miles from the coastal State's territorial sea baselines, was, therefore, the obvious candidate. As seen above, however, the exclusive economic zone only exists if the coastal State has expressly claimed it: while there may be various good reasons why some coastal States have yet to claim an exclusive economic zone, the drafters of the 1997 conventions understandably felt that it would have been unreasonable to ask the victims to bring their actions in a court of the installation State in the event of a nuclear incident occurring within two hundred miles of the coast, simply because the coastal State had not (yet) claimed an exclusive economic zone. This explains why both conventions state that, if an exclusive economic zone does not exist, jurisdiction still lies with the competent court of the coastal State if an incident occurs "in an area not exceeding the limits of an exclusive economic zone, were one to be established".⁴³ In this respect also, precedents can be found in the 1969 Oil Pollution Convention, as will be amended by a 1992 Protocol,⁴⁴ and in the 1996 HNS Convention,⁴⁵ which, indeed, was specifically mentioned during negotiations within the IAEA Standing Committee.

4. The international law of the sea and civil jurisdiction for acts outside a State's territory

Even if the law of the sea has influenced the new provisions on jurisdiction in the 1997 conventions, there remains to be seen whether or not these provisions are actually in keeping with the law of the sea. In fact, in the later stages of negotiations within the IAEA Standing Committee as well as during the 1997 diplomatic conference, some States and in particular the Russian Federation expressed worries that the new provisions might actually extend coastal States' "jurisdiction" beyond what is permitted under the 1982 LOS Convention and/or the corresponding rules of international customary law. These worries are to some extent reflected in the proviso stating that the new provisions shall not be interpreted "as permitting the exercise of jurisdiction in a manner, which is contrary to the international law of the sea, including the United Nations Convention on the Law of the Sea".⁴⁶ But in this writer's opinion, a conflict between the new provisions on jurisdiction and the law of the sea does not really arise.

42. Whereas the continental shelf has a *minimum* breadth of 200 miles from the baselines of the coastal State's territorial sea, it can in fact extend much further "throughout the natural prolongation of its territory to the outer edge of the continental margin". There *is*, however, a maximum limit of the continental shelf: under Article 76 of the LOS Convention, the outer limit of the shelf cannot exceed either 350 nautical miles from the baselines of the territorial sea or 100 nautical miles from the 2 500 metre isobath, *i.e.* "a line connecting the depth of 2,500 metres".

43. However, in order to be able to exercise jurisdiction, the coastal State must have notified the Depository of such area prior to the nuclear incident: see Article XIII (2) of the 1997 Convention on Supplementary Compensation and Article 12 (1) of the 1997 Vienna Protocol.

44. See *supra*, note 23.

45. See *supra*, note 24.

46. See Article 12 (1) of the 1997 Vienna Protocol and Article XIII (2) of the Convention on Supplementary Compensation.

The law of the sea traditionally aims at finding a compromise between the exercise of States' authority over sea areas and the idea of the freedom of the seas, intended mainly as freedom of navigation: this explains why the law of the sea is mainly, though not exclusively, concerned with the exercise of governmental power resulting in *material* interference with foreign shipping.

It is significant, in this respect, that even within a coastal State's territorial sea ships of all nations enjoy a so-called "right of innocent passage",⁴⁷ and that, in order to avoid undue interference with such passage, limits are provided in respect of the exercise of criminal and civil jurisdiction on the part of the coastal State. As far as criminal jurisdiction is concerned, the coastal State is expected not to exercise its jurisdiction "on board" a foreign ship in order to arrest any person or to conduct any investigation in connection with a crime committed on board the ship during its passage unless the consequences of the crime "extend to the coastal State" or if the crime is of a kind to disturb "the peace of the country" or "the good order of the territorial sea".⁴⁸ As for civil jurisdiction, the coastal State is expected "not to stop or divert a foreign ship passing through the territorial sea for the purpose of exercising its civil jurisdiction in relation to a person on board the ship"; in addition, it may not "levy execution against or arrest the ship for the purpose of any civil proceedings, save only in respect of obligations or liabilities assumed or incurred by the ship itself in the course or for the purpose of its passage through the waters of the coastal State".⁴⁹

It seems clear, therefore, that what matters is not the fact *per se* that the coastal State extends the jurisdiction of its courts to acts committed on board a foreign ship: the purpose of such provisions is rather to avoid undue interference with the ship during its "innocent" passage through the territorial sea. *Mutatis mutandis*, similar considerations apply as regards the exercise of jurisdiction over facts occurring or acts committed beyond a coastal State's territorial sea within its exclusive economic zone or on the high seas, where foreign ships enjoy "freedom of navigation".⁵⁰ It must be pointed out in this respect that, if a coastal State has no exclusive economic zone, the exercise of jurisdiction on the part of its courts in respect of a nuclear incident occurring within two hundred miles from its coast but beyond its territorial sea would amount to the exercise of jurisdiction for an incident occurred on the high seas.

47. See Articles 14 *et seq.* of the 1958 Geneva Convention on the Territorial Sea and the Contiguous Zone and Articles 17 *et seq.* of the LOS Convention. Both conventions state that the coastal State can take "the necessary steps" to prevent passage which is not "innocent". It may be interesting to point out in this context that Article 19 of the LOS Convention contains a list of activities which are considered incompatible with the concept of innocent passage, and that the carriage of nuclear substances or materials is not listed among such activities. Although the list is not exhaustive, Article 23 of the LOS Convention implicitly confirms that foreign nuclear-powered ships and ships carrying nuclear or "other inherently dangerous or noxious substances" enjoy the right of innocent passage: in fact, the article in question provides that, when exercising passage, such ships must carry documents and "observe special precautionary measures" established for them by international agreements. In addition, under Article 22, the coastal State may require them to confine their passage to such sea lanes as it may designate or prescribe, where this is necessary for the safety of navigation.

48. See Article 19 of the 1958 Geneva Convention on the Territorial Sea and the Contiguous Zone and Article 27 of the LOS Convention. In addition, the exercise of criminal jurisdiction "on board" the ship is permitted if necessary for the suppression of illicit traffic in narcotic drugs or if requested by the ship's master or by a diplomatic agent or consular officer of the flag State.

49. See Article 20 of the 1958 Geneva Convention on the Territorial Sea and the Contiguous Zone and Article 28 of the LOS Convention. Execution or arrest are, however, permitted for the purpose of "any" civil proceedings if the ship is lying in the territorial sea or passing through it after leaving internal waters.

50. Under Article 58 of the LOS Convention, freedom of navigation and overflight is listed among freedoms enjoyed by all States in a coastal State's exclusive economic zone. As for the high seas, see Article 2 of the 1958 Geneva Convention on the High Seas and Article 87 of the LOS Convention.

In a famous judgement rendered in 1927 and relating to a claim to exercise criminal jurisdiction against an officer of a foreign ship for a collision which occurred on the high seas, the Permanent Court of International Justice dismissed the idea “that international law prohibits a State from exercising jurisdiction, in its own territory, in respect of any case which relates to acts which have taken place abroad, and in which it cannot rely on some permissive rule of international law”; on the contrary, the Court held that, “far from laying down a general prohibition to the effect that States may not extend the application of their laws and the jurisdiction of their courts to persons, property and acts outside their territory, it leaves them in this respect a wide measure of discretion which is only limited in certain cases by prohibitive rules; as regards other cases, every State remains free to adopt the principles which it regards as best and most suitable”.⁵¹

In this writer’s opinion, even if the evolution of the law since 1927 is taken into account,⁵² there is still no such general prohibition in customary international law, nor are there specific prohibitive rules in the law of the sea preventing the courts of a coastal State from exercising civil jurisdiction for actions for compensation arising out of a nuclear incident occurring beyond its territorial sea. This conclusion seems to be confirmed, in particular, by Part XII of the 1982 LOS Convention dealing with the “protection and preservation of the marine environment”: in fact, Article 229 unambiguously states that nothing in the LOS Convention affects “the institution of civil proceedings in respect of any claim for loss or damage resulting from pollution of the marine environment”.

When it comes to enforcement action, Article 220, relating to pollution from ships, allows the coastal State to “institute proceedings, including detention of the vessel” only if there is clear evidence that a vessel, while navigating in the exclusive economic zone⁵³ or in the territorial sea, committed a violation of environmental rules resulting in a “discharge causing major damage or threat of major damage to the coastline or related interests of the coastal State, or to any resources of its territorial sea or exclusive economic zone”.⁵⁴ No interference with the ship seems, therefore, to be allowed if the coastal State has no exclusive economic zone and an incident occurs on the high seas. But account must be taken in this respect of Article 221 (1) whereby nothing in Part XII of the LOS Convention “shall prejudice the right of States, pursuant to international law, both customary and

51. *Permanent Court of International Justice, Collection of Judgements, Series A/B, No. 22, The Case of the S.S. “Lotus”,* at p. 19. The Court then held that no prohibitive rule prevented a State from exercising criminal jurisdiction in its own territory over acts occurred on board a foreign ship on the high seas (at p. 25).

52. It may be interesting to point out in this respect that a specific prohibitive rule has evolved precisely in respect of cases such as the one decided by the Court in 1927: Article 97 of the LOS Convention unequivocally states that penal or disciplinary jurisdiction in matters of collision or any other incident of navigation concerning a ship on the high seas exclusively lies with the judicial or administrative authorities of either the flag State or the State of which the person responsible is a national.

53. Apart from the protection of the marine environment, Article 73 (1) of the LOS Convention states that “the coastal State may, in the exercise of its sovereign rights to explore, exploit, conserve and manage the living resources in the exclusive economic zone, take such measures, including boarding, inspection, arrest and judicial proceedings, as may be necessary to ensure compliance with the laws and regulations adopted by it in conformity with this Convention”.

54. Where there is no evidence of a discharge but there are grounds for believing that the vessel has violated environmental rules, the coastal State can only require the vessel to give information regarding its identity and port of registry, its last and next port of call and “other relevant information”. Where there is evidence of a “substantial” discharge but only “significant pollution”, as opposed to “major damage”, has been caused or threatened, the coastal State may undertake “physical inspection” of the ship if the ship has refused to give information or if the information supplied is manifestly at variance with the evident factual situation, but can still not “institute proceedings”. On the other hand, Article 216 gives general enforcement powers with respect to pollution by “dumping”, defined in Article 1 as including “any deliberate disposal of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea”, as well as any deliberate disposal of such vessels, aircraft, platforms or structures.

conventional,⁵⁵ to take and enforce measures beyond the territorial sea proportionate to the actual or threatened damage to protect their coastline or related interests, including fishing, from pollution or threat of pollution following upon a maritime casualty or acts relating to such a casualty, which may reasonably be expected to result in major harmful consequences”.⁵⁶

5. Main implications of the new provisions

If, then, no prohibitive rule exists in the law of the sea preventing a coastal State from extending the civil jurisdiction of its courts to nuclear incidents outside its territorial sea, precisely such a rule exists for parties to the 1960 Paris Convention or the 1963 Vienna Convention, which give exclusive jurisdiction over such incidents to the competent court of the installation State. As stated above, the purpose of the new provisions adopted at the 1997 Vienna conference is to replace that rule and allow the coastal State to exercise jurisdiction.

Indeed, a Party to the 1997 Vienna Protocol and/or the Convention on Supplementary Compensation will actually be obliged, *vis-à-vis* other Parties, to ensure that one of its courts has jurisdiction for incidents occurring within its exclusive economic zone. If, on the other hand, that Party has not (yet) established an exclusive economic zone and an incident occurs within two hundred miles from its coast, jurisdiction will lie with the competent court of the installation State, unless, prior to the incident, it has notified the Depository of its intention to exercise jurisdiction for incidents occurring in an area not exceeding the limits of an exclusive economic zone.

As seen above, however, a proviso was added to Article XIII of the 1997 Convention on Supplementary Compensation to the effect that, if the exercise of jurisdiction on the part of the coastal State is inconsistent with its obligations under Article XI of the Vienna Convention or Article 13 of the Paris Convention in relation to a State not party to the Convention on Supplementary Compensation, “jurisdiction shall be determined according to those provisions”. In this writer’s opinion, this proviso is, in some respects, superfluous and, in others, unfortunate in that it may have very negative and (perhaps) unforeseen consequences.

During negotiations within the IAEA Standing Committee, the supporters of the proviso presented it as a means of avoiding possible “conflicts of jurisdiction” which might arise until all States party to either the Paris or the unamended Vienna Convention had ratified or acceded to the new Convention on Supplementary Compensation, but such “conflicts of jurisdiction” are not very likely to arise: in fact, if the coastal State were a party to the Convention on Supplementary Compensation but the installation State were not, the Convention would not apply and there could be no “conflict of jurisdiction”;⁵⁷ if, on the other hand, both the coastal State and the installation State were party to the

55. Account must be taken in this connection of the 1969 IMCO Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, which was adopted following the 1967 incident of the Liberian tanker *Torrey Canyon*.

56. Paragraph 2 of Article 221 defines “maritime casualty” as “a collision of vessels, stranding or other incident of navigation, or other occurrence on board a vessel or external to it resulting in material damage or imminent threat of material damage to a vessel or cargo”.

57. Under Article II (2), the Convention only applies if liability for nuclear damage lies with the operator of an installation situated in the territory of a Party thereto.

Convention, the new rule would prevail in their mutual relations and there would again be no “conflict of jurisdiction”.⁵⁸

But the proviso does not in fact refer to “conflicts of jurisdiction”: rather, it refers to possible conflicts of conventional “obligations” for the coastal State. It would seem to follow that coastal States party to either the 1960 Paris Convention or the unamended Vienna Convention will be prevented from exercising jurisdiction for nuclear incidents outside their territorial sea until *all* parties to the applicable convention have ratified or acceded to the new Convention on Supplementary Compensation;⁵⁹ until that happens, jurisdiction for incidents occurring within their exclusive economic zone, or equivalent area, will continue to lie with the courts of the installation State, even if the installation State has in fact already ratified or acceded to the new Convention. It may seem ironic that a similar proviso was not adopted in the context of the Vienna Protocol, since conflicts of conventional obligations, and indeed in some cases even real “conflicts of jurisdiction”, might well arise in relations between Parties to the Protocol and Parties to the unamended Vienna Convention.⁶⁰

Leaving aside the question of possible conflicts of conventional obligations, the main practical problems which may arise as a result of the new provisions on jurisdiction seems to relate to the delimitation of the exclusive economic zone, or of the equivalent area, between States whose coasts are opposite or adjacent.⁶¹ In fact, Article 74 of the LOS Convention merely states that the delimitation of the exclusive economic zone “shall be effected by agreement on the basis of international law ... in order to achieve an equitable solution”, and that, pending such agreement, the States concerned, “in a spirit of understanding and co-operation, shall make every effort to enter into provisional arrangements of a practical nature”; no rule is laid down which might apply where neither an agreement nor provisional arrangements are reached between the States concerned. One might then ask what would happen if a nuclear incident occurred in a disputed area claimed by more than one Party as part of its exclusive economic zone, or of the equivalent area.⁶²

58. This does not mean that such States would not be guilty of a violation of either the Paris or the (unamended) Vienna Convention in their relations with Parties thereto which had not yet ratified or acceded to the Convention on Supplementary Compensation: see Article 30 (5) of the 1969 Vienna Convention on the Law of Treaties.

59. Under Article 30 (2) of the 1969 Vienna Convention on the Law of Treaties, “when a treaty specifies that it is subject to, or that it is not to be considered as incompatible with, an earlier or later treaty, the provisions of that other treaty prevail”.

60. Under Article 19 of the 1997 Vienna Protocol, Parties to the unamended Vienna Conventions will still be bound by its provisions when they ratify or accede to the amending Protocol, in their relations with other Parties which have not (yet) ratified or acceded to the Protocol. Similarly, when States not party to the unamended Vienna Convention ratify or accede to the 1997 Protocol they will also be bound by the unamended convention in their relations with the Parties thereto, unless they express a contrary intention.

61. Of course, in the case of States whose coasts are opposite, problems would only arise if the distance between the baselines of their respective territorial seas were less than four hundred miles.

62. The same question may actually be asked in the event of a nuclear incident occurring in an area claimed by more than one State as part of its territorial sea. In this case, however, both Article 12 of the 1958 Geneva Convention on the Territorial Sea and the Contiguous Zone and Article 15 of the LOS Convention provide that, in the absence of a delimitation agreement, neither of the States concerned can extend its territorial sea “beyond the median line every point of which is equidistant from the nearest points on the baselines from which the breadth of the territorial sea of each of the two States is measured”. It is true that this provision is said not to apply “where it is necessary by reason of historic title or in other special circumstances, to delimit the territorial sea of the two States in a way, which is at variance therewith”. But it would seem that the median line rule could still be provisionally applied until an agreement is reached on the effect of such special circumstances (such as, for example, an island lying “on the wrong side” of the median line). As for historic titles, this writer believes that historic titles relevant for the delimitation of maritime areas between two States are really in the nature of tacit delimitation agreements: see Gioia, *The Law of Multinational Bays and the Case of the Gulf of Fonseca*, in *Netherlands Yearbook of International Law*, Vol. XXIV (1993), pp. 81 *et seq.*, at pp. 111 *et seq.* and in note 101.

As far as the delimitation of the exclusive economic zone is concerned, Part XV of the LOS Convention, dealing with the settlement of disputes, provides in general that, if no settlement has been reached by the parties by means of their own choice, disputes relating to the interpretation or application of the Convention can be submitted, at the request of any party, to compulsory procedures entailing binding decisions. But then Article 298 allows a State at any time to declare that it does not accept such compulsory procedures with respect to certain categories of disputes, among which are those concerning the interpretation or application of Article 74. If a State has not claimed an exclusive economic zone but has declared that it will exercise jurisdiction for nuclear incidents occurring within an area of equivalent extension, Part XV of the LOS Convention will not even be applicable to disputes concerning the delimitation of such area, since, for the purposes of the law of the sea, that area is part of the high seas.

It is unfortunate then that the drafters of the 1997 conventions have finally opted for dispute settlement procedures that give no assurances of binding decisions. In fact, both Article 17 of the Vienna Protocol and Article XVI of the Convention on Supplementary Compensation provide that, if no settlement has been reached within six months, disputes shall be submitted to compulsory arbitration or judicial settlement, but then allow each ratifying or acceding State to declare that it will not be bound by such provisions.

CASE LAW AND ADMINISTRATIVE DECISIONS

CASE LAW

France

*French Case Law in the Medical Field concerning Ionising Radiation**

Introduction

Since a judgement handed down by the Seine Civil Tribunal on 29 March 1899, medical liability arising from the use of ionising radiation has given rise to a considerable number of decisions by the courts.

According to the Basic Standards and the amended Community Directive 97/43 of 30 June 1997¹ concerning the health protection of individuals against the dangers of ionising radiation in relation to medical exposure, the dose limits laid down by these Standards do not apply to the exposure of patients as part of their medical diagnosis or treatment. The reason for this exclusion has been given by the International Commission on Radiological Protection (ICRP),² in particular in its Publication 26 (1972), paragraph 92, which reads: “Medical exposure is, in general, subject to most of the Commission’s system of dose limitation, that is: unnecessary exposures should be avoided; necessary exposures should be justifiable in terms of benefits that would not otherwise have been received; and the doses actually administered should be limited to the minimum amount consistent with the medical benefit to the individual patient.”³ The individual receiving the exposure is himself the direct recipient of the benefit resulting from the procedure. For this reason it is not appropriate to apply the quantitative values of the Commission’s recommended dose-equivalent limits to medical exposures. With certain medical exposures a very much higher level of risk may in fact be justified by the benefit derived than by the level judged by the Commission to be appropriate for occupational

* This note on case law has been kindly prepared by Mr. Jean Hébert, former Head of the Nuclear Law Division, *Électricité de France*. Responsibility for the facts contained and the ideas expressed remains solely with the author.

1. O.J.E.C. L No.180/22 of 9 July 1997; it is to be implemented by Member States by 13 May 2000.
2. The ICRP is a non-governmental organisation, originating from the International Radiology Congresses, which drafts radiation protection provisions. These are transformed into legal standards by the European Union or the International Atomic Energy Agency.
3. On optimisation in general, see J. Lochard and M.Cl. Boehler: “Optimising radiation protection – the ethical and legal bases”, NEA Nuclear Law Bulletin, No.52, December 1993; M.Cl. Boehler: “À propos du principe d’optimisation de la protection radiologique et du principe de précaution”, *Revue Générale Nucléaire (R.G.N.)* 1996, No.6; M.Cl. Boehler: “Réflexions sur la responsabilité et l’accident radiologique ou nucléaire”, *S.F.E.N-I.N.L.A. Colloquium, Poitiers 1997*.

exposure or for exposure of members of the public.” ICRP Publication 60 (1990), paragraphs 139, and 179 to 184, together with Publication 73 of 1996 give further details on certain points.⁴ Community Directive 97/43 provides however for “diagnostic reference levels” and “levels of activity for typical examinations”, which could represent a dose-limit equivalent specific to the medical field. It is therefore only in order to simplify matters that we shall use “excessive doses” to mean doses administered during diagnosis and especially medical treatment by X-rays, radium, artificial radioelements or other sources of ionising radiation giving rise to injury and not satisfying these conditions or requirements.

To limit the scope of this paper, we shall exclude examination of the criminal liability of radiologists⁵ and the disciplinary function of the *Conseil de l’Ordre*, and the issue, in welfare law, of Table No. 6 occupational diseases, which has given rise to much discussion⁶ since this compensation regime is separate from radiation protection law (and dosimetry in particular).

We shall therefore focus on **civil case law** with regard to the liability of doctors to their patients, and on **administrative case law** about the liability of public hospitals. We shall, generally speaking, look only at those decisions which are specific to the medical use of radioactivity, excluding those which, although involving radiologists, deal with different questions not necessarily related to this medical activity, unless they illustrate the working of the two liability regimes applied successively, and in particular the one currently in force.

A. Third party liability

In civil case law, until 1936, the liability of a doctor towards his patient was usually established by means of delictual liability, with great importance being attached to the patient’s consent (which was, moreover, contradictory). Most decisions were based on Articles 1382 and 1383 of the Civil Code. It was held in a judgement of the *Cour de Cassation*, of 21 July 1862⁷ that “the courts are well advised not to interfere recklessly in the examination of medical theories or methods, but there are general rules of common sense and care which must be complied with in every profession, and thus doctors remain subject to the ordinary law like any other citizen”.

During the 1930s, certain courts were nevertheless tempted to proceed on the basis of Article 1384, paragraph 1, *in fine*. Thus on 19 March 1936 – between the judgement of the *Chambres Réunies* of 13 July 1930,⁸ which definitively established the presumption of liability of the “person in possession” (*guardian de la chose*) and the judgement of 20 May 1936, discussed below – the Court of Lyons held that a radiologist, as the person in possession of radiation, was liable for causing radiation dermatitis requiring the amputation of the leg following an operation to extract lead pellets. The Court

4. Ludo Veuchelen: “*Divers problèmes liés à l’utilisation médicale, scientifique et industrielle des radioisotopes*”, I.N.L.A. Nuclear Inter Jura 1997.

5. Judgement of the Court of Appeal of Paris, 1 July 1972, *Gazette du Palais* (hereinafter *Gaz. Pal*) 1973-1-29, conduct a verdict of passing a sentence of involuntary homicide on a radiologist who should have detected the error in the dose prescribed by a dermatologist which led to a fatal case of radiation dermatitis, is the only case we know of concerning radiology.

6. *Inter alia*: Toutée and de Nercy: “*À propos d’un cas de maladie professionnelle attribuée aux rayonnements ionisants*”, *Droit Social* 1967 No.1 pp.51 *et seq.*

7. *Cassation Requête*, 21 July 1862, Sirey 1862-1-818. This reference to “rules of common sense and care” was later used in many judgements, for example: Court of Appeal (hereinafter C.A.) of Besançon 16 October 1912, Sirey 1912-2-542; C.A. Paris, 16 January 1913, *Gaz. Pal.* 1913-2-130.

8. *Cass. Chambres Réunies*, 13 February 1930; *Jandheur Case*, *Dalloz Hebdomadaire* 1930-29.

of Appeal overturned this judgement, holding that it was mistaken as to the law.⁹ Since the judgement of principle of 20 May 1936¹⁰ case of the (Mercier couple, *les Époux Mercier*), only contractual liability had been recognised. This judgement was also handed down in relation to a radiographical accident, though this seems to be simply a coincidence.

Two periods should therefore be distinguished: before and after the Mercier judgement of 1936.

A-1. Period preceding the Mercier case of 1936

The first French decision was the judgement handed down by the Seine Civil Tribunal on 29 March 1899,¹¹ appointing an expert concerning the X-ray of a case of nephritis in the thigh, involving three sessions of 40, 45 and 75 minutes carried out in the early months of 1898, which gave rise to a deep burn without any radiographical picture being obtained. When it is remembered that X-rays were discovered by Röntgen in November 1895, it can be seen that our ancestors lost no time in applying their scientific research in practice.¹² Thus, Antoine Béclère made the first radiological diagnosis of pulmonary tuberculosis in 1896.

There was also a curious case in 1901 concerning ethics: a certain Mrs. Devevey had been attracted by an advertisement for free care in a large store (“simply bait” said the court), and was then treated by the doctor in his surgery for facial neuralgia, causing conjunctivitis and alopecia.¹³ Again in 1899, a doctor in Nice, who had acquired a Röntgen machine, offered a free radiographical examination to a worker who had suffered a work accident. The Court of Aix held that he “had treated the man simply as a guineapig, perhaps even as an opportunity to practice using devices which he had only recently acquired; that led on in this way by scientific curiosity to achieve a result not justified by his research, he came to forget all measures of caution”, the result being not only burns but “extreme lassitude”. The commentator wrote more bluntly that the victim had been “rendered impotent and maimed for life”.¹⁴ It would seem that in the shadow of gifted doctors such as Béclère or Regaud, and a little later Lacassagne, at the origin of radiology, there were some other doctors who had few scruples or mistaken ideas about their skill. In their defence, it should be said that the large number of sessions and their duration could be due to the poor quality of the electric current and its lack of standardisation, factors which gave rise to considerable difficulties for the manufacturers of the relevant apparatus and for practitioners. As for charlatans, they took advantage of the enthusiasm of the general public for this new marvel of science. If major department stores agreed to the installation of X-ray machines, it was because they were all but certain that all of Paris would flock to see their

9. *Cass. Civile*, 27 May 1940: Dr. T v. Durozat D.C. 1941-53, note Nast; *Gaz. Pal.* 1940-2-81 and also *Cass. Req.* 15 June 1937 *Le Bail Gaz. Pal.* 1937-II-411.

10. *Cass. Civ.* 20 May 1936: Dr. N. v. *Époux Mercier*, *Gaz. Pal.* 1936-2-41; *Dalloz Périodique* 1936-I-88.

11. *Tribunal Civil* Seine, 29 March 1899: *Macquaire v. Dr. Renault*, *Gaz. Pal.* 1899.668. The judgement as to substance, giving detailed reasons and highly critical, was handed down on 8 March 1901. *Le Droit* 21 March 1901 and *Gaz. Pal.* 1901 somm. 130, the Tribunal condemning the medical practitioner for negligence during an operation. He was criticised for not having a suitable chair or table available and for having placed the patient on the floor, using books to wedge her in place! See also *Bull. Société de Médecine Légale*, 1905, pp.116, 117.

12. M. Bertin: “*Les effets biologiques des rayonnements ionisants*” *E.D.F.* 1984 p.86 and Nándor Ratkozy, “*Dermatitis caused by the Röntgens Rays*”, *Lancet* 1 (1897) 396.

13. *T.Civ.* Seine, 5 January 1901: *Dame Devevey v. Dr. de Bourgade*, *Le Droit* 6 January 1901.

14. *C.A. Aix*, 22 October 1906; Dr. Chini v. Coconni D.P. 1907-II-41 note *Mérignac*, S.1909-II-321 note Perreau.

bones through their skin, and this was good for business. X-rays, and later radium, boosted sales. For instance, before the war, the labels on mineral water bottles boasted that the product was radioactive.¹⁵

Some years later, an expert appointed by the Narbonne Civil Tribunal, in a work accident case, investigating damage to bone marrow, said in 1903 that his examination had to be supplemented by radiography.¹⁶ This type of examination was therefore already common practice.

Another example is the Seine Civil Tribunal in 1911,¹⁷ which, on the basis of a report submitted in particular by Bécclère, held that the difficulty of extracting a fragment of needle using Röntgen rays had indeed necessitated “the extreme limit of the permissible dose”, but had not constituted professional negligence.

There is another very interesting case dating from this period.¹⁸ In 1905, a young woman asked a radiologist to use X-rays to remove unwanted hair, but repeated and long sessions gave rise to permanent lesions on her chin. The Court, “... considering that radiotherapy can have serious consequences for both operators and patients; that certain operators have died as a result of their commitment to science, and that even today it is impossible to predict the consequences of second-degree radiation dermatitis, and thus despite the most careful precautions and skill of the doctor involved; that the greatest specialists warn of the risks; considering therefore that while, in spite of the dangers involved, doctors should not hesitate to administer this treatment when the health of the patient requires it, and while they cannot be held responsible for accidents which though foreseeable had been guarded against as far as possible, this is not so when a patient is not ill but simply has a physical imperfection he or she wants removed or disguised; that, in such cases, it is in the interests neither of science nor of the patient, for such an insignificant result, to risk the death of the patient or at least converting his imperfection into a veritable illness or making it worse; considering that Miss X only had a little hair on her chin; that doubtless her self-image suffered as a result; but that Doctor D. does not even allege that this young woman was obsessed with the problem which, up to a certain point, could have justified his action considering that, knowing better than anyone the possible risks of the treatment and that it could not be guaranteed to succeed, he was duty-bound to refuse to administer it, and that it is not even established that he warned this young woman of the risk she was running, he is manifestly at fault; that while the prejudice suffered by Miss X is real, its importance should not be exaggerated since in fact her health is not affected; that very probably it never will be because of the treatment; that the present consequences are limited to lesions of the skin on her chin which, though no doubt permanent, can, according to the experts, be improved and are not, in their eyes, more unsightly than the many and thick hairs she had on her chin before treatment ...”. This judgement gives rise to four comments:

First observation: the judges of the Court of Paris do not live up to the reputation for gallantry of the *Belle époque*, and give the college of experts a task akin to that of a jury in a beauty contest.

15. This was imposed by an Italian Order in the 1920s, one of the first nuclear law texts. I remember having seen, in the early 1970s, such a label on a bottle of mineral water whose source is located in Alsacian vineyards and which could not therefore have had much of an outlet! Most, if not all mineral waters are indeed radioactive, at least at source, since all radioactivity diminishes with time, more or less quickly depending on the radioelements present. The S.C.P.R.I. (Central Service for Protection against Ionising Radiation) has moreover measured the radioactivity of French springs. Cf. M-L. Remy and P. Pellerin: “*Quelques données récentes sur la radioactivité naturelle des sources hydrominérales françaises*”, Presse Thermale et Climatique, 1982, 119, No.3.

16. *T. Civ.* Narbonne, 28 May 1903, *Moniteur Judiciaire du Midi*, 3 01 1904.

17. *T. Civ.* Seine, 29 March 1911, *Gaz. Pal.*, 1911-2-39.

18. C.A. Paris, 22 January 1913, D.P. 1919-2-73 and *Cass. Civ.*, 24 November 1920: Dr. Delherm v. Dlle Calou. *Gaz. Pal.*1921-28, S. 1921-1-111, D.P.1924-1-104, which dismissed the doctor’s appeal.

Second observation: they were perhaps a little rash in saying that there probably would not be any unfortunate consequences from this exposure. Dr. Jammet has published an article about a case of cancer which manifested itself several decades after the removal by X-ray of unwanted hair on the upper lip.¹⁹ It would, however, appear that the experts did not draw the Court's attention to this risk, despite its being known since 1902.

Third observation: on the other hand, the judgement seems to me to give a perfect rendering of the principle of justification which constitutes, as we have pointed out, one of the pillars of the law of radiation protection, and this was 15 years before the creation of the ICRP (1928) and indeed 52 years before its Publication 9. There seem three possible hypotheses on this topic. The first would be that this case inspired the ICRP, given its precedence. This seems rather unlikely: the opposition of the medical profession to being held potentially liable does not sit well with the taking into account of the case law and the multiplicity of sources of possible inspiration of an international organisation. The second hypothesis is the contrary one: the above-mentioned case was based on medical sources, but nothing in the judgement gives credence to this hypothesis. The third hypothesis, which we favour for the time being, lies in a parallelism of intellectual reasoning with a common basis in a call for caution and common sense to the effect that the benefits or necessity of a practice should be balanced against the risks of the exposure considered, as is said in Publication 9. As far as French case law is concerned, we may cite the note by Lalou in relation to a Court of Appeal of Lyons case in 1913²⁰ to the effect that the element required to exonerate a doctor from liability is not so much the consent of the patient as the usefulness or urgency of the operation; using the "lesser of two evils" approach, he said that the potential prejudice "must be envisaged as less than that which would result from not performing the operation". This balance between the risk inherent in the treatment and its benefit, or indeed necessity, for the patient nevertheless appears, in this formulation at least, as a development²¹ of the transgression "of the rules of common sense and care" which, since 1862, give rise to liability on the part of doctors. But the idea seems to be an old one. A 16th century lawyer wrote that a doctor should not be blamed for a patient's death unless caused by the doctor's ignorance or **excessive risk-taking**, since these should not be excused and are punishable". It may be wondered whether "justification", in medical thinking, does not also originate in this popular wisdom, reflected doubtless in the writings of great doctors or surgeons, and whether the contribution of today's society does not

19. H. Jammet – "*Relations entre l'irradiation et les dommages consécutifs: possibilités et limites d'une évaluation objective*" in *Problèmes juridiques et administratifs de la protection dans l'emploi pacifique de l'énergie nucléaire – EURATOM-June 1961*, p. 247. On hair removal for esthetic reasons: Daniel J. "Depilatory action of the X-rays", *Med. Rec.* 1896; "X-rays as depilatory" *the Lancet* I (1896) 1296, and the first publication of a radiation induced cancer: cf. Tubiana M., Jammet, H., Bertin M. "*Les rayonnements ionisants*" *Encycl. Méd. Chir. Intoxications, Maladies par agents physiques* 16510 a 10-9-1985; Tubiana M. "*Effets sanitaires des faibles doses*" in *Rev. d'Epidémiologie et de Santé Publique* 1982, Vol. 30 No.2; Lacassagne A. and Gricoureff G. "*Effets cancérogènes des rayonnements ionisants*". *Radiobiologie Appliquée*, Vol. II, Gauthiers Villars 1966.

20. C.A. Lyon, 27 June 1913 D.P. 1914-2-73, judgement on experiments for esthetic reasons and note in Liège, 30 July 1890, D.P. 1891-2-281. See also the opinion of Hamonic expressed in 1896, quoted by Merignnac, in his note on C.A. Aix, 22 October 1906: "the caring for humanity and its ills is certainly a noble cause but on one condition and that is that the risks to be run are not too great" and who states that the patient must be informed of the chances of success and risks of the operation. See also the note on *Cass.*, 29 November 1920 for which, according to the case law, "the transgression of the rules of common sense and care" constitute gross negligence, adding that "doctors must ensure that the risk run by the patient by reason of the treatment is in proportion to the condition from which he is suffering".

21. See C.A. Amiens, 14 February 1906, D.P. 1907-2-44 and S.1909-II-225, note by Perreau who writes that the minimal chances of dying from an anaesthetic in no way offset the benefits for the patient". See also *T. Civ. Montpellier*, 15 December 1909, *Gaz. Pal.* 1910-1-187, also handed down after a death during an operation for appendicitis under chloroform. Rouen, 6 May 1931: *Recueil Rouen et Caen* 1931, p.122 held that it is for the doctor, who had not checked his diagnosis "using the invaluable procedure of X-rays", "to balance the slight advantage of a saving for his patient against the much greater danger of an unsuccessful treatment".

lie in calling upon ways of helping reach a decision derived from economic science or “management” (see ICRP Pub. 22 – bibliography).

Fourth observation: the reservation or excuse of an “obsession” manifested by the patient. An application of this principle was made by the Court of Appeal of Lyons, in 1936, with regard to an extraordinarily severe hypertrichosis of the legs. The court took account of the patient’s obsession and of the warning given and the reduction of the doses applied by the radiologist, but held that there had been “such a great and obvious disproportion between the goal pursued and the risk involved in the means employed that the surgeon should have abstained”.²² Between the wars, there was a great increase in decisions published. The most common seem to be those handed down following ringworm treatments for young children which gave rise not only to cases of radiation dermatitis and alopecia, but also sometimes to brain damage.²³ The treatment was effective but required great precision, including an immobility very difficult to obtain from young children. The civil courts showed a tendency to conclude, from the occurrence of injury, that an excessive dose had been applied, and thus presumed negligence on the part of the practitioner. This tendency was countered by the courts of appeal, using the law of delict or quasi-delict, so as not to create a presumption of liability or merge “fault” with “causal link”. The courts of appeal, and the *Cour de Cassation* in particular, wanted to retain the hypothesis of “rare, unforeseeable and uncontrollable phenomena”, unsuspected by the “greatest experts and practitioners” at the time of the treatment or arising from variations in sensitivity between individuals.

However, sensitivity to radiation, for example of the arch of the foot, or the existence of sensitising factors such as previous treatments of another nature that the doctor should have known about through medical literature or through asking and carefully examining the patient, does not absolve the doctor from liability.²⁴ In such cases, the doctor should not only refrain from exceeding the doses normally tolerated, according to the experts, but reduce them. The contradiction between this

22. C.A. Lyons, 27 May 1936: Dr. X v. Dame P. D.H. 1936-465, the treatment having been carried out in 1924. The Tribunal of Lyons, 3 January 1936 *id*-127, had already held that it was the doctor’s duty “to explain that it was absurd to risk a greater ill than that which it was hoped to prevent”. See also *T. Civ.* Lille, 30 January 1952: Époux Lamourette v. Dr. X. Gaz. Pal. 1952-1-216 concerning the treatment of verrucas and corns on the feet which ended in the amputation of both feet. The proper treatment for verrucas was a single application on the affected area, protecting the healthy tissues, and the doctor should have refused, for an “ailment as benign as simple corns”, and should not have ignored the particular sensitivity of certain subjects and the special sensitivity of the sole of the foot. On the other hand, the Court of Bordeaux, on 31 October 1938, held that radiation was a current treatment for acne D.H. 1939-28 Dame L. The same Court, 9 December 1943, Ain v. Dr. D., Gaz Pal. 1943-II-279, held the method “in conformity with current scientific knowledge” providing for a single session on the sole of the foot.

23. *T. Civ.* Bordeaux, 7 June 1933: Samazeuilh v. Dr. R, Gaz. Pal. 1933-II-615 (child of 18 months); *T. Civ.* Morlaix, 17 May 1933: Le Bail v. Dr. X, Gaz. Pal. 1933-II-257 in a note; Rennes, 14 November 1934, same parties, Gaz. Pal. 1935-I-104; *Cass. Req.*, 15 June 1937, *id*, Gaz. Pal. 1937-II-411, which reported retarded intellectual development, in light of the Mercier case moved the debate from Article 1384 to contractual liability. Rennes, 5 December 1935: Dr. C. v. Combot, Gaz. Pal. 1936-I-257; *Cass. Req.*, 3 July 1945: Dr. S. v. Ouary D., 1946-53 (use of old equipment to treat three children). However, a meaningful link between irradiation of the scalp and neurological damage and alterations in intellectual performance has only been recognised by medicine since 1966; cf. Albert R.E. *et al* “Follow-up study of patients treated by X-ray for tinea capitis” – American Journal of Public Health 56-2114-2120; Ron E. *et al*, 1982 – “Mental function following scalp radiation during childhood” – American Journal of Epidermology 116-146-160; Picard Ph. *et al* “Conséquences des accidents radiologiques sur la santé mentale”. Radioprotection-1998, Vol. 33 No.4-435-456.

24. 22 *Cass. Civ.*, 27 June 1939: Dr. A. v. Retrouvay, Gaz. Pal. 1940-I-98, J.C.P. 1940-II-438; Lyons, 19 March 1935; Dr. G. v. Durozat, Gaz. Pal. 1936-I-915; *Cass. Civ.*, 27 May 1940, D. 1941-53, note Nast; Gaz. Pal. 1940-II-81; Bordeaux, 9 December 1943: Ain v. Dr. D, Gaz. Pal 1943-II-279 “an excess of precaution and care”; *T. Civ.*, Lille, 30 January 1952: Époux Lamourette, Gaz. Pal. 1952-I-216 in which the treatment of verrucas had led to the amputation of both feet!; *Cass. Civ.*, 12 November 1968, D. 1969 J 91 with a note on causality.

obligation of care and the concern to apply effective treatment is obviously difficult to overcome, but it would seem that this requirement to reduce doses in certain cases is analogous to the optimisation approach which has today become the keystone of radiation protection law. On the other hand, it is striking to note the lack of consideration given to the possibility of deferred damage or, to use modern terminology, stochastic damage, despite its being known for certain cancers since 1902. However, in a case of treatment for ringworm given to young children, the Court of Rennes in 1934 asked experts to determine “the physical, esthetic and intellectual results and consequences” for a particular child, since a certificate from his teacher gave reason to believe that the child’s cerebral state was no longer normal. No allusion was made to the risk of cancer of the thyroid, but this was normal since the first scientific publication on this subject was much later than these decisions.²⁵

A-2. Period following the Mercier Judgement

While in the old decisions mentioned above, only the number and duration of the sessions, as well as the interval between them, were indicated, in the 1930s, measures in roentgens began to appear²⁶. Alongside X-rays, artificial radioelements began to be used (radioactive cobalt in the Colmar Judgement of 28 July 1966) and radium (Court of Appeal of Aix 17 May 1951).²⁷ The Mercier case based the liability of a doctor towards his patients on contractual liability (Article 1146 *et seq.*, Civil Code). This was more in line with already accepted rules (action for payment of fees, consent of the patient) and favourable to doctors using “things” (therefore including radiologists), whereas the presumption of liability on the basis of “things” (*responsabilité du fait des choses*) was being established under Article 1384 para. 1. The only exceptions to such liability are *force majeure*, the action of a third party or negligence on the part of the victim presenting similar characteristics of unavailability and unforeseeability.

Contracts, resulting from the offer of care and acceptance by the patient or his representative, should be preceded by a phase, theoretically pre-contractual, of information given by the doctor to the patient which, by way of simplification, case law subjects to the rules governing contractual liability. This obligation of advice and information applies both to the prescribing doctor and to the radiologist (Cass. Civ. I 29 May 1984).²⁸ Thus, a charlatan who treated cancer with plants and metals was held liable for twice having advised his patient against classical radiotherapy.²⁹ This information must be intelligible and trustworthy, and should in particular indicate the normally foreseeable risks of the treatment so as to enable the patient to compare its benefits, or indeed its necessity, with the risks involved so as to be able to give enlightened consent.³⁰

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25. Modan *et al*, “Thyroid cancer following scalp irradiation”, *Radiology* 1977, quoted by Tubiana *et al*, in their volume of the *Encycl. Méd. Chirg.*, referred to above.
 26. *T. Civ. Lille*, 30 January 1952: *Époux Lamourette v. Dr. X*, *Gaz. Pal.*, 1952-I-216; *Colmar*, 28 July 1966, *Dr. X and Y v. Dr. H and Z*, *Gaz. Pal.* 1967-I-49.
 27. *Court of Appeal, Aix*, 17 May 1951: *Centre Régional de lutte contre le cancer de Marseille v. Dr. Tristan*, *Gaz. Pal* 18 07 1952-D. 1952-somm.8. An action disavowing paternity was even based on impotence caused by professionally applied X-rays, *T. Civ. Lille* 19 November 1946, *Jurisclasseur Périodique* 1947-II-G-3566.
 28. *Cass. Civ.*, 29 May 1984 D. 1985-281.
 29. *C.A. Orléans*, 27 February 1959, D.1959-661 on referral.
 30. *C.A. Lyons*, 12 April 1956, D. 1956-439 (intravenous pyelogram); *Cass. Civ.1.*, 14 April 1961, D.1961 somm. 108 (arteriography); *Cass. Civ.*, 23 May 1973, J.C.P. 1973-260, D.1973 IR 174, *Gaz. Pal.* 1973-II-885 (methodical radiculography): very few accidents having occurred at the time, the doctor was not obliged to point out risks then considered to be exceptional; *Cass. Civ.*, 13 February 1985, J.C.P. 1985-20388 (aortography); *Versailles*, 28 March 1996, D.1996 IR 138: the patient’s state of health rendering a coronarography necessary, no

The principle laid down by the *Mercier* case is that “a veritable contract is formed between the doctor and his patient comprising, for the practitioner, the undertaking to give his patient care that is conscientious, attentive and, except in exceptional circumstances, in conformity with established scientific knowledge”. More recent case law prefers formulae such as “current knowledge”, less characterised by the concern, for long predominant, not to stray from traditional methods. It would seem reasonable to suppose that as far as radiology is concerned, the principles of justification and optimisation, although based on a hypothesis – that of the absence of thresholds – must be considered as forming part of “established knowledge” or, at least, as defining what conscientious care should be. Pending the transposition into national law of the above-mentioned Community Directive 97/43, the case law is however based on a judgement of 1949 in which the *Cour de Cassation* held that “apart from negligence or a lack of care, which anyone can be guilty of, a doctor is liable for the prejudicial results of his care only if, having regard to scientific knowledge and the consecrated rules of medical practice, he was guilty of a lack of care, inattention or negligence demonstrating a neglect of duty, which it is for the patient suing for damages to prove”.³¹

Thus, without referring to Community or domestic radiation protection provisions, some judgements, in seeking to know whether rules of care have been applied, reach a similar result to the concepts of justification and optimisation. This is achieved through reference to medical practice which, it may be hoped, establishes the best current compromise between reducing doses and achieving a therapeutic result. Thus, it was held in a 1992 judgement,³² that “the application of superficial radiotherapy to treat skin lesions on the ends of fingers is very limited and is almost no longer used because of the accidents which have occurred”. This is a reference to “current scientific knowledge” but the court added that this being a benign affliction, the treatment of which could be interrupted, it was wrong for it to have been continued by a replacement using apparatus in good state of repair but lacking many safety devices and therefore requiring particular care and attention. A 1983 case³³ may also be mentioned, according to which “massive dose radiation should not have been prescribed if there was any doubt as to possible outcomes given the importance and consequences of such treatment”.

It is also the doctor’s responsibility to enquire, both from the patient and from other doctors who have treated him, about his patient’s pathological state and previous treatments. Without being exactly specific, this obligation is a very important one in radiology, where specialists are often giving treatment after other practitioners. Thus, a doctor was held to have been negligent for not having obtained full information about the particular pathology of a patient suffering from hyperlipidemias and who was taking oral contraceptives, a causal link having been established between hemiplegia and an aortography.³⁴ An even more typical case is that in 1996 in which four doctors had been involved, not counting a Swiss professor and ⁶⁰Co treatment self-administered by the patient, himself a doctor. While the illness required therapy of an exceptional nature, the fact of omitting to obtain information about previous irradiation treatment meant that the subsequent treatment was excessive. A number of

obligation to point out a risk of 3 in a 1 000; *Cass. Civ.*, 25 February 1997, Bulletin de la Cour de Cassation – *Chambres Civiles* No. 425: need for treatment, normal and foreseeable risks of the technique chosen. Accidents due to contrast products seem to have been fairly numerous.

31. *Cass. Civ.*, 13 July 1949, *Gaz. Pal.* 1949-II-214 X v. Detrez.

32. *C.A. Paris*, 1 July 1992, *Dalloz* 1993 somm. p.28 note Perreau.

33. *C.A. Paris*, 6 June 1983, *Gaz. Pal.* 1983, somm. p.344; see also *Cass. Civ.*, 8 January 1985-2-panor. p.189 concerning cobalt therapy given “in the absence of factors indicating a possible malign tumour”. *T. Civ.*, Lille, 30 January 1952, *Gaz. Pal.* 1952-1-216, on overdoses due to use of a method which had been abandoned; *C.A. Aix*, 1 December 1949, *D.* 1950.53; *C.A. Bordeaux*, 9 December 1943, *Gaz. Pal.* 1943-II-279 etc.

34. *Cass. Civ.*, 13 February 1985, *D.* 1985 IR. 403 note Penneau and *J.C.P.* 1985-20388 note Gulphe.

accidents have occurred when extracting foreign bodies because of a lack of co-ordination between successive doctors, resulting in excessive doses.³⁵ More generally, moreover, this type of treatment tends to result in irradiation of too long a duration, which the courts have condemned as a breach of the obligation of caution.³⁶ Today, a distinction is made between contracts imposing an obligation to achieve a specific result (*obligation de résultat*) and those involving only an obligation to use one's best endeavours (*obligation de moyens*). Since doctors cannot undertake to effect a cure, it is agreed that the above obligation is simply that to use one's best endeavours.

This means that the plaintiff cannot simply establish that the result was not achieved, but must also specify the "carelessness, lack of attention or negligence showing a neglect of duty"³⁷ of which the doctor was guilty. In practice, it is in the expert report commissioned by the court that such proof may be found. The court must not distort this report by assuming fault simply because prejudice has occurred, on the ground, for example, "that thanks to the processes used to filter and record the rays used, modern apparatus has rendered cases of injury by X-ray extremely rare and that when such injury does arise it is normally the fault of the practitioner or because old-fashioned apparatus was used". In the above-mentioned case of 1949, the *Cour de Cassation* held that the contested decision had simply raised doubts about the conclusions of the experts, with the effect of reversing the burden of proof.³⁸ But the doctor may be found to have been at fault when this is implied by all the only possible causes of injury found by the experts.³⁹

Apart from the general concern to retain the character of *obligation de moyens*, this caution on the part of *Cour de Cassation* can be explained more concretely by taking account of the particular sensitivity to X-rays of the patient (cf. *supra*) or of an unforeseen variation in the emission of rays, as in the expert report referred to in the above-mentioned case of 13 July 1949. However, there is a certain trend, in courts of first instance and of appeal, away from the *obligation de moyens*, for instance in the case of physical, chemical or biological analyses or examinations, the results of which obey exact scientific rules, as written by Savatier,⁴⁰ or when injury results from the fact of the things used,⁴¹ with jurisprudence pointing to an obligation of safety with regard to the instruments and devices used, though without any radiological examples.⁴² For the moment, the *Cour de Cassation* does not look kindly on such extensions of the *obligation de moyens*.⁴³ However, obtaining a proper X-ray is one thing and interpreting it is another, and the *Cour de Cassation* has a strict rule in this

35. *Cass. Civ.*, 12 November 1968, D. 1969-96, J.C.P. 1969-15864. On a lack of co-ordination between treatments of a different type: *Cass. Civ.*, 6 January 1971, J.C.P. 1971-37.

36. *C.A. Aix*, 1 December 1949 D. 1950-53; *Cass. Civ.*, 16 November 1965, Bull. Cass. 1965-1470, D. 1966-61; *Cass. Civ.*, 14 March 1966. Bull. Cass. 1966-141.

37. *Cass. Civ.*, 13 July 1949, J.C.P. 1950-II-5716: radiologists must not, on their own initiative and without its being absolutely necessary, exceed the limits prescribed by the doctor. Also, *C.A. Paris*, 17 July 1936, D.H. 1936. 498.

38. *Cass. Civ.*, 13 July 1949, J.C.P. 1950-II-5716 note Brunet.

39. *Cass. Civ.*, 28 June 1960: Dr. X v. Fumasoli J.C.P. 1960-11787 note Savatier.

40. Note Savatier in *Civ.*, 28 June 1960, Dr. X v. Fumasoli, J.C.P. 1960-II-11787, who quotes, as regards radiography tests, *Cass. Civ.*, 3 April 1939, Gaz. Pal. 1939-1-872; Toulouse, 14 December 1959, J.C.P. 1960-II-11402, concerning a blood test, "laboratory work, given current scientific knowledge, not involving any technical research risk obeying strict and invariable rules which must necessarily result in an exact solution".

41. *Cass. Civ.*, 28 June 1960, J.C.P. 1960 ed. G. 11787, Savatier goes as far as a custodial obligation, less strict than the Article 1384 presumption, when damage arises from faulty equipment, provided the doctor was negligent.

42. B. Starck *et al*, *Obligations* 4th ed. 1993, p.753. The *Cour de Cassation* did not recognise an *obligation de résultat* concerning the safety of an apparatus placed in the body of a patient. See also *Cass. Civ.*, 25 February 1997, Bull. Civ. No. 425.

43. *Cass. Civ.*, 1. 28 June 1984 Gaz. Pal. 1984-2-panor 166.

instance of fault being required (for example when a fracture was confused with a sarcoma which resulted in an amputation).⁴⁴ There are other examples in the case law of manifestly erroneous interpretations⁴⁵ which could have reduced the patient's chances (cf. *infra*). Negligence, essentially on the part of those prescribing treatment, may also be found in the fact of not having prescribed an X-ray or having advised against radiotherapy treatment. One case here involved not making an X-ray of the spine of a road accident victim and giving authorisation for a premature discharge.⁴⁶ Fault may, on the contrary, result from the diagnosis of a non-existent disease. Thus, in 1976,⁴⁷ a patient who had been given a diagnosis of rapidly developing cancer without being given any back-up histological examination, decided to undertake a long journey to consult a specialist. The consequent money worries were perhaps to be preferred to the first diagnosis!

A doctor may also be guilty of negligence when carrying out his radiodiagnosis or the treatment itself. Thus, a radiologist cannot invoke, with regard to radiation dermatitis caused by over-exposure, that the control process was not working properly if he should have noticed this.⁴⁸ Negligence has also been found with regard to exposures which were too close together or too long,⁴⁹ or to an error in the dose of the contrast product (methiodal)⁵⁰ or an error in carrying out an arteriography.⁵¹

In the period following the Mercier Judgement, the courts have paid greater attention to the subsequent evolution of the patient's state of health.⁵² Thus, in order to allow for the possibility of a review of compensation, a 1949 judgement mentioned that the experts were unsure of the future evolution given the very particular nature of the evolution of X-ray burns.⁵³ But this was simply to postpone the final establishment of compensation to the age of majority, "when it will be possible to know exactly the permanent injury of all types from which the patient will continue to suffer". The courts are clearly reluctant to assume the existence of a causal link when it comes to taking account of deferred, and *a fortiori* stochastic, injury when first fixing the amount of damages. In a 1950 judgement,⁵⁴ although admitting that radiation dermatitis could manifest itself six years after the

44. C.A. Angers, 4 March 1947, D. 1948-288 note Savatier.

45. *Cass. Civ.*, 3 April 1939, DH.1939-332: a mistake in interpreting an X-ray led to a prolongation of suffering and an incomplete cure; Grenoble, 4 November 1946, D.1947-79; *T.Civ. Seine*, 25 January 1949, *Gaz. Pal.*; 1949-1-216: the careless reading of an X-ray by a surgeon led him to operate on the right, instead of the left hip; *T.Civ. Seine*, 20 June 1939, *Gaz. Pal.* 1940-1-64, the surgeon operated on the right, instead of the left sinus, having misread an X-ray which had been properly carried out and noted by the radiologist; see also *C.A. Montpellier*, 29 May 1934, D.H. 1934-453.

46. *C.A. Lyons*, 5 December 1975, D. 1975 somm. 100. A radiologist who had carried out X-rays correctly and written a note concluding that surgery was not necessary was found innocent but the dentist and surgeon who failed to take account of this, were found guilty. See also *T.Civ. Seine*, 20 June 1939, *Gaz. Trib.* 6 January 1940 and *C.A. Paris*, 22 February 1943 *The Act of 8-10 September 1943*.

47. *Tribunal de Grande Instance, Nice*, 8 January 1976, *Gaz. Pal.* 1976-1-209

48. *C.A. Montpellier*, 10 March 1948, *Gaz. Pal.* 1948 somm. 74; the accused should have noticed that there was a defect in crystals since they failed to change colour.

49. *Cass. Req.*, 3 July 1945 D. 1946-53; *Cass. Civ.* 1. 23 May 1973, *Gaz. Pal.* 1973-2-885, D. 1973 IR 174; *Cass. Civ.* 8 October 1974 J.C.P. 1975-II-17955 note Savatier.

50. *Cass. Civ.* 1, 23 May 1973, quoted in the previous note.

51. *Cass. Civ.* 1, 19 June 1962 *Bull. Civ.*1-311.1.

52. *T. Civ.*, Lille, 30 January 1952: *Époux Lamourette v. Dr. X*, *Gaz. Pal.* 1952-216; *C.A. Colmar*, 28 July 1966: *Dr. X and Y v. Dr. H and Z*, *Gaz. Pal.* 1967-1-49.

53. *C.A. Aix*, 1 December 1949: *Hôpital Desbief v. Moreno et al*, D. 1950 case law 83.

treatment, the court required the victim to transform this hypothesis into a certainty, in particular by proving that she had not undergone any other treatment in the interval.

In certain cases, the loss of potential improvement has, however, been taken into consideration.⁵⁵ Thus in the case of the charlatan, mentioned above, the court estimated that through his negligence, his patient's chances of not having to have a laryngectomy had been reduced by a "sufficiently certain degree" (some 20 per cent, according to the experts). In the above-mentioned judgement of 1975,⁵⁶ it was held that the failure to make an X-ray of the spine had, to a significant degree, reduced the victim's prospects of improvement. In a 1985 judgement,⁵⁷ partial compensation was awarded because a surgeon, without any real reason to fear a malign tumour, had decided on cobalt therapy, thus rendering a bone on which a prosthesis had been applied more fragile and making it less likely that this prosthesis would remain fixed.

In another case, the mother of a child born with a wasted pavilion and totally deaf, blamed this malformation on an X-ray of the abdomen carried out during her pregnancy. The experts had estimated that this could have very slightly increased the risk of this handicap but the *Cour de Cassation*, holding that the possible effect of the irradiation was uncertain, did not recognise the existence of a loss of prospects.⁵⁸ It can therefore be seen that before such loss can be held as constituting prejudice, it must be thought sufficiently likely, and compensation will only be a fraction of what would have been awarded if the causal link had been established with certainty.

Outside the field which concerns us, in that of the possible application of the special nuclear third party liability regime, it seems to the author⁵⁹ that insufficient attention has been given to the problem of stochastic damage, despite its being the most likely form of injury to the general public in the event of a nuclear accident. While provision is being made for considerable insurance cover or the allocation of public funds, and there is a tendency to lengthen prescriptive time limits (now 30 years for personal injury under the Protocol to Amend of the Vienna Convention on Civil Liability for Nuclear Damage, signed on 12 September 1997), we have suggested that using the concept of a loss of prospects could constitute a solution, though not one without difficulties, at least as long as progress in the field of biology does not enable the more precise identification of cancers induced by radiotherapy or persons particularly sensitive to such treatment.⁶⁰

A number of decisions have thus been handed down since the Mercier case, and particularly since the end of the Second World War. At least until 1970, there were a similar number each year as before the war, while the use of X-ray diagnosis and radiotherapy has probably increased sharply. This relative decline in cases brought to court is no doubt due to the use of better equipment (measures taken by the Central Service for Protection against Ionising Radiation – SCPRI) and to the quest for

54. C.A. Rennes, 17 October 1950: Mlle Junka v. Dr. de Vulpian, D. 1951 somm. 19; *Civ.* 6 January 1971 J.C.P. 1971-37.

55. C.A. Orléans, 27 February 1969 D. 1969-661; Lyons, 5 December 1974, *Gaz. Pal.*, 1975 somm. 100; *Cass. Civ.*, 7 June 1989, *Bull. No.* 877.

56. C.A. Lyons, 5 December 1974, D. 1975 somm. 100.

57. *Cass. Civ.*, 8 January 1985, *Gaz. Pal.* 1985-2-panor. 189.

58. *Cass. Civ.*, 5 February 1991, *Gaz. Pal.* 1991-2-panor. 172, D. 1991 somm. 357 note Penneau.

59. J. Hébert: Comments on establishing a causal link between the "fact or succession of facts of the same origin" and the "damage" required to trigger application of the Convention on civil liability in the nuclear field, in *"La responsabilité civile nucléaire de l'assurance. Bilan et perspectives"*, Munich Symposium, 1985.

60. J.C.L. Nenot: "Radioprotection et faibles doses", *Revue Générale Nucléaire* 1996 No. 6; B. Dutrillaux: "Peut-on savoir si un cancer est dû à la radioactivité?". *La recherche*, April 1998.

settlements on the part of insurers. There has, however, been an increase recently even though it is very difficult to interpret the statistics available.⁶¹

B. Administrative law

Administrative law applies when either the organisation or functioning of a public hospital, or the activity of its medical staff, causes injury to a patient in this hospital. In the first case, this is simply an application of the principle of the liability of public administration. In the second, which is relevant to our context, the liability of the public hospital is substituted for that of the doctor.

Liability for the poor organisation of the functioning of a public service may arise in particular when damage is caused by a lack of co-ordination between services,⁶² or arises from faulty installation or equipment. In such cases, simple negligence has always been enough to engage the liability of the public hospital. Thus in one case, following a manufacturer's forgetting to install a filter, an oversight not detected on reception of the equipment, the surgeon and patient both suffered severe radiation dermatitis.⁶³

As far as the second category is concerned, there has been an evolution over time which must be taken into account when reading the summaries of the judgements below. Until 1992, the actions of practitioners did not engage the liability of the hospital unless there had been gross medical negligence (*faute lourde médicale*) in the performance of the medical act (diagnosis, choice of therapy, operation). Thus, a hospital was not liable for an excusable error, simple negligence or the risks of treatment. However, the courts have become readier to find gross negligence, and two important developments have occurred since 1992, as will be seen below.

Two cases have raised questions similar to those already examined in the ordinary law. First, the judgement of the *Conseil d'État* of 20 July 1938 (in the Zimmer case) in which a child had undergone treatment in 1927 in the dermatology clinic of the Faculty of Medicine, Strasbourg, which led to traces of burns to the head and one ear, permanent alopecia, and above all mental deficiency. The *Conseil d'État* ordered a medical examination to discover whether there was in fact a causal link between the child's current vision and intellectual faculties and the X-ray treatment undergone.⁶⁴ I have not been able to find a decision on the substance, perhaps explained by what happened to Alsace during the war. Similarly, in 1962, the *Conseil d'État*, in a case of a child left disabled following an X-ray examination, postponed the decision on the amount of compensation until the age of his majority "when it will be possible to know exactly the permanent injury of all types from which the patient will continue to suffer".⁶⁵

Examples of gross negligence found in radiology include: a judgement of the *Conseil d'État* in 1967 (Ciabrini) concerning the interpretation of an X-ray,⁶⁶ and a decision of the Administrative Tribunal of Paris in 1979 concerning an examination during which an abdominal perforation led to

61. D. Thouvenin: *La responsabilité médicale*, Flammarion 1995.

62. *Conseil d'État* (C.E.), 9 December 1988, Gaz. Pal. 1989-2-somm. 350.

63. T.A. Versailles, 16 March 1956: Dame Tufal, Gaz. Pal. 1956-II-16.

64. C.E., 20 July 1938: Dame Zimmer, Recueil des arrêts du Conseil d'État, 1938-702.

65. C.E., 20 March 1962: L'homme, Recueil des arrêts du Conseil d'État, 1962, contents, 1104.

66. C.E., 22 November 1967: Sieur Ciabrini, Recueil des arrêts du Conseil d'État 1967-439.

removal of the spleen.⁶⁷ Another case, in 1988⁶⁸ held that “given the medical knowledge at the time, and knowing that the patient had been exposed to toxic products, more detailed investigations, using large-size X-rays or tomography would not have been disproportionate and would have made it possible to detect a tumour on the lung”. In 1981, the *Conseil d’État* found that the administration of radiation greatly exceeding the “generally accepted norms at the time” to a child for a laryngeal angioma was, “having regard to the risks” known at the time, grossly negligent.⁶⁹ Administrative case law considers that injury may also consist in “reduced changes of survival”.⁷⁰ Thus, the lack of an X-ray examination during three months of hospitalisation, leading to the absence of appropriate treatment for a fracture, reduced the patient’s chances of avoiding the need for a hip replacement (although this case would seem rather to be a shortcoming in the functioning of a public service).⁷¹

But in those days, carelessness, a mistake or the risks attached to treatment exonerated the hospital from liability:

- In the Nescam case of 1970,⁷² concerning treatment using radioactive gold which, though not normally dangerous, gave rise to serious consequences, it was held that the choice of doctor did not constitute gross medical negligence in the absence of any other negligence in the carrying out of the treatment.
- In the case of the Besançon Regional Hospital in 1971,⁷³ it was clearly established that radiation treatment had directly caused radiation necrosis, but that while the development of the ailment proved that the initial diagnosis had been incorrect, the latter had been established following a serious and full examination; it was held that this mistake did not therefore constitute gross negligence.
- In 1982, in the Radisson case involving the treatment of a wart between the patient’s toes which caused radiation dermatitis, the *Conseil d’État* held that “even if the treatment was not without certain risks and required to be applied with special precautions, it was commonly used at the time”, and that the choice of doctor could not constitute gross medical negligence in the absence of any other negligence in the carrying out of the treatment.
- In 1988, in the Omel case, since the patient’s previous history of allergy to iodine had not been drawn to the attention of the hospital, and since there had been no reason to suspect the risk of such a reaction, the absence of a prior test did not constitute gross negligence.⁷⁴

67. T.A. Paris, 22 February 1979, Gaz. Pal.-1-somm. 362.

68. T.A. Toulouse, 22 November 1988, Gaz. Pal. 1990 somm. 151.

69. C.E., 14 December 1981, Centre Hospitalier de Pontoise, Gaz. Pal. 1982-2-somm. p.268, D. 1982-IR-379 note Moderne.

70. C.E., 9 December 1988, Gaz. Pal. 1989-2-somm. p.350; T.A. Toulouse 22 November 1988, Gaz. Pal. 1990-1-somm. p.151. etc.

71. C.E., 10 November 1979, Gaz. Pal. 1979-2-somm. 271.

72. Rec. 1970 p.406.

73. Rec. 1971 p.372.

74. C.E., 17 February 1988, No. 61005.

However, the requirement of gross negligence was abandoned in the *Époux V.* case⁷⁵ and, from then on, it was enough to prove “medical negligence of a type to engage the hospital’s liability”. “An isolated error, slight carelessness or imprudence due to the need for urgency” are the only cases in which resulting injury would not be compensated. We know of no case concerning radiology since this judgement of the *Conseil d’État* in 1992.

The same applies as regards the risk or uncertainty of treatment.⁷⁶ But here, in two cases to our knowledge,⁷⁷ the *Conseil d’État* has recognised the strict liability of a public hospital when a “medical act necessary for the diagnosis or treatment of a patient presents a known though slight risk, with no reason to think that the patient was particularly at risk” and when this risk in fact turned out to be the “direct cause of injury unconnected with the patient’s initial state or with the foreseeable evolution of that state, and is of an extremely serious nature”. The Administrative Tribunal of Amiens used a similar approach in 1994 to hold that a public service was liable when there were “exceptional and unusually serious complications” following the use “of new techniques for diagnosis” the “consequences of which were not fully known” which gave rise to “a special risk” despite the fact that this use was not essential “for vital reasons”.⁷⁸

But is it for the law of liability to serve as a legal tool to compensate the shortcomings of social law in cases in which fate seems to have been too cruel? Time will tell whether this latest trend in case law will develop further or whether legislation will be introduced to try to regulate the problem of the risks inherent in treatment.

Conclusion

In writing this paper on a century of French case law dealing with problems of liability arising from radiological accidents, the author hopes to encourage foreign readers to undertake similar research in their own legal systems. This would make it possible then to benefit from comparative studies. Some systems might have had to deal with other aspects of the problem or have introduced solutions which could be adopted or adapted in other countries.

75. *C.E. Ass.*, 10 April 1992: *M. and Mme V.* Rec, 171, concl. H. Legal, A.J.D.A., 1992-355; *Rev. fse. de Droit Administratif* (hereinafter referred to as *Rev. fse. DA*) 1992-571; J.C.P. 1992 ed. G II-355; *Rev. fse D.A.* January-February 1998 J-H Stahl: “*Responsabilité des services hospitalier : le déclin de la faute lourde*” (the case of S.A.M.U.).

76. *T.A. Versailles*, 16 March 1956: *Dame Tufal* *Gaz. Pal.* 1956-II-16; *C.E.*, 12 July 1970 Rec. 1970. p.406 *C.E.* 19 May 1971; *C.E.* 26 May 1982; *C.E.* 17 February 1988.

77. *C.E.*, 9 April 1993: Bianchi, Rec. 1993-127, concl. Daël, R.D.P. 1993-IO99, note M. Paillet; *Actualités Juridiques Droit Administratif* 1993-344; P. Fraisse: “*les vicissitudes de la jurisprudence administrative en matière de responsabilité médicale*” *Rev. fse. D.A.* 1993 561; note J. Moreau J.C.P. 1993-II-11061. *Rev. fse. D.A.* January-February 1998 conclusions V. Péresse on *C.E.* 3 November 1997 *Hôpital Joseph Imbert d’Arles*.

78. *T.A. Amiens*, 18 November 1994, *Gaz. Pal.* 1995-2-panor.adm. p.153; see also *T.A. Toulouse*, 16 November 1995, *Gaz. Pal.* 1996-1-Panorama administratif p.61: exceptional risk of a relatively recent technique, the complications of which were not known at the time but which was not the only technique available, and at the time of the operation, the patient’s life was not in danger.

United States

*Litigation relating to the DOE's obligation under the NWPA to commence acceptance of spent fuel by 31 January 1998 (1999)**

The Department of Energy (DOE) is involved in extensive litigation relating to its obligation under the 1982 Nuclear Waste Policy Act (NWPA) (see *Nuclear Law Bulletin* Nos. 26, 31, 35, 41 and 60) to commence acceptance of spent fuel by 31 January 1998.¹ As background, all nuclear utilities in the United States are signatories to a so-called Standard Contract² under the NWPA whereby the DOE agreed to dispose of spent nuclear fuel (“SNF”) and high-level radioactive waste (“HLW”) generated by the utilities in exchange for their payment of fees under the contract. The NWPA specifies certain contractual obligations to be assumed by the Department:

“... following commencement of operation of a repository, the Secretary shall take title to the [SNF] involved as expeditiously as practicable upon the request of the generator or owner ... and in return for the payment of fees ... the Secretary, beginning not later than January 31, 1998, will dispose of the [SNF] involved ...”

A. *U.S. Court of Appeals*

Indiana Michigan and Northern States

In July 1996, the U.S. Court of Appeals for the District of Columbia Circuit ruled in **Indiana Michigan Power Co. v. U.S. Department of Energy**³ that the NWPA creates an unconditional obligation that the Department commence disposal of the utilities’ SNF by January 31, 1998 in return for payment of fees under the Standard Contract. The Court rejected arguments that the Department’s obligation to accept SNF by the 1998 date was conditioned upon the existence of a repository or interim storage facility constructed under the NWPA and held that, apart from payment of fees by the utilities, the Department’s obligation was “without qualification or condition”. The Department did not appeal the decision in **Indiana Michigan**.

In November 1997, the same Court of Appeals for the District of Columbia Circuit in **Northern States Power Co. v. U.S. Department of Energy**,⁴ a similar suit, again confirmed the unconditional obligation but declined to order the Department to begin accepting SNF by the 1998 date, as requested by the utilities, because it found a potentially adequate remedy in the form of an

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1. For a review of the previous litigation on this subject, see the note by the same author in *Nuclear Law Bulletin* 61, entitled “*Department of Energy's Responsibility for Disposal of Spent Fuel*”.

2. 10 C.F.R. Part 961, “Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste”.

3. *Indiana Michigan Power Co. v. U.S. Department of Energy*, 88 F.3d 1272 (D.C. Cir. 1996).

4. *Northern States Power Co. v. U.S. Department of Energy*, 128 F. 3d 754 (D.C. Cir. 1997).

“equitable adjustment” under the Standard Contract⁵. The **Northern States** decision precludes the Department from invoking the unavoidable delays clause of the Standard Contract and from asserting traditional sovereign acts defences in any suits for damages in the U.S. Court of Federal Claims which has jurisdiction over claims involving money claims in contracts with the Federal Government⁶. The Department and the State of Michigan both filed petitions for certiorari to the U.S. Supreme Court which were denied on November 30, 1998.

B. U.S. Court of Federal Claims

Lawsuits for breach of contract have been filed in the U.S. Court of Federal Claims by utilities seeking a total of over \$4 billion in damages based on the Standard Contract, as discussed below. One of the key issues before that Court in 1998 was whether the utilities could by-pass the contract’s disputes procedures at the administrative level in favour of an action for breach of contract in court. That issue was decided on 6 April 1999 by the U.S. Court of Federal Claims which held that the plaintiff in **Northern States**, a utility with operating nuclear power plants, must pursue its claims through administrative remedies established in the Standard Contract⁷.

The Court appeared to distinguish between: 1) a utility with a shut-down reactor (see **Yankee** below) which no longer makes payments into the Nuclear Waste Fund and cannot apply for an “equitable adjustment” of fees – the Court found that it did not have an adequate remedy under the Standard Contract; and 2) a utility with operating reactors (see **Northern States** below) which still makes payments into the Fund – the Court found that this utility can apply for an equitable adjustment of fees and must first exhaust remedies under the Standard Contract.

Yankee Atomic Electric Co.

In February 1998, the Yankee Atomic Electric Company (“Yankee”)⁸ filed a complaint for damages for breach of contract in the amount of \$270 million dollars – associated with extended storage of 127 metric tons of SNF onsite at its shut-down nuclear plant in Massachusetts. Yankee asserted that, while it had paid its contractual fees in full, the Department has not commenced disposal. The Department argued that any delay in acceptance of Yankee’s SNF was redressable under the “Avoidable Delays” clause of the Standard Contract (i.e., that Yankee had failed to exhaust its contractual remedies), and that Yankee had only a claim for an equitable adjustment through administrative procedures described in that contract.

In a decision issued in October 1998, the U.S. Court of Federal Claims noted that a controversy is subject to the Disputes clause where complete relief is available under the contract. In considering the adequacy of a remedy under the Standard Contract, the Court held that an adjustment to the contract charges was unavailable as the contract permits only a prospective adjustment to the

5. An equitable adjustment under Article IX.B of the Standard Contract (“Avoidable Delays by Purchaser or DOE”) could potentially involve an adjustment of fees paid by utilities into the Nuclear Waste Fund.

6. The Court of Federal Claims is authorized to hear primarily claims for money founded upon the Constitution, federal statutes, executive regulations, or contracts, – express or implied-in-fact – with the United States.

7. Northern States Power Co. v. U.S. Department of Energy, U.S. Court of Federal Claims, case no. 98-484C.

8. Yankee Atomic Electric Co. v. United States, U.S. Court of Federal Claims, case no. 98-126C.

post-7 April 1983 fees⁹ and Yankee had already paid all of its fees, in addition to its entire pre-7 April 1983 fee. The Court felt that statutory restrictions on the use of contract payments preclude the Department from retroactively adjusting Yankee's charges to reflect its on-site storage costs. The Court ruled that Yankee has no adequate contractual remedy and that its claim does not fall within the Disputes clause of the Standard Contract. Summary judgement was granted for Yankee on the issue of liability.

Similar suits have been filed by two other nuclear utilities, Connecticut Yankee and Maine Yankee¹⁰ seeking \$90 million and \$128 million respectively, for the Department's failure to remove SNF from their shutdown reactor sites. In October and November 1998, the Court issued orders finding that, for the same reasons as stated in the **Yankee Atomic** decision, the Department is contractually liable to these utilities. The next phase of the so-called "Yankee" cases will determine the amount of damages payable by the Department.

Northern States Power Co.

The Northern States Power Company (Northern States) which owns operating commercial nuclear power plants in Monticello and Red Wing, Minnesota filed a complaint in June 1998 alleging breach of contract for the Department's failure to commence disposal by 31 January 1998 and that as a result it had and would continue to incur substantial costs for extended on-site storage of its SNF.

On 6 April 1999, the U.S. Court of Federal Claims decided in **Northern States Power**¹¹ the issue of whether the plaintiff utility might seek to enforce its contract rights through a claim for breach damages in court or whether it was obliged by the terms of its contract with the Department to pursue its demand for monetary relief at the agency level, i.e., through a claim for equitable adjustment submitted in accordance with the Disputes clause of the Standard Contract.

Unlike the **Yankee** cases, the Court concluded that Northern States must pursue its remedies under the contract since it found that the Disputes clause provision that "any dispute concerning a question of fact arising under this contract which is not disposed of by agreement shall be decided by the Contracting Officer..."¹² was controlling as a matter of law. The Court also stated that since the Avoidable Delays clause speaks explicitly of "any" delay in the delivery, acceptance or transport of SNF or HLW, the Department's indicated 12-year delay in commencing disposal was within the scope of the clause.

Unlike the Yankee cases, the Court rejected the plaintiff's contention that because remedies under the Standard Contract were inadequate and incomplete, the claim does not "arise under" the contract. The Court held instead that since the Delays clause speaks of "any" delay caused by circumstances within the reasonable control of either party and directs that "the charges and schedules be equitably adjusted to reflect any estimated additional costs incurred by the party not responsible for

9. 10 C.F.R. 961.11, Art. VIII, A.2. "Fees and Terms of Payment" provides that payment of a one-time fee assessed on SNF used to generate electricity in a civilian nuclear power reactor prior to April 7, 1983 "shall not be subject to adjustment..."

10. Connecticut Yankee Atomic Power Co. v. United States, U.S. Court of Federal Claims, case no. 98-154C, and Maine Yankee Atomic Power Co. v. United States, U.S. Court of Federal Claims, case no. 98-474C.

11. Northern States Power Co. v. United States, U.S. Court of Federal Claims, case no. 98-484C.

12. 10 C.F.R. 961.11, Art. XVI, A. "Disputes".

or contributing to the delay”, the contract affords complete relief to Northern States and therefore the delay does indeed “arise under” the contract.

The decision confirms the Department’s position that the Standard Contract provides the remedy for its delay in commencing disposal via equitable adjustment of fees paid by utilities to account for their additional costs incurred as a result of the delay.¹³ Northern States, which sought damages as opposed to an equitable adjustment, has indicated that it will appeal.

Waste Isolation Pilot Plant (WIPP)¹⁴

On 26 March 1999, Secretary of Energy Bill Richardson announced that the first shipment of radioactive transuranic (TRU) waste from the Los Alamos National Laboratory had arrived at the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico. He remarked that:

“On Monday, U.S. District Judge John Garrett Penn cleared the way for today’s shipment. The Court ruled that there is no legal reason to delay the shipments any longer ... The D.C. Circuit Court of Appeals agreed ... Over the past two decades, we have found again and again that the WIPP facility is the safest, best solution for the nation, and it is ready to go. And in May of last year, WIPP was certified by the Environmental Protection Agency as exceeding that Agency’s rigorous safety standards for disposal of radioactive waste. That was my important standard as New Mexico’s Congressman – that WIPP be certified by EPA ... We have two other critical endorsements: the National Academy of Sciences and the Defence Nuclear Facilities Safety Board. Forty years ago, the National Academy of Sciences recommended that the Federal government examine waste disposal in deep, stable geologic formations. I am very pleased to “close the loop” on this long-abiding national recommendation.”

The issue of disposal of TRU waste at WIPP has engendered extensive litigation since 1991 when the Department proposed transporting limited amounts for a test phase. Suits were filed by the State of New Mexico and environmental organisations alleging violations of environmental laws and the Resource Conservation and Recovery Act (RCRA)¹⁵. In particular, the New Mexico Environment Department, a State Agency regulating WIPP with respect to hazardous waste, has argued: 1) that WIPP does not have a RCRA permit for hazardous or “mixed TRU waste”,¹⁶ 2) that the Department cannot establish that containers of TRU waste destined for WIPP do not also contain hazardous elements; and 3) that the Department lacks the “interim status” under RCRA which would allow operation of a hazardous waste facility without an actual permit.

13. The Department’s Contracting Officer would evaluate the evidence submitted by any utility concerning additional costs incurred as a result of the delay and would calculate an appropriate fee adjustment. Any appeal from the Contracting Officer’s decision would be heard by the Energy Board of Contract Appeals.

14. For a review of the previous case-law on this issue, see the note by the same author and with the same title in Nuclear Law Bulletin No. 62.

15. 42 U.S.C. 6901 et seq. RCRA comprehensively regulates from generation to burial waste designated as hazardous. States may take primary responsibility for RCRA implementation by adopting a hazardous waste management program that is approved by the EPA. New Mexico’s plan largely replicates the Federal program.

16. TRU waste containing hazardous as well as radioactive constituents is known as “mixed TRU waste” and is regulated in part by RCRA or EPA approved State program.

Most recently, the State of New Mexico and various environmental organisations had, on March 12, 1999, sought an injunction by the Court in **State of New Mexico v. Richardson**¹⁷ prohibiting shipment by the Department of 36 drums of TRU waste from the Los Alamos National Laboratory on grounds of a 1992 injunction and threatened violation of the New Mexico Hazardous Waste Act. They maintained that the Department's plan violated regulations forbidding receipt of waste without a permit or "interim status". The Department contended that WIPP does in fact have interim status and that, since the waste intended for shipment is purely radioactive and not hazardous, interim status should not be required in any event.

On 22 March 1999, the U. S. District Court for the District of Columbia Circuit issued a decision concluding that the 1992 injunction did not prevent the shipment, that WIPP has in fact "interim status" and that the proposed shipment of non-mixed TRU waste identified as "TA-55-43, Lot No. 01" from the Los Alamos National Laboratory was non-hazardous as defined under RCRA.¹⁸

The first shipment arrived at WIPP on 25 March 1999 containing almost 600 pounds of TRU waste consisting primarily of protective clothing, gloves, tools, and other materials used in the manufacture of batteries used in space probes for the National Aeronautics and Space Administration. The Department reportedly plans to also commence shipping non-hazardous TRU waste from the Idaho National Engineering Laboratory on April 27, 1999.¹⁹ The ability to ship TRU waste from Idaho eliminates a political and legal problem for the Department. By commencing shipments to WIPP, the Department complies by a matter of days with a court-ordered deadline for beginning to move certain TRU waste out of Idaho. Failure to do so could have resulted in financial penalties.

ADMINISTRATIVE DECISIONS

Canada

Radioactive Waste Management

Response of the Canadian Government to the Nuclear Fuel Waste Management and Disposal Concept Environmental Assessment Panel (1998)

On 3 December 1998, the Minister of Natural Resources announced the response of the Canadian Government to the Nuclear Fuel Waste Management and Disposal Concept Environmental Assessment Panel, also known as the Seaborn Panel. The Panel, which reported to the Government in

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17. State of New Mexico v. Richardson, U.S. District Court for the District of Columbia Circuit, case no. 91-2527 (JGP).
 18. The decision in State of New Mexico v. Watkins, 969 F.2d at 1127-1133 (D.C. Cir 1992) provides detailed background on the issue of "interim status" in this case and held that WIPP was eligible for interim status under RCRA.
 19. *Energy Daily*, April 15, 1999.

March 1998, after almost ten years, found the nuclear waste disposal concept developed by Atomic Energy of Canada limited (AECL) to be technically safe but it did not have broad public support.

The Policy Framework for Radioactive Waste of Canadian Government, announced in 1996, outlined the principles governing institutional and financial arrangements for the disposal of radioactive waste by waste producers and owners. It clearly recognised that arrangements may be different for nuclear fuel waste, low-level radioactive waste and uranium mine and mill tailings. The Government's response to the Seaborn Panel outlines the Government's expectations for nuclear fuel waste.

For nuclear fuel waste, the Government expects that:

- The producers and owners of nuclear fuel waste in Canada, in particular, Ontario Hydro, Hydro-Quebec, and New Brunswick Power, will establish a waste management organisation, incorporated as a separate legal entity which operates at arm's length from both the nuclear utilities and AECL, with a mandate to manage and co-ordinate the full range of activities relating to the long-term management, including disposal, of nuclear fuel waste. The waste management organisation will consist of a Board of Directors, representative of producers and owners of nuclear fuel waste, and an advisory council. It will allow for the participation of all producers and owners of nuclear fuel waste.
- The producers and owners of nuclear fuel waste in Canada will establish a fund to fully finance all activities and operations of the waste management organisation including the costs for developing and comparing waste management options, for designing and siting the preferred approach for the long-term management, including disposal, of nuclear fuel waste, for implementation, and ultimately for decommissioning waste management facilities.
- The waste management organisation will report to the Government setting out its preferred approach for the long-term management, including disposal, of nuclear fuel waste, with justification, as well as:
 - a comprehensive public participation plan;
 - an ethical and social assessment framework;
 - an Aboriginal participation process;
 - practicable long-term waste management options for Canada, including a modified AECL concept for deep geological disposal, storage at reactor sites and centralised storage, either above or below ground;
 - a comparison of risks, costs and benefits of the options along with proposed siting territories; and
 - future steps.

The Government will determine whether it accepts the report and the preferred approach proposed by the waste management organisation, and future steps.

The Atomic Energy Control Board, Canada's independent nuclear regulator, will make certain that health, safety security and protection of the environment will not be compromised.

Recognising that there is a need to ensure that the preferred approach for the long-term management, including disposal, of nuclear fuel waste is carried out in a comprehensive, cost-effective and integrated manner, Natural Resources Canada has initiated a consultative process with appropriate federal departments, the Atomic Energy Control Board, producers and owners of nuclear fuel waste, the provinces, and other stakeholders to develop options, including legislative options, to meet three key objectives:

- to require that a dedicated fund be established, to which only the producers and owners would contribute, to fully finance long-term management, including disposal, of nuclear fuel waste;
- to establish a reporting relationship between the federal government and the waste management organisation, and the producers and owners, to review progress on a regular basis; and
- to establish a federal review and approval mechanism to provide oversight and access to funds.

The Minister of Natural Resources will return to Cabinet by the end of 1999 with the preferred option to ensure key federal objectives will be met.

Switzerland

Leibstadt Nuclear Power Plant: Increase in Nominal Thermal Power from 3138 to 3600 MW (1998)

On 28 October 1998, the Federal Council (Swiss Government) granted the Leibstadt Nuclear Power Plant's request to increase its nominal thermal power to 3600 MW. This request was submitted by the operator on 7 September 1992 (see *Nuclear Law Bulletin* Nos. 51 and 60). During their evaluations of March 1996 and April 1997, the Principal Nuclear Safety Division and the Federal Commission for the Safety of Nuclear Installations had both concluded that an increase in power as requested by the operator was possible under certain conditions.

In Spring 1997, an inspection of fuel rods revealed patches of corrosion on certain cladding significantly bigger than normal. The rods examined had spent between three and five years inside the core. This anomaly caused the Federal Department for Transport, Communications and Energy (hereinafter "the Department") to recommend that the Federal Council should not authorise an increase in power until the technical failings were corrected. One of the principal reasons for these failings was found to be the chemical composition of the cooling water in the reactor combined with the properties of the alloys within the fuel rods. Once this anomaly had been discovered, the safety authority took emergency measures in order to be prepared for all eventualities. In order to dramatically slow down the corrosion process, the following measures were adopted: modification of the chemical composition of the cooling water, preliminary oxidation of the external part of the fuel rods and the insertion of new constituents into the alloys within the fuel rods. In May 1998, the safety authority concluded that the measures taken were sufficient in order to allow an increase in power.

Mühleberg Nuclear Power Plant : Extension of the Operating Licence for a Limited Time (1998)

By decision of 28 October 1998, the Federal Council decided to extend until 2012 the operating licence granted to the Mühleberg nuclear power plant (operated by BKW FMB Energie AG)

(see *Nuclear Law Bulletin* Nos. 49 and 51). The Federal Council's decision of 14 December 1992 had extended the operating licence until 2002. The operator had requested in 1996 that this limited licence be transformed into an unlimited operating licence. The operator founded his request upon the principle of legal certainty and the necessity of ensuring an energy supply to the country, combined with the principle of equality of treatment in respect of the three other nuclear installations which benefit from an unlimited operating licence (namely, Beznau I, Gösgen and Leibstadt). The other two plants, Beznau II and Mühleberg hold operating licences for a limited period, which are renewable, in principle, for as long as the operator wishes. This "inequality of treatment" thus led to the Mühleberg operator's request to transform the limited operating licence into an unlimited one. The competent authority, the Federal Council, refused this request, while granting, by decision of 28 October 1998, an extension of Mühleberg nuclear power plant's operating licence until 31 December 2012. The Federal Council thus extended the preceding operating licence by ten years.

Change of Direction in Energy Policy: Planned Closure of Existing Swiss Nuclear Power Plants (1998)

During its session of 21 October 1998, the Federal Council discussed a large range of issues in the field of energy policy, leading to certain decisions of principle, including the fixing of a time limit for the closure of the existing nuclear power plants. These plants are to be closed down after expiration of a period of time yet to be determined. The Heads of the Departments of Energy and the Economy invited the operators of power plants, ecological organisations, and representatives of the cantons and communes affected to discuss possible solutions for the disposal of radioactive waste, and to suggest a time limit for the closure of the existing plants. If the parties involved do not reach agreement on these issues, the Federal Council will decide. The two major problems which the Federal Council has encountered are the choice of method of disposal of radioactive waste (permanent disposal or long-term disposal with a possibility of recovery) and the question of reprocessing of spent fuel. The choices which Switzerland eventually makes on these issues will be described in a future edition of the *Nuclear Law Bulletin*.

NATIONAL LEGISLATIVE AND REGULATORY ACTIVITIES

Argentina

General Legislation

Decree on the Implementation of the Law on Nuclear Activities and on the Privatisation of the Nuclear Sector (1998)

Decree No. 1390/98, which was promulgated on 27 November 1998, was published in the Official Journal of the Republic of Argentina on 4 December 1998 and entered into force on the same date.

This Decree is divided into three main parts. Chapter 1 provides for the application of the provisions set out in Law No. 24.804 on Nuclear Activities (see *Nuclear Law Bulletin* No. 59). The Decree establishes the obligation to pay a fee towards research and development amounting to 2.5% of the income created from the sale of electrical energy produced by nuclear power plants. This percentage will continue to apply until Unit Atucha II, currently under construction, commences operations, at which stage the annual fee will be reduced to 1.5%. These fees will initially be paid by the company *Nucleoelectrica Argentina s.a* to the National Atomic Energy Commission. Afterwards, the privatisation of this company will be carried out by the limited company *Generadora nuclear Argentina* (GENUAR s.a.).

Chapter II governs the privatisation regime itself. It establishes the limited company GENUAR s.a. as mentioned above and defines the manner in which it will carry out its tasks. In order to carry out the privatisation, it provides that all activities of nuclear energy production previously entrusted to *Nucleoelectrica Argentina s.a.* are now transferred to GENUAR. The statute of GENUAR is to be approved by the Department of Energy of the Ministry of Economy and Public Services. The Decree provides furthermore that until the actual moment when the privatisation comes into effect, 99% of GENUAR's shares will be held by the State and the remaining 1% by *Nucleoelectrica Argentina s.a.* GENUAR therefore becomes the operator of the Atucha I and Embalse plants, and becomes the licenseholder in respect of the construction of the Atucha II plant.

Chapter III establishes three funds in order to guarantee the financing of the decommissioning of the Atucha I, Embalse and Atucha II plants. Furthermore, it sets out the amount necessary to dismantle each plant and the annual contribution which GENUAR must make to each fund. Finally, the Decree establishes the conditions of such contribution, in particular in relation to the timing of payments, the eventual termination of the obligation to make such payments and the annual adjustment of the amount due.

Radioactive Waste Management

Law on Radioactive Waste Management (1998)

Law No. 25018 on radioactive waste management was promulgated on 19 October 1998 (see *Nuclear Law Bulletin* No. 56). This Law is divided into 16 sections within four chapters, which govern respectively general provisions (Sections 1 to 5), liability and transfer of liability (Sections 6 to 9), the national radioactive waste programme (Sections 10 to 12) and financing of radioactive waste management (Sections 13 to 15).

This Law establishes the legal framework and technical provisions governing radioactive waste management on Argentinean territory in order to ensure the protection of the environment and public health and to guarantee the rights of future generations. This management extends to all activities necessary to eliminate radioactive waste generated from nuclear activities from the biosphere until its level of radioactivity no longer poses a threat to man or the environment.

The National Atomic Energy Commission (CNEA) is the body responsible for the correct implementation of this Law. It ensures that the requirements concerning radiological safety and physical protection are observed while waste management activities are being carried out.

The operator of an installation which produces radioactive waste is responsible for its treatment and control until it is transferred to the Commission, which will then establish criteria concerning the acceptance of waste and conditions of its shipment. The operator may not evade his liability for potential damage to individuals or to the environment until this liability has been transferred to the Commission. The CNEA is required to establish a Strategic Plan for Radioactive Waste Management within six months of promulgation of this Law. The guidelines governing this Plan are included in Section 10 of the Law, which lists all the tasks attributed to the Commission in connection with this project. The Strategic Plan will be finally approved by the National Parliament, and a report will be provided annually to the Parliament in this respect.

Finally, a fund is established from the date of promulgation of this Law in order to ensure the financing of the Strategic Plan for Radioactive Waste Management. This fund will consist of contributions made by producers of radioactive waste, which is to be scaled according to the nature and volume of the waste produced, as well as other criteria concerning the manner in which such waste is produced. The Law provides that the National Parliament shall adopt specific legislation to govern the administration and control of this fund.

Armenia

General Legislation

Law for the Safe Utilisation of Atomic Energy for Peaceful Purposes (1999)

The Law of the Republic of Armenia for the Safe Utilisation of Atomic Energy for Peaceful Purposes was adopted on 1 February 1999. It came into force on 1 March 1999 upon its signature by the President.

The Law provides the legal framework and principles for management and regulation of the peaceful use of atomic energy. It determines the respective duties of the Government, Republican and

regional state authorities and local authorities, together with the Operational Organisation which is held responsible for the safe operation of nuclear facilities and the safe treatment of nuclear and radioactive materials.

The basic principles for the regulation of the use of atomic energy are as follows:

- to ensure the protection of the population and the environment from the harmful effects of atomic energy;
- to ensure the predominance of safety requirements during the use of atomic energy;
- to ensure availability of information concerning the use of atomic energy, with the exception of those matters governed by State secret;
- to ensure the participation of concerned legal and physical persons in the drafting of nuclear legislation; and
- to ensure compensation for nuclear damage.

The Law provides that nuclear facilities, nuclear materials and special materials, equipment and technologies defined in the Law are State-owned.

The regulatory function of the State is to be exercised by the Nuclear Regulatory Authority, the duties of which are listed comprehensively in the Law. One of its main tasks is to issue licenses in respect of all activities involving atomic energy, and for all the phases from site selection to decommissioning of nuclear facilities as well as for use, storage, transportation, reprocessing, disposal, import and export of nuclear materials, radioactive materials and special materials, equipment and technologies.

The Law establishes a system of state registration, accounting and control of ionising radiation sources and radioactive waste. The responsibility for such registration is assigned to the licensees who manage ionising radiation sources, or whose activity resulted in the generation of radioactive waste. The import of radioactive waste is prohibited unless such waste was generated by another state as a result of services rendered to Armenia. Measures involving the storage and disposal of radioactive waste are determined by the Government in co-operation with the Regulatory Authority. Nuclear materials, radioactive materials and special materials, equipment and technologies are also subject to state accounting and control.

Licensees are similarly responsible for physical protection, which is to be provided during all stages of operation of nuclear installations.

A special legal regime may be established in the area of nuclear facilities where the rights of those persons involved in the operation of the nuclear installation as well as the general public are restricted.

The Law contains provisions concerning third-party liability for nuclear damage, which provide that licensees for nuclear activities are liable for nuclear damage up to those amounts determined by specific legislation which will be adopted by Armenia. However, compensation available for any nuclear incident must not be less than the minimum amounts determined by the international agreements ratified by Armenia.

The text of this Act will be reproduced in the Supplement to *Nuclear Law Bulletin* No.64.

Australia

Organisation and Structure

Radiation Protection and Nuclear Safety Act (1998)

A set of legislation consisting of three Acts in the field of radiation protection and nuclear safety was passed by both Houses of Parliament on 10 December 1998 and was proclaimed on 5 February 1999.

Act No. 133 (Australian Radiation Protection and Nuclear Safety Act), which is a framework Law, established the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) as the regulatory body for radiation protection and nuclear safety, in place of the Nuclear Safety Bureau. The Chief Executive Officer of ARPANSA, who is appointed by the Governor-General for a term of up to 5 years, exercises the following regulatory functions:

- to promote uniformity of radiation protection and nuclear safety policy and practices;
- to provide advice and services concerning radiation protection and nuclear safety;
- to undertake research in relation to radiation protection, nuclear safety and related issues;
- to accredit persons with technical expertise for the purpose of this Act;
- to monitor the operations of ARPANSA, the Radiation Health and Safety Advisory Council (the Council), the Radiation Health Committee and the Nuclear Safety Committee; and
- to monitor compliance with the provisions of this Act.

The Chief Executive Officer is obliged to submit annual and quarterly reports to the Minister on the operations of the Chief Executive Officer, ARPANSA, the Council, the Radiation Health Committee and the Nuclear Safety Committee.

The Council is a consultative body which examines issues relating to radiation protection and nuclear safety and advises the Chief Executive Officer on these issues as well as on the adoption of recommendations, policies and codes. The Radiation Health Committee and the Nuclear Safety Committee are to be established as advisory committees to the Chief Executive Officer or the Council. Both committees should draft national policies, codes and standards in their respective fields and review their effectiveness periodically.

The second in this series of legislation, Act No. 134 (Australian Radiation Protection and Nuclear Safety (License Charges) Act) requires holders of both facility and source licenses to pay an annual charge, to be prescribed by the regulations.

Act No. 135 (Australian Radiation Protection and Nuclear Safety (Consequential Amendments) Act) repeals those provisions of the 1987 Australian Nuclear Science and Technology Organisation Act which concern the Nuclear Safety Bureau, and the 1978 Environment Protection Act as a whole.

Austria

Third Party Liability

Law on Third Party Liability for Nuclear Damage (1998)

A new Law on Third Party Liability for Nuclear Damage was adopted by the Austrian Parliament on 7 October 1998. This Law was the subject of an article by Professor Monika Hinteregger in *Nuclear Law Bulletin* No. 62. The text of this Law is reproduced in the Supplement to this Bulletin.

Bosnia and Herzegovina

General Legislation

Law on Radiation Protection and Radiation Safety (1999)

The Parliament of the Federation of Bosnia and Herzegovina adopted the Law on Radiation Protection and Radiation Safety on 24 January 1999. The Law will enter into force on the eighth day after its publication in the Official Gazette of the Federation of Bosnia and Herzegovina. Details on this Law will be provided in the next Bulletin.

Brazil

General Legislation

Law on the Levying of a Tax in Respect of the Licensing and Control of Radioactive Materials and Nuclear Installations (1998)

Law No. 9.765 of 17 December 1998 establishes a system of taxation of radioactive materials and nuclear installations. This system is based upon the exercise of supervisory powers attributed to the National Nuclear Energy Commission in respect of the following activities:

- prospecting for nuclear minerals containing thorium and uranium or minerals used to produce nuclear energy;
- choice of site, construction, operation and decommissioning of nuclear installations;
- choice of site, construction, operation and decommissioning of installations to be used for the production and utilisation of radioelements for scientific, medical, agricultural or industrial purposes;

- production of and trade in nuclear minerals and materials, as well as minerals containing uranium and thorium;
- transport of radioactive materials;
- construction and operation of installations to be used for the production of radioactive materials and for the utilisation of nuclear energy;
- the possession, utilisation and control of radioactive materials;
- the collection, treatment, transport and storage of radioactive waste.

This tax will in principle be paid by natural or legal persons authorised to exercise the following activities: operate a nuclear installation; use radioactive materials; hold, transport or store ionising radiation sources; carry out research into uranium and thorium minerals; produce and commercialise minerals of interest to nuclear energy; and carry out radioactive waste management. The relevant amounts are set out in the Annex to this Law.

This Law was published in the Official Journal of the Republic of Brazil on 18 December 1998 and entered into force on 1 January 1999.

Resolution of the Secretary for Strategic Affairs concerning the Protection System for the Brazilian Nuclear Power Programme – SIPRON (1998)

The objective of Resolution No. 145 of 7 December 1998 is to set out the procedure for the protection of secret information in connection with the Protection System for the Brazilian Nuclear Power Programme (SIPRON). This instrument provides instructions for the preparation of guidelines concerning secret State information, in particular on nuclear activities and installations (see *Nuclear Law Bulletin* Nos. 27, 50, 53 and 60).

Such measures destined to protect secret information aim to rule out any possibility of hostile activities, and extend to employees, documentary resources, and to the premises where nuclear activities are carried out.

This Resolution was published and entered into force on 8 December 1998.

Croatia

*Act on Liability for Nuclear Damage (1998)**

Introduction

On 9 October 1998, the Croatian Parliament adopted the new Act on Liability for Nuclear Damage (Official Gazette No. 143/98), hereinafter referred to as “the 1998 Act”, which amended the

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previous Act of 1978 (see *Nuclear Law Bulletin* No. 23). The need for amendment derived from some obvious deficiencies in the 1978 Act, in particular, its references to certain public authorities which in the Croatian legal system no longer exist, and the fact that the formulation of certain provisions did not reflect in a sufficiently precise manner the solutions established in the 1963 Vienna Convention. The lack of the necessary level of precision, which resulted in legal uncertainty, concerned in particular the provision governing the minimum amount of liability of the operator.

Scope of Application

The 1998 Act governs liability for nuclear damage which results from peaceful uses of nuclear energy, insurance and other financial security covering such liability (Article 1). The definitions of nuclear material and nuclear installation to which the provisions of the 1998 Act refer, as well as the definition of nuclear damage, are the same as those contained in the 1963 Vienna Convention (Article 2). However, several nuclear installations of one operator that are located at the same site shall be considered as a single nuclear installation (Article 3). The Act contains a provision on reciprocity, which may be based on national legislation or established by multilateral or bilateral treaty, thus binding the State in question and the Republic of Croatia (Article 4).

Liability for Nuclear Damage

Liability for nuclear damage lies exclusively with the operator of a nuclear installation, irrespective of his fault (Articles 10 and 11). Exceptionally, with the approval of the competent State authority and with the written consent of the operator who would otherwise be considered liable, a carrier of nuclear material may take the place of the operator (Article 6). The operator is liable for nuclear damage caused by a nuclear incident if the incident occurred in his nuclear installation or during the transport of nuclear material to or from his installation (Article 5).

Liability for nuclear damage is limited up to the amount of 320 million Kuna, which corresponds approximately to \$ 48 million (Article 8). In cases where several nuclear installations of one and the same operator are involved in any one nuclear incident, such operator shall be liable in respect of each nuclear installation involved, up to the amount established in Article 8 of the 1998 Act (Article 15). Also, the operator is not liable for nuclear damage caused to the nuclear installation or to any on-site property, or to the means of transport on which the nuclear material involved was located at the time of the nuclear incident (Article 13).

The 1998 Act has modified to a certain extent the provisions of the 1963 Vienna Convention in respect of liability for damage occurring during the transport of nuclear material. In addition, nuclear material may be imported into or transported through the territory of the Republic of Croatia only if the carrier has a certificate issued by or on behalf of the insurer or other financial guarantor providing the security required, which covers liability for nuclear damage up to an amount not less than that established under Article 8 of the 1998 Act (Article 19). This provision, which departs from the provisions of the Vienna Convention, does not however undermine the general rule of the 1963 Convention whereby the liability ceiling of the operator is that specified by the national law of the operator liable. This is because the limitation of liability established by the 1998 Act reflects the amount of minimum liability established by Article V of the 1963 Vienna Convention, as the US dollar referred to in this instrument denotes a unit of account equivalent to the value of the United States dollar in terms of gold on 29 April 1963 (\$ 35 per one troy ounce of fine gold).

Limitation and Exclusion of Liability

The operator shall not be held liable for nuclear damage caused by a nuclear incident which is directly due to an act of armed conflict, hostilities, civil war, insurrection or a grave natural disaster of an exceptional character (Article 12). Also, in cases where the person suffering damage has acted intentionally or where the nuclear damage resulted from his gross negligence, the operator may be wholly or partly relieved from his obligation to pay compensation in respect of the damage suffered by such a person (Article 14).

Insurance and other Financial Security

The operator is obliged to provide and maintain insurance or other financial security covering his liability for nuclear damage of an amount which shall not be lower than that established under Article 8. If the liability of the operator which may occur during transport of nuclear material is not covered by such insurance or other financial security, such liability shall be covered by a separate insurance policy or financial security (Article 16). The insurer or financial guarantor is not entitled to cancel the insurance or the financial security without giving notice in writing three months prior to such cancellation to the operator and the competent state authority. Furthermore, they are not entitled to cancel the coverage during the carriage of nuclear material (Article 17).

The Role of the State

The 1998 Act introduced elements of state intervention in respect of compensation for nuclear damage, in certain strictly enumerated situations. More precisely, the 1998 Act has recognised the obligation of the Republic of Croatia to establish measures of supervision to verify the existence and content of insurance or financial security contracts. The Republic of Croatia shall provide the means for compensation of nuclear damage up to the amount established under Article 8:

1. if the operator fails to provide for or maintain insurance or financial security pursuant to Article 16;
2. if the insurer or financial guarantor is not liable to compensate the nuclear damage, pursuant to the terms of the insurance contract or financial security;
3. if the insurer or financial guarantor cannot fulfil his contractual obligations due to insolvency.

In such cases, the Government of the Republic of Croatia has a right of recourse against the insurer or financial guarantor, or operator, up to the amount paid, during a period of five years from each payment of compensation made (Article 20).

The Compensation of Nuclear Damage and the Right of Recourse

Jurisdiction over compensation for nuclear damage shall lie only with the court on whose territory the nuclear installation of the operator liable is located. However, where nuclear damage occurs during the carriage of nuclear material, jurisdiction over such actions shall lie with the court on whose territory the nuclear damage occurred or on whose territory the nuclear installation of the operator liable is located (Article 21).

Actions for compensation for nuclear damage caused by a nuclear incident may be brought not only against the operator, but also directly against the insurer or financial guarantor (Article 22). The action may be brought within ten years from the date of a nuclear incident, provided that the action is not brought later than three years from the date on which the person suffering nuclear damage had knowledge of the damage and of the operator liable for the damage (Article 24).

In cases where funds, which on the basis of public health insurance, pension insurance, inability insurance or other insurance funds, have been used entirely or partly for the payment of compensation for nuclear damage for which the operator is liable, the bodies responsible for the management of such funds have a right of recourse against the operator, up to the actual amount which has been paid (Article 26).

Penal Provisions

The operator shall be fined if he fails to acquire and maintain insurance or other financial security covering his liability for nuclear damage. Also, the insurer or financial guarantor shall be fined in the event that he cancels the insurance or financial security before giving notice in writing to the competent state authority, or during the carriage of nuclear material (Article 27).

Conclusions

The 1998 Act has incorporated all of the principles of the 1963 Vienna Convention and is almost entirely based on its provisions. Furthermore, Article 28 explicitly states that all other matters which are not specifically regulated by its provisions shall be governed by the provisions of the 1963 Vienna Convention. In any case, the 1998 Act is a significant step forward in comparison with the provisions of the old legislation. Finally, it should be mentioned that in Croatia, there is at present no nuclear installation to which the regime of operator's liability may be applied. Therefore, the Act shall only cover situations where nuclear material is transported through the territory of the Republic of Croatia.

Finland

Third Party Liability

Decree on Liability Amount (1998)

Pursuant to Section 18 of the 1972 Nuclear Liability Act, as amended, the Council of State adopted, on 30 October 1998, Decree No. 785 which raised the maximum liability amount of a Finnish operator from 150 to 175 million SDRs (the text of the 1972 Act is reproduced in the Supplement to *Nuclear Law Bulletin* No. 44, see also Bulletin Nos. 53 and 55). This Decree entered into force on 1 January 1999.

France

Radiation Protection

Decrees concerning the protection of workers against the dangers of ionising radiation (1998)

Two Decrees, bearing the references 98-1185 and 98-1186 of 24 December 1998, amended the existing French legislation in relation to the protection of workers against the dangers of ionising radiation (Decree No. 75-306 of 28 April 1975, as amended and Decree No. 86-1103 of 2 October 1986, as amended). These two legislative instruments implement Council Directive No. 90/641/Euratom of 4 December 1990 (see *Nuclear Law Bulletin* No. 47) on the operational protection of outside workers exposed to the risk of ionising radiation during their activities in controlled areas.

One of the principal objectives of these Decrees is to introduce the concept of operational dosimetry. They provide that only the worker concerned (or his legal representatives), the in-house doctor and inspector, and those persons who are qualified in radioprotection may have access to the individual results in respect of the radiation measures carried out. The Board for Protection against Ionising Radiation (OPRI) is entitled to use such individual results for statistical purposes or in the study of epidemiology. Furthermore, these Decrees set up a registration system to certify outside companies which carry out activities in controlled areas in a major nuclear installation, or which are involved in maintenance or repair work on machinery which emits ionising radiation. These certification measures apply equally to temporary employment agencies whose employees participate in such work.

Decision concerning official maximum limits for radioactive contamination by radon (1998)

Official maximum limits for radioactive contamination of housing by radon have for the first time been fixed by the French Government in a Circular signed by the Ministers of Health and Housing. Two different ceilings exist: the alert limit, which is fixed at 1 000 Becquerels per cubic metre of air, and the precautionary limit, at 400 Bq/m³ for existing buildings and 200 Bq/m³ for new constructions. These maximum limits are based on 1998 recommendations by the High Council for Public Health in France.

Transport of Radioactive Materials

Orders modifying the ADR and RID Orders on transport of dangerous goods by road and rail (1998)

The ADR and RID Orders of 5 and 6 December 1996, which implement respectively into French legislation the European Agreement on the International Carriage of dangerous Goods by Road (ADR) and the Regulation on the International Carriage of Dangerous Goods by Rail (RID), were further amended on 17 December 1998. The principal objective of this amendment was to implement the modifications introduced in 1999 to the ADR and the RID into French law.

Order concerning the nomination and professional qualifications of safety officers for transport of dangerous goods by road, rail or inland waterway (1998)

The position of “safety officer” was established in Council Directive 96/35/CE of 3 June 1996. Companies obliged to designate such a safety officer include those which carry out road, rail or river transport of materials considered as dangerous according to the terms of the ADR, RID and ADNRR

instruments. The safety officer is in charge of preventing risks which may occur during loading, transport and unloading of dangerous materials. This officer is required to identify and promote, under the authority of the company director, measures which encourage the company to observe all the applicable regulations and to carry out work in optimum safety conditions.

Germany

Transport of Radioactive Materials

Amendment to the Act Concerning the Carriage of Dangerous Goods (1998)

The Act Concerning the Carriage of Dangerous Goods by Rail, Road, Air and Waterway of 6 August 1975 (see *Nuclear Law Bulletin* No. 16) was amended by Act of 6 August 1998 (*Bundesgesetzblatt* 1998 I, p. 2037). This amendment, *inter alia*, implements EC Council Directives Nos. 93/75/EC; 94/55/EC as amended; 95/50/EC; 96/35/EC, 96/49/EC as amended (Official Journal of the European Union 1993 No. L 247; 1994 No. L 319; 1995 No. L 249; 1996 No. L 145; 1996 No. L 235 and L 335), and entered into force on 14 August 1998. A consolidated text of the Act was published in the *Bundesgesetzblatt* 1998 I, p. 3114. This legislation applies to the transportation of dangerous goods as defined in Section 2. This definition includes radioactive material notwithstanding the absence of an express provision to this effect. The Act applies to transportation by rail, by road, by inland waterways and by air. It does not apply to carriage on the sites of installations where dangerous goods are produced, processed, stored, used or disposed of. Furthermore, the Act does not apply to the transboundary shipment of dangerous goods, to the extent that regulations of the European Union or international agreements apply to that carriage. Finally, it does not apply to transportation by mountain railway.

Amendments to Annexes A and B to the ADR Agreement (1998)

Based on an authorisation in the 1998 Act Concerning the Carriage of Dangerous Goods, the Federal Minister of Transportation issued the 14th Ordinance of 29 September 1998 (*Bundesgesetzblatt* 1998 II, p. 2618) to apply the 1998 amendments of the Annexes A and B to the European Agreement on the International Carriage of Dangerous Goods by Road, as revised in 1997 (See *Nuclear Law Bulletin* No. 59). The amended Annex is published in Annex to *Bundesgesetzblatt* 1998 II, No. 42. A consolidated version of the Annexes A and B to the European agreement is published in Annex to *Bundesgesetzblatt* 1998 II, No. 44.

Amendments to the Ordinances on the Carriage of Dangerous Goods (1998)

The 1st Ordinance to Amend the Ordinance on the Carriage of Dangerous Goods by Road and the 1st Ordinance to Amend the Ordinance of Dangerous Goods by Rail (See *Nuclear Law Bulletin* No. 59) implement the EU Directive No. 96/86/EC of 13 December 1996 to Amend the Directive 94/55/EC of the Council (Official Journal of the European Union 1996 No. L 335) (*Bundesgesetzblatt* 1998 I, pp. 3984, 3985). Consolidated versions of the Dangerous Goods Ordinances were published in *Bundesgesetzblatt* 1998 I, pp. 3910, 3993.

The 7th Ordinance to Amend the Order Concerning the International Railway Transportation of Dangerous Goods (RID) pronounces the entry into force as of 1 January 1999 of the Order for the

International Carriage of Dangerous Goods by Rail (RID), which is Annex 1 to the Agreement on the International Railway Transportation of Goods (CIM) (*Bundesgesetzblatt* 1998 II S. 2955).

The amendments of Annexes A, B1 and B2 to the Ordinance on the Carriage of Dangerous Goods on the Rhine river and on the Mosel river respectively, were set into force by the 4th Ordinance on Entry into Force of the above-mentioned amendments of 22 December 1998 (*Bundesgesetzblatt* 1998 II, p. 3000 and Annex to *Bundesgesetzblatt* 1998 II, No. 51).

Ordinance on the Shipment of Radioactive Waste (1998)

By Ordinance of 27 July 1998 (*Bundesgesetzblatt* 1998 I, p. 1918), Germany implemented the EU Council Directive of 3 February 1992 on the Supervision and Control of Shipments of Radioactive Waste between Member States and into and out of the Community (Official Journal of the European Union 1992 No. L 35, p. 24). The Ordinance sets up the legal framework as required by the Directive, including the necessary licence specifications. The Ordinance entered into force on 1 August 1998.

Radiation Protection

Fourth Ordinance Implementing the Preventive Radiation Protection Act (1998)

The Fourth Implementing Ordinance of 30 July 1998 was adopted (*Bundesgesetzblatt* 1998 I, p. 2009) to assign competence for measurement and evaluation in accordance with the Preventive Radiation Act of 1986 as amended (see *Nuclear Law Bulletin* No. 39) to the German Weather Service. The Ordinance entered into force on 1 January 1998.

Implementation of EU Directives on Electromagnetic Compatibility (1998)

The adoption of the Act on the Electromagnetic Compatibility of Equipment on 18 September 1998 (*Bundesgesetzblatt* 1998 I, p. 2882) resulted in the implementation in Germany of numerous EU Directives concerning protection against electromagnetic radiation. The regime established by the Act provides for special requirements for protection purposes and measures to assess the compliance of electromagnetic equipment with EU regulations.

Regulations on Nuclear Trade (including Non-Proliferation)

Amendments to the Foreign Trade Ordinance (1998)

The Foreign Trade Ordinance of 22 November 1993, as last amended by the Ordinance of 20 January 1998 (see *Nuclear Law Bulletin* No. 61) was further amended by a series of ordinances on foreign trade (*Bundesanzeiger* 1998 Nos. 105, 139, 162 and 174). The 42nd, 43rd and 45th Ordinances implement European Union law regarding foreign trade with the Federal Republic of Yugoslavia and certain African countries. The 44th Ordinance provides for the necessary legal framework in order to introduce the Euro currency to German foreign trade.

Through the adoption of the 94th Ordinance to Amend the Export List – Annex AL to the Foreign Trade Ordinance – of 7 May 1998 (*Bundesanzeiger* 1998 No. 88), the Export List was adapted in accordance with Decisions made in 1998 by the Council of the European Union. The Export List now

conforms to the amended Joint List of the European Union for Goods with Dual Use. The amendments implement in particular the decisions of the Nuclear Suppliers Group. Notwithstanding the fact that the Joint List of Goods of the European Union is directly applicable in EU Member States, it was deemed appropriate to introduce an express amendment to this effect into the German Export List for reasons of consistency. Furthermore, this Ordinance contains amendments to implement the decisions of the Wassenaar arrangements regarding military goods.

Act to implement the Comprehensive Nuclear Test-Ban Treaty (1998)

Following the ratification of the Comprehensive Nuclear Test-Ban Treaty of 24 September 1996 by the German Parliament (Act of 9 July 1998: *Bundesgesetzblatt* 1998 II, p. 1 210), Parliament adopted on 23 July 1998 an Act to implement this Treaty (*Bundesgesetzblatt* 1998 I, p. 1 882). This Act provides for the necessary legal framework to carry out inspections under Article IV of the Treaty. According to Section 2 of the Act, such inspections will only take place if a special “accompanying group” is present. This group is composed of representatives of competent German authorities. Section 3 of the Act describes in detail the rights of the inspectors, who, *inter alia*, are granted access to sites and rooms during normal business hours. Section 4 imposes on those persons and entities who are to be inspected obligations to co-operate with the inspectors and accompanying group. In the event of damage being caused by a member of the inspection group, the Federal Republic of Germany will be held liable in accordance with the provisions of the German Law for State Liability (Section 6). According to Section 8, special rules apply to the transfer and use of protected data. Finally, the Act provides for the necessary sanctions by amending the penal code accordingly.

With the exception of two articles, this Act will enter into force when the Treaty itself, in accordance with Article XIV, enters into force. This date will be published in the *Bundesgesetzblatt*.

Radioactive Waste Management

Act to implement the 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes (1998)

The German Parliament ratified the 1996 Protocol to the 1972 London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (see *Nuclear Law Bulletin* Nos. 17, 28, 36 and 53), by an Act of 9 June 1998 (*Bundesgesetzblatt* 1998 II, p. 1 345). An Act was adopted on 25 August 1998 in order to implement this 1996 Protocol (*Bundesgesetzblatt* 1998 I, p. 2 455). The Act describes in Sections 2 and 3 the scope of application and defines terms used in the Act. According to the general rule in Section 4 of the Act, the dumping of waste and other matter into the high seas is prohibited. The incineration of waste and other matter at high sea is also forbidden (Section 6). In the event of an emergency, the prohibition in dumping contained in Section 4 of the Act does not apply. The Act furthermore designates the competent authority and authorises the Minister for the Environment, Nature Conservation and Nuclear Safety to issue implementing Ordinances. Finally, it amends numerous other acts of relevance in the field of sea dumping.

Indonesia

Organisation and Structure

Decree on the National Energy Control Board (1998) and Decree on the National Nuclear Energy Agency (1998)

Decree No. 76 of the President of the Republic of Indonesia on the National Energy Control Board (BAPETEN) was promulgated on 8 May 1998. The purpose of this Decree is to implement the 1997 Atomic Energy Act which established separate agencies for the promotion (BATAN) and regulation (BAPETEN) of nuclear energy.

The principal functions assigned to BAPETEN under this regulation are as follows:

- formulation of national policies and programmes for the control of the peaceful uses of nuclear energy;
- preparation of regulations with regard to nuclear safety assessment, radiation protection and control of nuclear materials and the supervision of their application;
- licensing and inspection for the construction and operation of nuclear installations;
- co-operation with other organisations for the control of the peaceful uses of nuclear energy; and
- guidance for the health and safety of workers and the public as well as for the protection of the environment.

This Decree describes the structure of BAPETEN, and lists the duties of its Chairman and his two Deputies, one of whom is responsible for nuclear safety assessment, and the other for licensing and inspection.

Decree No. 197 of the President of the Republic of Indonesia, promulgated on 7 December 1998, repeals and replaces the 1985 Decree concerning the National Nuclear Energy Agency (BATAN) and redefines its principal functions as follows:

- formulation of policies and programmes in the nuclear field in co-operation with other departments and organisations;
- development, planning and implementation of technical and administrative services and basic research and application programmes on nuclear energy;
- nuclear technology development;
- development of nuclear fuel cycle technology and engineering programmes; and
- promotion of public acceptance of nuclear science and technology programmes;

BATAN is headed by its Chairman who is supported by the Executive Secretariat and four Deputies. The Chairman of each Organisation is empowered to establish a Commission of Experts in order to advise them on particular issues.

Italy

Organisation and Structure

Decree on the Reorganisation of the National Committee for Research and Development of Nuclear and Alternative Energies – ENEA (1999)

Parliamentary Decree No. 36 of 30 January 1999 provides for the re-structuring of the National Committee for Research and Development of Nuclear and Alternative Energies (ENEA) (see *Nuclear Law Bulletin* No. 48). Since 1991, the ENEA has exercised its activities in the fields of nuclear energy, the environment and new technologies. This Decree widens the scope of its activities. These new tasks which have been assigned to the ENEA essentially involve research in the field of sustainable development, innovation in terms of the production of small and medium-sized businesses and in relation to transfer of technology to such businesses, in particular in the energy field. As an Agency of the Civil Service, the ENEA provides advanced technical support in the fields of energy, the environment and technological innovation.

This Decree repeals and replaces Act No. 282 of 25 August 1991.

Radiation Protection

Community Law implementing European Directives (1998)

Community Law No. 25 of 5 February 1999 aims to implement several European Union Directives in the Italian legislation. This simplified method is used in order to speed up the procedure of incorporating Community regulations into national legislation (see *Nuclear Law Bulletin* Nos. 46, 49 and 53).

On the question of protection against ionising radiation, Annex B refers to Directive 96/29/Euratom of 13 May 1996 which sets out basic standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation and Directive 97/43/Euratom of 30 June 1997 on health protection of individuals against the dangers of ionising radiation in relation to medical exposures.

According to this Law, the Government is to adopt parliamentary decrees in order to implement into national law the obligations arising under these Directives. Consequently, Decree No. 230 of 17 March 1995 on radiation protection will be subject to amendment (see *Nuclear Law Bulletin* Nos. 56 and 58). The Government should adopt such implementing decrees within twelve months from the date of entry into force of this Law (February 1999).

Japan

Third Party Liability

Law on Compensation for Nuclear Damage (1999)

The Law introducing partial amendments to the 1961 Law on Compensation for Nuclear Damage (see Nuclear Law Bulletin Nos. 9, 45 and 56), which will, upon its entry into force, raise the amount of financial security required for the operation of nuclear reactors from 30 billion yen to 60 billion yen, was adopted by the Diet on 28 April 1999. The provisions of this Law will be described in further detail in the next *Nuclear Law Bulletin*.

Lithuania

Radiation Protection

Law on Radiation Protection (1999)

The Law on Radiation Protection was adopted by the Lithuanian Parliament on 12 January 1999 and came into force on 1 April 1999. This legislation is divided into 10 Chapters governing *inter alia* licensing, radioactive waste and spent ionising radiation sources, limitation of doses, requirements concerning medical radiation procedures and liability. Implementing legislation which remains to be adopted includes Regulations on licensing of activities using ionising radiation sources and the Statute governing the Register of the sources of ionising radiation.

Poland

General Legislation

New Criminal Code (1998)

The New Polish Criminal Code entered into force on 1 September 1998 (*Nuclear Law Bulletin* No. 88, item 2677). Two new provisions have been introduced into Chapter XX of this Code, dealing with nuclear energy and ionising radiation. Article 163, paragraph 1.4, provides that a person responsible for an event which poses a threat to the life and health of a significant number of persons or considerable damage to property, through release of nuclear energy or ionising radiation, will be liable to imprisonment for a period of one to ten years. The second of these provisions, Article 170, paragraph 1, provides that whoever, without permission or contrary to stipulated conditions, possesses, uses, produces, reprocesses, collects or deals with explosion devices or substances, radioactive materials, ionising sources or other objects dangerous to the life or health of a significant number of persons or subject to cause considerable damage to property, will be liable to imprisonment for a period of six months to eight years.

Portugal

Organisation and Structure

Decree-Law setting up the Commission for Radiological Protection and Nuclear Safety (1998)

Decree-Law No. 311/98 of 14 October 1998 was published in the Portuguese Official Journal on 14 October 1998. This legislation was adopted in order to minimise risks to public health and to the environment as a result of ionising radiation, radioisotopes and nuclear installations.

The Preamble of the Decree-Law provides for an initial phase of comprehensive analysis of the existing legal and regulatory framework, which will be followed by regular updates to take into account scientific and technical progress. To attain this objective, the Commission for Radiological Protection and Nuclear Safety has been established. This Commission comprises representatives from the three ministries competent in this field, namely the Ministry of the Environment, the Ministry of Health and the Ministry of Science and Technology.

The Commission's duties are as follows:

- to draft bills and regulations in the above-mentioned sectors;
- to verify compliance with conditions set out in licenses for the storage, production or transport of radioactive material and equipment or for nuclear installations which generate radioactive residues or nuclear waste;
- to guarantee the respect of international obligations related to radiological protection and nuclear safety;
- to co-operate with similar bodies working in these fields in other countries and with the competent international organisations;
- to assist in the preparation of national radiological and nuclear emergency plans.

Technical assistance is provided to the Commission by the Technological and Nuclear Institute, within which a Department specialised in issues of radiological protection and nuclear safety has been created. The tasks assigned to this Department are listed in the Decree-Law and are of a strictly technical nature in order to guarantee its complementarity with the Commission's duties.

Slovenia

Third Party Liability

Decree establishing the Amount of Operator's Liability and the corresponding Amount of Insurance for Nuclear Damage (1998)

On 26 November 1998, a Decree establishing the Amount of Operator's Liability and the corresponding Amount of Insurance for Nuclear Damage was adopted by the Slovenian Government. It was published in the Official Gazette of 11 December 1998 and entered into force on 1 February 1999.

This Decree raised the amount of operator's liability for nuclear damage to the sum in Slovenian Tolars equivalent to US\$ 42 million in order to reflect the current value of the US\$ 5 million provided for in the 1963 Vienna Convention.

Furthermore, the operator of a nuclear installation is required to have and maintain insurance up to the above-mentioned amount. Exceptions to this exist in respect of the transport of nuclear materials, for which the insurance requirement is set at US\$ 14 million, and research reactors for which the insurance requirement varies between US\$ 187 000 and US\$ 467 000 depending on the thermal power of the particular reactor.

The adoption of this governmental Decree is deemed to be an interim solution while revision of the existing legislation takes place (See *Nuclear Law Bulletin* No. 54).

Spain

Organisation and Structure

Law establishing the National Energy Commission (1998)

Law No. 34 of 7 October 1998 establishes the National Energy Commission, which takes over the functions of the Commission on the National Electric System, established in 1994.

This new Commission is entrusted with fairly extensive powers, although its priority areas remain those of the energy and hydrocarbon markets. It participates in the legislative process in the energy sector as an advisory body, and it is involved in the licensing procedure for installations in the field of energy.

The Commission is a public body under the auspices of the Ministry for Industry and Energy. It is headed by a Board of Management comprised of a Chairman and eight members. Members of the Board are chosen from key public figures, and their nomination is confirmed by the adoption of a royal decree following a proposal from the Ministry for Industry and Energy.

Transport of Radioactive Materials

Regulation on the transport of dangerous goods by road (1997)

A Regulation was adopted on 31 January 1997 in order to incorporate into national legislation the 1993 amendments to the Regulation on the international transport of dangerous goods by road, which constitutes an Annex to the 1980 Convention on international transport by road.

This Regulation was enacted pursuant to Royal Decree No. 879 of 2 June 1989, which authorises the Minister of Public Works to amend the National Regulation on the transport of dangerous goods by road in order to incorporate modifications which have been introduced at the international level and published in the Spanish Official Journal.

Third Party Liability

Regulation concerning the Almaraz nuclear power plant (1997)

A Regulation was adopted on 25 April 1997 declaring that the two units at Almaraz nuclear power plant are to be considered as one nuclear installation. Therefore, these two units will be covered by one and the same insurance policy, and the operator will be liable for damages caused to third parties as if it were one nuclear installation.

Sweden

General Legislation

The Environmental Code (1999)

On 1 January 1999 a major new piece of legislation entered into force in Sweden: the Environmental Code (SFS 1998:808), amalgamating 15 of the principal environmental statutes into a consolidated version. The Code is wide in scope and applies to all operations, whether commercial or private and irrespective of whether the operation requires a permit or not. The provisions in the Code are more stringent than previous texts in this field, as they aim at promoting sustainable development as well as guaranteeing a healthy and pleasant environment for present and future generations.

Principal provisions of the Code

Fundamental provisions are to be found in Chapter 2, including the *general rules of consideration*, which contain common requirements for all activities that involve a risk to human health or the environment. These rules indicate that operations must be conducted in such a way and that necessary measures are taken so as to avert any harm to the health or the environment. The rules confirm general principles such as the “Polluter Pays Principle”, the principle of the “Best Available Technology”, the principle of knowledge (necessary to determine the effects of the operation), the localisation principle and the sound resource management and recycle principle.

There also exists a requirement that the measures to be taken should be reasonable and balanced in relation to the benefits to be gained. Furthermore, there is a “stop rule” according to which an operation may be stopped if it leads to unacceptable effects on the environment, even though it fulfils the requirements according to the general rules of consideration. The Government may for special reasons grant exceptions to the stop rule if the operation should prove beneficial to common interests.

An important new provision in the Code is the possibility for the Government to issue *Environmental Quality Norms*, according to Chapter 5. Regulations introducing such norms may concern the quality for land, water, air or the environment in general. These norms will specify the levels of pollution and of disturbance that humans may be exposed to without any significant risk. Public and local authorities must ensure that the Norms are attained when they consider permits and similar approvals, both under the Code and under other acts, e.g. the Nuclear Safety and Radiation Protection Acts.

According to Chapter 6 an *Environmental Impact Statement (EIS)* is required to constitute a basis for a decision on a permit. The EIS should facilitate an overall assessment of the planned operation's effects on the environment, health and management of natural resources, thus providing a better basis for the decision. The chapter contains mandatory requirements relating to the contents of the EIS as well as requirements on broad consultations with authorities, municipalities, organisations and the public affected. This should allow for those concerned to influence the work with the EIS at an early stage. Before issuing the permit, the permit authority must approve of the EIS.

According to Chapter 16, permits, approvals or exemptions may be issued for a limited period only, thus the entire activity must be re-examined at the expiry of this period in order to grant a renewal of the permit. Furthermore, permits, approvals or exemptions may be subjected to conditions in each individual case. Such conditions shall be based on the general rules of consideration in Chapter 2, or on other provisions of the Code. Permits or exemptions may not be issued for a new operation that would contribute to the contravention of an Environmental Quality Norm, unless special measures reducing the negative effects are taken.

For certain activities listed in the Code, e.g. nuclear activities or treatment of hazardous waste, the Government shall consider whether or not to allow such operations to proceed. This means that the Government shall decide whether the entity carrying out such activities may be established and in such a case, where it should be located. Such activities may be allowed only if the municipal assembly in the municipality concerned has given its consent. However, the Government may in certain cases, e.g. concerning intermediate or final storage of nuclear material, disregard such a municipal veto if the operation is considered to be of national importance and a more suitable location has not been found.

In the event that the Government authorises such activities, the matter is referred to the authority competent for the delivery of a permit, whether a governmental or local authority, an environmental court or the Government itself, as in the case of nuclear operations. The permit authority is then bound by the Government's decision on the permissibility, and the task of the authority is simply to decide on the necessary conditions for the operation in question.

Subsequent amendments in the Nuclear and Radiation Protection legislation

The Acts on Nuclear Activities and on Radiation Protection have not been included among the consolidated statutes in the Environmental Code. Instead, they have been amended so as to include references to the Code, which applies on a parallel basis. These amendments entered into force on 1 January 1999, in accordance with the Environmental Code.

Amendments to the Act on Nuclear activities (SFS 1984:3)

According to the amendment of Article 5b, the following provisions in the Environmental Code shall apply when considering matters under this Act:

- Chapter 2 concerning the general rules of consideration;
- Chapter 5 (Article 3) concerning the Environmental Quality Norms, when considering permits and similar approvals or when exercising supervisory powers or deciding on regulations;
- Chapter 16 (Article 5) indicating that permits, approvals or exemptions may not be issued for a new operation that would contravene an environmental quality norm, unless precautionary measures to alleviate the negative effects are taken.

Furthermore, it is mandatory to submit an EIS together with an application for a permit to construct, possess or operate a nuclear power plant. In the case of applications for permits for other matters than those mentioned, the Government or the appointed authority may issue regulations calling for an EIS to be included in the application for a permit. Such regulations shall follow the requirements concerning EIS in Chapter 6 of the Environmental Code.

Amendments to the Nuclear Activities Ordinance (SFS 1984:14)

According to Article 3a, the Swedish Nuclear Power Inspectorate (SKI) is authorised to issue regulations concerning an EIS in matters other than those linked to the construction, possession or operation of a nuclear power plant. Such regulations shall follow the requirements concerning EIS in Chapter 6 of the Environmental Code.

Amendments to the Act on Radiation Protection (SFS 1988:220)

According to the amendment introduced into Article 22a, the following provisions in the Environmental Code shall apply when considering matters under the Act on Radiation Protection or when deciding on conditions relating to nuclear operations governed by the Act on Nuclear Activities:

- Chapter 5 (Article 3) concerning the Environmental Quality Norms, when considering permits and similar approvals or when exercising supervision or deciding on regulations;
- Chapter 16 (Article 5) indicating that permits, approvals or exemptions may not be issued for a new operation that would contravene an Environmental Quality Norm, unless precautionary measures to alleviate the negative effects are taken.

According to the amendment of Article 27, the Government or the appointed authority may issue regulations calling for an EIS in matters concerning conditions on radiation protection for a nuclear operation.

Amendments to the Radiation Protection Ordinance (SFS 1988:293)

According to revised Article 14a in the Ordinance, the Swedish Radiation Protection Institute (SSI) is also authorised to issue regulations concerning Environmental Impact Statements.

Ukraine

Organisation and Structure

Presidential Decree on the Reorganisation of the Nuclear Control Structures (1999)

By Decree issued on 13 March 1999, the Ukrainian President has ordered a major restructuring of the state management system, involving substantial changes in the regulatory control of the country's nuclear sector. These measures are aimed at improving the efficiency of State executive bodies and strengthening the role of ministries in developing and implementing government policy. The Decree provides for the setting up of a new nuclear regulatory authority, called the State Nuclear Regulatory Administration of Ukraine, which will have the status of a central state executive body. The Nuclear Regulatory Administration, which will report to the Minister for Environmental Protection and Nuclear Safety, will have separate legal status that will render it financially independent, with its own accounting system, and which will give it considerable regulatory weight. The Cabinet is expected to draw up detailed plans for the implementation of this Decree over the coming months.

Regime of Nuclear Installations

Law on Basic Principles governing the Further Operation and Decommissioning of Chernobyl (1998)

On 11 December 1998, the Ukrainian Rada approved a new Law on basic principles governing the further operation and decommissioning of Chernobyl NPP and the transformation of its destroyed Unit 4 into an environmentally safe area. Article 3 of this Law outlines its principal objectives, namely, to develop legal principles governing the further operation and decommissioning of Chernobyl NPP, the rehabilitation of Unit 4 and social security cover for the personnel of the power plant and the population of Slavutich city. This legislation aims also to determine criteria for the more efficient use of international technical assistance offered for the above purposes, and to establish a special tax regime for commercial entities within the administrative territory of Slavutich city. Activities involving the early closure and decommissioning of Chernobyl, or measures of reinstatement of the impaired environment in respect of the Shelter Facility must be approved by the Cabinet of Ministers of Ukraine. Such activities are to be financed through the state budget, funds from the operating organisation (Energoatom), international technical support or voluntary contributions and, in the case of measures of reinstatement of the impaired environment, by the Fund for the elimination of the consequences of the Chernobyl catastrophe and social security of the population.

Third Party Liability

Decree concerning Ratification of the 1988 Joint Protocol relating to the Application of the Vienna Convention and the Paris Convention (1999)

On 8 February 1999, the Cabinet of Ministers of Ukraine issued a Decree confirming Ukraine's decision to ratify the 1988 Joint Protocol relating to the application of the Vienna Convention and the Paris Convention. At the same time, a draft law concerning ratification of this instrument was introduced before the Rada.

Resolution on Indemnifying Participants in the Shelter Implementation Plan (SIP) against Civil Liability for Nuclear Damage (1999)

On 18 February 1999, the Cabinet of Ministers of Ukraine issued Resolution No. 223 on indemnifying participants in the Shelter Implementation Plan against civil liability for nuclear damage. According to Article 1 of the Statement of the Cabinet of Ministers which is reproduced as Attachment 1 to the Resolution, the guarantees which are envisaged by this instrument are those granted in connection with activities financed through grant agreements entered into pursuant to the Framework Agreement of 20 November 1997 between the EBRD and Ukraine. The Ukrainian government agrees to indemnify foreign contractors from countries non-members to the Vienna Convention for any costs, losses, damages and expenses incurred in relation to activities undertaken in connection with the SIP.

It furthermore provides that Ukraine will bring no claims against the EBRD, or any contractors, subcontractors or employees in connection with damage suffered by Ukraine or any third-party claims as a result of a nuclear incident at the Chernobyl Plant, including the Shelter Facility. The Resolution ceases to apply only where the country of the foreign contractor in question and Ukraine have both ratified the Vienna Convention and the Joint Protocol or another similar convention which applies to both territories. A further Appendix to this Resolution contains a model letter of agreement concerning this arrangement to be signed by the supplier/contractor and the government of Ukraine

United States

Radioactive Waste Management

Bill to amend the Nuclear Waste Policy Act of 1982 (1999)

On 6 January 1999, draft legislation (H.R. 45) to amend the Nuclear Waste Policy Act was introduced in the House of Representatives and on 15 March 1999 a similar bill, S. 608, was introduced in the Senate (see *Nuclear Law Bulletin* Nos. 16, 31, 35 and 41). This pending legislation is supported by the nuclear utilities in the United States and is similar to previous bills introduced in 1997 which did not have the support of the Administration.

The major point of controversy in the legislation is a proposal to locate an interim storage facility in Nevada before a determination is made with regard to construction of a permanent repository at Yucca Mountain. A majority of members of both houses of Congress has supported this provision in the past, but not the two-thirds majority of the Senate required to override the threatened Presidential veto.

The Bill H.R. 45 provides for:

- Development of a temporary storage facility within Area 25 of the Nevada Test Site with operations to commence by 30 June 2003. This facility would be licensed in two phases by the Nuclear Regulatory Commission (NRC).¹ The first phase would be for a term of 20 years with storage capacity up to 10,000 MTU; the second phase would be for an initial and renewable term of 100 years with capacity up to 40,000 MTU.
- Acceptance and transportation of spent nuclear fuel (SNF) and high-level radioactive waste (HLW) commencing 30 June 2003. Trucks would move SNF and HLW from a main rail line in Caliente, Nevada to the interim storage facility. All transportation would be in licensed packages with services provided by private industry wherever possible.
- Construction of a permanent repository scheduled to commence operations by 17 January 2010 and licensed in three steps: 1) the Secretary of Energy would apply for a construction authorisation by 31 December 2003; 2) following construction and filing of necessary information, the NRC would issue a license to dispose if it determines that the repository will operate in conformity with the Nuclear Waste Policy Act and NRC regulations; and 3) after emplacement, the Secretary would apply for a license amendment for permanent closure.
- A new funding mechanism consisting of a combination of a user fee and a mandatory fee, with an average fee to electricity consumers of 1 mill per kilowatt-hour until the repository opens. During the averaging period, the fee could not exceed 1.5 mills/kWh in any given year. After the repository opens, the fee would be capped at 1 mill/kWh.²
- A radiation health standard prohibiting releases exposing a member of the general population in the vicinity of Yucca Mountain to an annual dose in excess of 100 millirems.
- Revocation of the DOE's Siting Guidelines at 10 C.F.R. Part 960.

S. 608 is similar to H.R. 45 in providing for an integrated system for the Federal government to accept spent fuel at a temporary storage facility by 30 June 2003 at Area 25 of the Nevada Test Site, but only after an environmental impact statement on that site is completed. The Senate bill would establish a more stringent risk-based radiation standard whereby releases of radioactive material or radioactivity would not exceed 30 millirems per year, and the funding mechanism would be similar to that proposed in the House bill. Shipping would be consistent with guidelines for transporting transuranic waste to the Waste Isolation Pilot Plant (WIPP).³

1. 10 C.F.R. Part 72, "Licensing Requirements For The Independent Storage Of Spent Nuclear Fuel and High-Level Radioactive Waste".

2. "H.R. 45 The Nuclear Waste Policy Act Of 1999", *NEI Issue Brief*. The Nuclear Energy Institute (NEI) represents all of the nuclear utilities in the United States, as well as nuclear vendors, radiopharmaceutical companies and universities with nuclear programmes. Information concerning NEI is available on the World Wide Web at: <http://www.nei.org>.

3. "Bill To Reform Energy Department's Used Nuclear Fuel Disposal Program Introduced in Senate", *NEI Fact Sheet*.

Third Party Liability

Recommendations concerning amendments to the Price-Anderson legislation (1999)

The Price-Anderson Act was originally enacted in 1957 as an amendment to the Atomic Energy Act of 1954 (AEI) to encourage development of the nuclear industry by providing private industry with financial protection in the event of liability resulting from a nuclear incident. The Price-Anderson Amendments Act of 1988 extended to 1 August 2002 the respective responsibilities of the Nuclear Regulatory Commission (NRC) and Department of Energy (DOE) for financial protection in respect of nuclear activities of both licensees of the NRC and contractors of the DOE. The Act has been renewed approximately every ten years since 1957. Section 170p. of the AEI required that both the NRC and DOE submit detailed reports to Congress in 1998 on the need for continuing or modifying the Price-Anderson Act, taking into account the condition of the nuclear industry, availability of private insurance and the state of knowledge concerning nuclear safety among other factors.

NRC RECOMMENDATIONS. The NRC announced in September 1998 that it was recommending a 10-year extension and modifications to clarify the Price-Anderson Act. With respect to NRC licensees operating large commercial nuclear power plants, the Act provides for a two-layer compensation system to pay public liability claims. The first layer consists of \$200 million dollars of insurance per reactor site currently available from the private insurance market. The second layer is provided by funds made available through an assessment on each licensed reactor of a prorated share not to exceed \$83.9 million per reactor per incident, as adjusted for inflation effective 20 August 1998. This program currently would make more than \$9 billion available to pay public liability claims if a severe accident were to occur. In its report to Congress,⁴ the NRC recommends that:

- To cover any new plants that might be licensed, the Price-Anderson Act be extended for 10 years after expiration, on 1 August 2002, of the NRC's authority to enter into new indemnity agreements. Plants presently licensed continue to be indemnified even if the law is not renewed.
- The maximum a nuclear utility can be assessed per reactor per incident per year be doubled to \$20 million dollars. This change would substantially increase the amount of funds available shortly after an accident. The total \$83.9 million dollar retrospective premium would be unchanged.
- Congress investigate whether the \$200 million dollars now available from the private insurance market for liability claims per reactor can be increased to keep pace with inflation.
- Congress consider clarifying its intent on some other issues, including: coverage for legal costs incurred by non-profit licensees; the prohibition on payment of punitive damages; jurisdiction of Indian tribal courts; and the effect of NRC regulation of selected Department of Energy activities.

DOE RECOMMENDATIONS In December 1998, DOE issued its "Report to Congress on the Price-Anderson Act".⁵ As noted in the Report, with respect to activities conducted for DOE, the Act

4. The 152-page NRC report entitled "The Price-Anderson Act – Crossing the Bridge to the Next Century: A Report to Congress" is available on the NRC's Internet web page at: <http://www.nrc.gov/NRC/NUREGS/indexnum.html>.

5. The DOE report entitled "Report to Congress on the Price-Anderson Act" and related documents are available at: <http://www.gc.doe.gov>.

requires that DOE include an indemnification in every contract that involves the risk of a nuclear incident. The DOE indemnification: 1) provides omnibus coverage of all persons who might be legally liable; 2) indemnifies fully all legal liability up to the statutory limit – currently \$9.43 billion for a nuclear incident in the United States; 3) covers all DOE contractual activity that might result in a nuclear incident in the United States; 4) is not subject to the usual limitation that funds be appropriated by Congress; and 5) is mandatory and exclusive.

The Price-Anderson Amendments Act of 1988 increased the amount of the DOE indemnification for a nuclear incident in the United States from \$500 million to \$9.43 billion, made inclusion of the DOE indemnification mandatory in all DOE contracts involving the risk of a nuclear incident, and established a system of civil penalties for DOE contractors, subcontractors, and suppliers covered by the DOE indemnification. The Report discusses experience with civil penalties imposed by DOE for violations of nuclear safety requirements by contractors, subcontractors and suppliers and concludes that this has proven a valuable tool for increasing the emphasis on nuclear safety and accountability of DOE contractors. It also examines the potential effects on the Price-Anderson Act of the Convention on Supplementary Compensation for Nuclear Damage. Ratification of the Convention will require conforming amendments to the Price-Anderson Act. The DOE Report contains five recommendations:

- The DOE indemnification should be continued without any substantial change.
- The amount of the DOE indemnification should not be decreased.
- The DOE indemnification should continue to provide broad and mandatory coverage of activities conducted under contract for DOE.
- DOE should continue to have authority to impose civil penalties for violations of nuclear safety requirements by for-profit contractors, subcontractors and suppliers.
- The Convention on Supplementary Compensation for Nuclear Damage should be ratified and conforming amendments to the Price-Anderson Act should be adopted.

AGREEMENTS

BILATERAL AGREEMENTS

Australia – United States

Arrangement concerning R & D in Nuclear Material Control, Accountancy, Verification, Physical Protection, Advance Containment and Surveillance Technologies for International Safeguards (1998)

This Arrangement was signed by the Department of Energy of the United States of America and the Australian Safeguards and Non-proliferation Office on 15 September 1998 and entered into force on the same date. The purpose of this Arrangement is to facilitate co-operation in joint projects including exchange of information, equipment, research and development, testing and evaluation on nuclear material control, accountancy, verification, physical protection and containment and surveillance technologies. This Arrangement will remain in force for ten years and will be automatically renewed for further ten-year periods unless terminated by either Party.

Germany – Russian Federation

Agreement on Nuclear Liability in connection with Deliveries from the Federal Republic of Germany for Nuclear Installations in the Russian Federation (1998)

This Agreement on Nuclear Liability in respect of German supplies to the Russian Federation, which was signed on 8 June 1998, is reproduced in the Chapter “Texts” of this edition of the *Nuclear Law Bulletin* (see also *Nuclear Law Bulletin* No. 62).

Japan – United Kingdom

Agreement for Co-operation in the Peaceful Uses of Nuclear Energy (1998)

The Agreement for Co-operation in the Peaceful Uses of Nuclear Energy, signed on 25 February 1998, entered into force on 12 October 1998. This Agreement terminated the previous Agreement signed by both governments in 1968, however, it explicitly provides that all material,

nuclear material and equipment falling within the scope of the previous Agreement, and which is under the jurisdiction of a Contracting Party at the termination of the previous Agreement, shall be subject to this Agreement. It will remain in force for a period of twenty-five years, and will continue in force thereafter until terminated by either Party.

Co-operation under this Agreement can be achieved through the following activities:

- exchanges of experts between organisations under their respective jurisdictions;
- exchanges of unclassified information;
- transfers of material, nuclear material and equipment; and
- provision of services on matters within the scope of this Agreement.

Co-operation activities specified above shall be subject to the provisions of this Agreement, laws and regulations in force in Japan and the UK and shall require, in the case of transfer of material, acceptance of the application of safeguards by the IAEA. Such material or equipment transferred pursuant to this Agreement and nuclear material recovered or produced as a by-product shall be used only for peaceful purposes. The peaceful uses of nuclear material are verified, in Japan, by the Safeguards Agreement between Japan and the IAEA, in the United Kingdom, by the Safeguards Agreement between the United Kingdom, Euratom and the IAEA and the safeguards applied by Euratom. Adequate measures of physical protection for nuclear material are to be maintained, and minimum levels in this respect are set out in Annex B to this Agreement.

The Agreement prohibits the Parties from retransferring any material and equipment transferred, recovered or produced under this Agreement to third countries without assurances of fulfilment by the third country of the conditions set out in Annex C or the prior written consent of the supplying Party. Furthermore, equipment for enrichment, reprocessing or heavy water production, and uranium enriched to 20% or more in the isotope 233 or 235 or plutonium, transferred pursuant to this Agreement, shall not be retransferred to third countries without the prior written consent of the supplying Party.

MULTILATERAL AGREEMENTS

Agreement for Co-operation in the field of Transport of Nuclear Materials between the Czech Republic and the Russian Federation across the Territory of Slovakia and the Territory of Ukraine (1998)

The above Agreement entered into force, for the Czech Republic, the Russian Federation and Slovakia, on 14 March 1998, upon signature by these Parties, and for Ukraine on 25 June 1998 after notification of the completion of its domestic legislative procedure for approval of the Agreement. It will remain in force for an unlimited period unless terminated by one of the Parties upon 12 months' notice in writing.

The Agreement stipulates the technical and legal conditions governing transport of fresh and spent nuclear fuel, uranium and other nuclear materials as well as the empty packaging assemblies between the Czech Republic and the Russian Federation through the territories of the other two Parties. All transport carried out under this Agreement must be carried out in compliance with relevant international agreements mentioned in the Attachment to the Agreement.

Declaration of Principles regarding a Multilateral Nuclear Environmental Programme in the Russian Federation (MNEPR) (1999)

A Declaration of Principles regarding a Multilateral Nuclear Environmental Programme in the Russian Federation (MNEPR) was adopted by a significant number of OECD Member countries and the Russian Federation¹ at the Barents Euro-Arctic Council meeting on 4 and 5 March 1999 in Bodø (Norway). This Declaration confirms the intention of participating countries to launch the MNEPR, which will constitute a framework for assistance activities and other forms of co-operation in support of the development and effective implementation of projects in the field of safety of spent nuclear fuel and radioactive waste management in the Northwestern region of Russia.

This Declaration, which was negotiated at the initiative of the Norwegian authorities, provides for the conclusion of a multilateral agreement which shall cover inter alia, liability issues, verification of financial allocations, and customs duties as well as tax exemptions in connection with financial and technical assistance provided to Russia. Negotiations on the Multilateral Framework Agreement opened in Oslo on 6 and 7 May 1999.

The text of this Declaration is reproduced in the Chapter "Texts" of this *Nuclear Law Bulletin*.

1. The Declaration was signed by Denmark, Finland, France, Germany, Iceland, Italy, Netherlands, Norway, Poland, Russian Federation, Sweden, United Kingdom and United States.

Convention on Nuclear Safety: First Review Meeting (1999)

The first Review Meeting pursuant to Article 20 of the Convention on Nuclear Safety, the dates for which were determined during the preparatory meeting in 1997 (See *Nuclear Law Bulletin* No. 59), was held at the headquarters of the IAEA on 12-23 April 1999. 45 of the 50 Contracting Parties participated in the meeting. The United States of America, which ratified the Convention on 9 April 1999 and thus, pursuant to Article 31, could not participate as a full Contracting Party at this Review Meeting, was invited to attend the final plenary sessions. The OECD Nuclear Energy Agency was also invited to attend as an observer.

The Contracting Parties were divided into six country groups, each of which included countries with nuclear programmes of different sizes, as well as countries not having nuclear power reactors. The country groups met for six days and discussed in depth the National Reports which Contracting Parties were obliged to submit six months before this meeting. The purpose of the country group session was the peer review of each National Report describing the steps and measures already taken or underway to implement each of the obligations of the Convention.

The National Reports were in most cases of high quality and provided ample information. Questions asked by other Contracting Parties in the review process was addressed by respondent Parties.

Contracting Parties concluded that although there were some variations among Contracting Parties with regard to the levels from which they commenced implementation of Convention obligations and available resources for its implementation, and additional steps may be required, all Contracting Parties participating in the Review Meeting are taking steps in the right direction.

Status of Nuclear Conventions

Vienna Convention on Civil Liability for Nuclear Damage and the Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage

Uruguay has become a Contracting Party to the Vienna Convention since the last update in *Nuclear Law Bulletin* No. 62. Therefore, as of 13 April 1999, the number of Parties is 32.

Romania became the first State to ratify the 1997 amending Protocol on 29 December 1998.

Convention on Supplementary Compensation for Nuclear Damage

Romania became the first State to ratify the Convention on Supplementary Compensation for Nuclear Damage on 2 March 1999.

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

Australia, Netherlands and the Russian Federation have signed this Convention since the last update in Nuclear Law Bulletin No. 62. Therefore, as of 10 March 1999, the number of Signatories is 39.

Seven States, namely Canada, Czech Republic, Germany, Hungary, Norway, Slovakia and Slovenia, have ratified this Convention.

Convention on Nuclear Safety

Three States, namely Belarus, Denmark and the United States of America, have become Contracting Parties since the last update in *Nuclear Law Bulletin* No. 62. Therefore, as of 11 April 1999, the number of Parties is 50.

Comprehensive Nuclear-Test Ban Treaty

The Comprehensive Nuclear-Test Ban Treaty was adopted on 10 September 1996 by the General Assembly of the United Nations. It was opened for signature on 24 September 1996 and it will enter into force 180 days after the date of deposit of the instruments of ratification by all States listed in Annex 2 to this Treaty. As of 27 April 1999, the Treaty was signed by 152 States and ratified by 34 States (17 of which are States whose ratification is required for the Treaty to enter into force.

* Indicates one of the 44 States whose ratification is required for the Treaty to enter into force

State	Date of Signature		Date of Deposit of Instrument	
Albania	27 September	1996		
Algeria*	15 October	1996		
Andorra	24 September	1996		
Angola	27 September	1996		
Antigua and Barbuda	16 April	1997		
Argentina*	24 September	1996	4 December	1998
Armenia	1 October	1996		
Australia*	24 September	1996	9 July	1998
Austria*	24 September	1996	13 March	1998
Azerbaijan	28 July	1997	2 February	1999
Bahrain	24 September	1996		
Bangladesh*	24 October	1996		
Belarus	24 September	1996		
Belgium*	24 September	1996		
Benin	27 September	1996		
Bolivia	24 September	1996		
Bosnia and Herzegovina	24 September	1996		
Brazil*	24 September	1996	24 July	1998

Brunei Darussalam	22 January	1997		
Bulgaria*	24 September	1996		
Burkina Faso	27 September	1996		
Burundi	24 September	1996		
Cambodia	26 September	1996		
Canada*	24 September	1996	18 December	1998
Cape Verde	1 October	1996		
Chad	8 October	1996		
Chile*	24 September	1996		
China*	24 September	1996		
Colombia*	24 September	1996		
Comoros	12 December	1996		
Congo	11 February	1997		
Cook Islands	5 December	1997		
Costa Rica	24 September	1996		
Côte d'Ivoire	25 September	1996		
Croatia	24 September	1996		
Cyprus	24 September	1996		
Czech Republic	12 November	1996	11 September	1997
Democratic Republic of the Congo*	4 October	1996		
Denmark	24 September	1996	21 December	1998
Djibouti	21 October	1996		
Dominican Republic	3 October	1996		
Ecuador	24 September	1996		
Egypt*	14 October	1996		
El Salvador	24 September	1996	11 September	1998
Equatorial Guinea	9 October	1996		
Estonia	20 November	1996		
Ethiopia	25 September	1996		
Fiji	24 September	1996	10 October	1996
Finland*	24 September	1996	15 January	1999
France*	24 September	1996	6 April	1998
Gabon	7 October	1996		
Georgia	24 September	1996		
Germany*	24 September	1996	20 August	1998
Ghana	3 October	1996		
Greece	24 September	1996	21 April	1999
Grenada	10 October	1996	19 August	1998
Guinea	3 October	1996		
Guinea-Bissau	11 April	1997		
Haiti	24 September	1996		
Holy See	24 September	1996		
Honduras	25 September	1996		
Hungary*	25 September	1996		
Iceland	24 September	1996		
Indonesia*	24 September	1996		
Iran*	24 September	1996		
Ireland	24 September	1996		
Israel*	25 September	1996		

Italy*	24 September	1996	1 February	1999
Jamaica	11 November	1996		
Japan*	24 September	1996	8 July	1997
Jordan	26 September	1996	25 August	1998
Kazakhstan	30 September	1996		
Kenya	14 November	1996		
Kuwait	24 September	1996		
Kyrgyzstan	8 October	1996		
Laos	30 July	1997		
Latvia	24 September	1996		
Lesotho	30 September	1996		
Liberia	1 October	1996		
Liechtenstein	27 September	1996		
Lithuania	7 October	1996		
Luxembourg	24 September	1996		
Madagascar	9 October	1996		
Malawi	9 October	1996		
Malaysia	23 July	1998		
Maldives	1 October	1997		
Mali	18 February	1997		
Malta	24 September	1996		
Marshall Islands	24 September	1996		
Mauritania	24 September	1996		
Mexico*	24 September	1996		
Micronesia	24 September	1996	25 July	1997
Monaco	1 October	1996	18 December	1998
Mongolia	1 October	1996	8 August	1997
Morocco	24 September	1996		
Mozambique	26 September	1996		
Myanmar	25 November	1996		
Namibia	24 September	1996		
Nepal	8 October	1996		
Netherlands* ²	24 September	1996	23 March	1999
New Zealand	27 September	1996	19 March	1999
Nicaragua	24 September	1996		
Niger	3 October	1996		
Norway*	24 September	1996		
Panama	24 September	1996	23 March	1999
Papua New Guinea	25 September	1996		
Paraguay	25 September	1996		
Peru*	25 September	1996	12 November	1997
Philippines	24 September	1996		
Poland*	24 September	1996		
Portugal	24 September	1996		
Qatar	24 September	1996	3 March	1997
Republic of Korea*	24 September	1996		

2. On behalf of the Kingdom in Europe, the Netherlands Antilles and Aruba.

Republic of Moldova	24 September	1997		
Romania*	24 September	1996		
Russian Federation*	24 September	1996		
Saint Lucia	4 October	1996		
Samoa	9 October	1996		
San Marino	7 October	1996		
Sao Tome and Principe	26 September	1996		
Senegal	26 September	1996		
Seychelles	24 September	1996		
Singapore	14 January	1999		
Slovakia*	30 September	1996	3 March	1998
Slovenia	24 September	1996		
Solomon Islands	3 October	1996		
South Africa*	24 September	1996	30 March	1999
Spain*	24 September	1996	31 July	1998
Sri Lanka	24 October	1996		
Suriname	14 January	1997		
Swaziland	24 September	1996		
Sweden*	24 September	1996	2 December	1998
Switzerland*	24 September	1996		
Tajikistan	7 October	1996	10 June	1998
Thailand	12 November	1996		
the former Yugoslav Republic of Macedonia	29 October	1998		
Togo	2 October	1996		
Tunisia	16 October	1996		
Turkey*	24 September	1996		
Turkmenistan	24 September	1996	20 February	1998
Uganda	7 November	1996		
Ukraine*	27 September	1996		
United Arab Emirates	25 September	1996		
United Kingdom*	24 September	1996	6 April	1998
USA*	24 September	1996		
Uruguay	24 September	1996		
Uzbekistan	3 October	1996	29 May	1997
Vanuatu	24 September	1996		
Venezuela	3 October	1996		
Viet Nam*	24 September	1996		
Yemen	30 September	1996		
Zambia	3 December	1996		

TOTAL SIGNATORIES 152 TOTAL RATIFICATIONS 34

Declaration of Principles regarding a Multilateral Nuclear Environmental Programme in the Russian Federation (MNEPR)

Members and Observers of the Barents Euro-Arctic Council hereinafter referred to as Participants;

Noting the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management done at Vienna on 5 September 1997 (hereafter referred to as the “Joint Convention”);

Noting that the Joint Convention stipulates that spent fuel and radioactive waste within military or defence programmes should be managed in accordance with the objectives stated in that Convention even though they are excluded from that Convention except as provided in Article 3 thereof;

Noting also the Convention on Nuclear Safety done at Vienna on 20 September 1994;

Recalling the importance the Joint Convention attaches to international co-operation in enhancing the safety of spent fuel and radioactive waste management through bilateral and multilateral mechanisms;

Reaffirming the importance they attach to the principles embodied in relevant international conventions on nuclear liability for the implementation of co-operative activities in this field;

Taking into account international activities to support various forms of co-operation in the field of radioactive waste and spent nuclear fuel management, including those carried out by the Contact Expert Group for International Radwaste Projects established under the auspices of the International Atomic Energy Agency;

Desiring to facilitate practical co-operation to enhance the safety of radioactive waste and spent fuel management in the Russian Federation, in particular through the implementation of projects identified as priority ones in Russia;

Recalling that the Barents Euro-Arctic Council has underlined the need to intensify work in the area of nuclear safety and nuclear waste management in the Barents Euro-Arctic Region;

NOW, THEREFORE, DECLARE THE FOLLOWING PRINCIPLES:

1. Multilateral Nuclear Environmental Programme in the Russian Federation (MNEPR)

The Participants intend to facilitate and broaden their co-operation in the area of safety of spent nuclear fuel and radioactive waste management to improve the safety and ecological situation in the regions of Russia where large amounts of such fuel and wastes have accumulated;

The Participants hereby declare their readiness to launch an initiative, building on existing co-operation, which will be referred to as the “Multilateral Nuclear Environmental Programme in the Russian Federation” (MNEPR). The MNEPR will constitute a framework for assistance activities and other forms of co-operation in support of the development and effective implementation of projects. It should facilitate fast and efficient interaction between the Participants to resolve issues of mutual interest. The MNEPR will seek to avoid duplication and will be complementary to the activities of international or bilateral funds, mechanisms or arrangements. The MNEPR will be open for participation by any interested government or inter-governmental organisation.

2. Implementation of the MNEPR

Conclusion of a multilateral agreement among interested participants, providing a legal framework for the MNEPR, should be realised as soon as practicable upon the signing of this Declaration. This agreement will include terms and conditions related to such co-operation, covering, inter alia, issues of liability, verification of financial allocations, and customs duties as well as tax exemptions in connection with financial and technical assistance. This agreement may also apply to projects deemed appropriate by interested participants in other areas of nuclear activities, including nuclear safety.

The co-operative activities under the MNEPR on specific projects may be implemented through bilateral or multilateral agreements between participants, or through a financing arrangement pooling the resources of more than one participant.

3. Meetings of Participants

The Participants will meet at mutually agreed times and locations to discuss the preparation and development of the MNEPR and to facilitate the implementation of the MNEPR in the Russian Federation.

Done at Bodø, Norway, on 5 March, 1999.

Convention on Nuclear Safety

Summary Report from the First Review Meeting of the Contracting Parties (12-23 April 1999)

General background

1. On April 12 1999, 50 states had ratified the Convention on Nuclear Safety, which had entered into force on October 24, 1996. The First Review Meeting pursuant to Article 20 of the Convention was held at the headquarters of the International Atomic Energy Agency (IAEA), being the Secretariat under the Convention, in Vienna, 12-23 April 1999. The meeting was chaired by Mr. Lars Högberg, Director General of the Swedish Nuclear Power Inspectorate (SKI).
2. 45 Contracting Parties participated, namely: Argentina, Armenia, Australia, Austria, Belarus, Belgium, Brazil, Bulgaria, Canada, Chile, China, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Republic of Korea, Latvia, Lebanon, Lithuania, Luxembourg, Mexico, the Netherlands, Norway, Pakistan, Peru, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, Ukraine and the United Kingdom. The United States of America, who ratified the Convention on April 9, 1999 and thus, pursuant to Article 31, could not participate as a full Contracting Party at this Review Meeting, was invited to attend the final plenary sessions. The Nuclear Energy Agency of the OECD was invited to attend as an observer.
3. Six months before the Review Meeting, Contracting Parties submitted National Reports on steps and measures taken to implement Convention obligations. In the following months the Contracting Parties reviewed each other's reports, and exchanged written questions and comments. At the Review Meeting, Contracting Parties organised themselves into six country groups, each group including countries with nuclear power programmes of different sizes, as well as countries not having nuclear power reactors. The country groups met for six days and discussed in depth each National Report, each Contracting Party receiving answers to the questions they had put, these answers providing additional information on the steps and measures taken in each country.
4. Three Contracting Parties, namely Bangladesh, Mali and the Republic of Moldova did not comply with the basic obligations of the Convention to submit a National Report and attend the Review Meeting. Singapore submitted a National Report but did not attend the meeting.

Observations on the achievement of the general objectives of the review process

5. The Contracting Parties recalled that the main purpose of the meeting was to review the national nuclear safety programme of each Contracting Party; focusing on the steps and measures already taken and in progress to implement the obligations as stipulated in Chapter 2 of the Convention. The stated objective of the Convention is to achieve and maintain a high level of nuclear safety worldwide, through the enhancement of national measures and international co-operation.
6. The Contracting Parties noted that it was not their task to review the safety of individual nuclear installations. Also, the Contracting Parties noted that the review had to rely on the accuracy and completeness of the information provided by each country in its National Report and in its answers to the questions asked of it.

7. The Contracting Parties noted that this Convention entails two basic commitments by each Contracting Party:
 - To prepare and make available a National Report including a self-assessment of steps and measures already taken and in progress to implement the Convention obligations; and
 - To subject its National Report, and the nuclear safety programme it describes, to a peer review by the other Contracting Parties, and to take an active part in that review and in the review of the reports of other Contracting Parties.

Thus, in summary, being a Contracting Party to this Convention entails a commitment to a continuous learning and improving process, something which is a key element of a high-quality safety culture. As a part of this learning process, it was considered to be good practice to provide additional information in future reports on those topics and issues on which particular interest was expressed during the review process at this meeting.

8. The Contracting Parties noted that as a consequence of the incentive character of the Convention, an important objective of the review process would be to observe and take note of successive improvements, where appropriate, in the implementation of Convention obligations. Consequently, this first Review Meeting could be regarded as a base-line for such observations at future meetings, as well as providing an opportunity to improve review procedures for subsequent meetings, based on lessons learned.
9. The Contracting Parties observed that the National Reports submitted were in most cases of high quality and provided ample information on steps and measures taken and in progress to implement the obligations stipulated in Chapter 2 of the Convention. All questions asked by Contracting Parties in the review process were addressed by respondent Parties. The discussions in the Country Group sessions and the Plenary sessions were open and constructive, illuminating issues of special interest, providing additional insights with regard to national safety programmes, and generally demonstrating the strong commitment of each participating Contracting Party to the review process under the Convention and to its safety objectives.
10. The Contracting Parties noted that the reports, questions and answers exchanged in connection with this Meeting provided them with a unique worldwide overview of 45 national nuclear safety programmes.
11. The Contracting Parties noted that they were all given reasonable opportunity to discuss the National Reports submitted by other Contracting Parties, and to seek clarification of such reports, as stipulated in Article 20.3 of the Convention.
12. The Contracting Parties noted that the Convention and the Review Meeting had also proved to be of value to Contracting Parties without nuclear power reactors, for reasons such as having reactors near their borders, or planning a nuclear programme, or wishing to convince themselves of the safe use of exported nuclear material.
13. The Contracting Parties furthermore observed that the self-assessment process, starting with ratifying the Convention and preparing a National Report, had already initiated steps and measures by many Contracting Parties to improve implementation of their obligations.
14. The Review Meeting agreed on the following observations with regard to steps taken and in progress to implement specific obligations of the Convention:

Observations on external factors of special interest

15. Contracting Parties took note of trends in several countries with regard to factors and circumstances external to the nuclear safety programme as such, but which still could have a significant impact on nuclear safety if not counteracted by appropriate actions. Such factors included:

- Deregulation of electricity markets and associated ownership changes and increased competition;
- Maintaining competence in industry, regulators and research institutions, especially in countries with small nuclear programmes, or where phasing out nuclear power is part of the national energy policy, or where the use of nuclear power is reduced for other reasons;
- Lack of sufficient economic resources in some countries;

It was noted that several Contracting Parties had taken action to meet the challenges created by such factors. Contracting Parties were invited to provide further information in their next National Reports on developments with regard to these factors and circumstances.

Observations on the legislative and regulatory framework (Articles 4, 7, 9-10)

16. The legislative framework is well established in most countries.

17. After political changes in some countries, the new Governments had taken steps to implement new national systems. In these cases, Contracting Parties would welcome information in the next National Report, demonstrating that there are no gaps as a result of this transition and that the new system is complete and consistent.

18. Some countries who started their nuclear programme some decades ago have found that their legislation now needs updating. Some countries also have to update their regulations to include new developments such as ICRP60. For the next Review Meeting, information on these updates would be welcomed.

Observations on the regulatory body (Article 8)

19. All Contracting Parties had established regulatory bodies. For some countries questions were raised as to the effective independence, administrative position, and the human and financial resources of their Regulatory Bodies.

20. The effective independence of regulatory bodies is considered an essential element in nuclear safety. Generally, the regulatory bodies of Contracting Parties appeared to act in a clearly independent way in a “de facto” sense, relying on a well established management policy of the regulatory body. It was noted that in several cases, it would be desirable, and in some cases even necessary, to improve the “de jure” independence of the regulatory body as a complement to its “de facto” status, inter alia to facilitate future evolution of the regulatory body.

21. The status and position of the regulatory bodies remains an important topic to be dealt with in future National Reports and Review Meetings. Special attention should be given to the

development of assured human and financial resources. This focus is especially needed in those countries where the level of salaries that the regulatory body can offer to its staff is very low as compared to the salaries offered to staff of equivalent levels in the industry.

22. Contracting Parties reported on their national regulatory strategies. The advantages and limitations of regulations of a detailed prescriptive nature as compared to less prescriptive, goal oriented approaches and the complementary use of risk based assessments were discussed. Although no preferable approach was identified, some countries have agreed to review their experience and report at the next Review Meeting.
23. It was noted that there is an interest in continuing an exchange of experience on the regulatory actions to be taken to address management issues relevant to nuclear safety.
24. The importance of international co-operation between regulatory bodies for the enhancement of nuclear safety through bilateral and multilateral mechanisms was emphasised by all Contracting Parties. In particular, international peer reviews were considered as very effective tools for the support of regulatory improvement programmes. The importance of international co-operation was emphasised as a way to share common experiences and exchange of information. Regulatory bodies in countries having nuclear programmes of limited size found international co-operation particularly beneficial. International co-operation will also enable the regulatory body to decide, when considered useful, on whether and how to contract technical support from foreign organisations. It was stressed that countries phasing out nuclear energy should nevertheless continue their support for maintaining and improving safety in other countries.
25. It was noted that some Contracting Parties are implementing quality assurance systems in relation to the activities performed by the regulatory body. An interest in continuing an exchange of experience on this topic was expressed.
26. Even if this subject is not formally addressed in the Convention, some countries emphasised how a clear, open and proactive policy of providing information to the public on regulatory requirements, decisions and opinions, contributes to the establishment of an independent, competent and credible regulatory body.
27. Contracting Parties would welcome additional information in the next National Reports regarding:
 - “De jure” and “de facto” status of regulatory bodies;
 - Experience gained in implementing different regulatory strategies;
 - Actions taken to monitor safety management;
 - Implementation of modern quality assurance systems for regulatory activities;
 - International co-operation on a bilateral and multilateral basis among regulatory bodies.

Observations on the safety of nuclear installations

Existing nuclear installations (Article 6 and others)

28. Many countries have carried out or are carrying out detailed assessments of the safety status of their existing nuclear power plants, particularly older plants designed and constructed to earlier standards. These assessments can be in the form of critical self-assessments with outside assistance, peer reviews, or in-depth evaluations involving experts from other countries or international bodies. Some countries require periodic safety reviews as part of their regulatory process. Further information on safety assessments is contained in the following sections of the report.
29. These assessments have been used to identify safety upgrades, which improve the safety of the installations. Probabilistic analysis has been used in several countries to identify and prioritise safety upgrades. In many countries substantial upgrades have been completed. Nevertheless, several countries have significant safety improvements still to be implemented. Special attention should be given to the safety level reached after the improvements, and the subsequent assessment for licensing of continued operation.
30. Measures for severe accident management are in various stages of development and implementation in many countries. It was noted that different approaches are used, e.g. with regard to improving the capability of the containment to cope with severe accidents. Further information on these programmes in the next National Reports would be welcomed.
31. The availability of financial resources varied between the countries with safety improvement programmes under way. Some countries had adequate financing provisions in place, while others indicated that difficulties existed in obtaining the required financial resources.
32. It was observed that several safety improvement programmes used technology imported from sources different than those which provided the original design, and that in such cases, special attention to compatibility was required.
33. It was noted that some plants designed to earlier standards, if not upgraded would have safety levels significantly lower than those designed to present standards. In this connection, it was pointed out that it would be necessary to adopt the measures provided for in Article 6, namely that the Contracting Party shall ensure that all reasonable practicable improvements are made as a matter of urgency to upgrade the safety of the nuclear installation. If such upgrading cannot be achieved, plans should be implemented to shut down the nuclear installations as soon as practically possible. The timing of the shutdown may take into account the whole energy context and possible alternatives as well as the social, environmental and economic impact.
34. Further and more detailed information on the status of the safety improvement programmes would be welcomed in the next National Reports, with demonstration of progress achieved by safety assessments of the improved installations. A statement on whether the original workplan and schedule have been implemented, with reasons why this has not been possible, if that is the case, would also be appreciated.

Financial and human resources – national infrastructure (Article 11)

35. It was noted that a sound economic basis of the nuclear utility owning and operating the plant is a prerequisite for financing an effective safety programme. In the present changing energy market in many countries, it is important that utility management as well as regulatory bodies understand the potential effects on safety of severe financial constraints.
36. For countries with an expanding nuclear programme, adequate planning for human resources at the utility and the regulatory body must take place, observing appropriate lead times, especially if there is a diversity of reactor designs.
37. Potential safety issues linked to the stagnation or shrinking of nuclear programmes in several countries were identified, such as:
 - Decrease of the global national nuclear technology knowledge base will require increased international collaboration;
 - Special measures that may be required to maintain critical competence within the industry due to retirement of many people who contributed to the design and start up of nuclear power plants and the difficulty of attracting young people into the nuclear energy field;
 - Changes in national energy policy, may also require special measures to counteract loss of motivation and loss of personnel;
 - Obsolescence of equipment will require new technological solutions;
 - Decrease in the number of certified manufacturers will require special measures with regard to equivalence of industry codes and standards; and
 - Decrease of capacity to support nuclear safety internationally.

Assessment and verification of safety (Articles 12-14 and 17-19)

38. In their review with regard to this section of the Convention, the Contracting Parties identified a number of significant developments and trends. The following areas were considered of particular interest.
39. In addition to traditional deterministic assessment methods, Probabilistic Safety Analyses (PSA) are increasingly being used. The Meeting noted that a proper balance between both approaches is essential.
40. In many countries Periodic Safety Reviews (PSR) are conducted on a regular basis, ten years being a typical interval. The PSR often includes a re-evaluation of the site characterisation, a seismic re-evaluation, consideration of other external factors and an ageing management programme, in addition to the usual update of the safety analysis and a review of operating experience.
41. Operational experience feedback systems, incorporating information on international experience, are present in all countries.

42. External peer reviews of operational performance (IAEA, WANO, etc.) are widely used and the implementation of their recommendations are in some cases monitored by the regulatory body.
43. Most countries make efforts to continuously review and update the safety case (safety analysis report, procedures and other relevant technical documentation). For older generation nuclear power plants the scope of the initial safety analysis was limited by national regulatory requirements in force at the time the plants were built. In some countries, work on a more comprehensive safety analysis should be accelerated, and reports on results would be welcomed in the next National Reports. For some of these plants, safety analysis reports according to modern standards do not exist and efforts are underway to complete them in accordance to international practice, with the help of foreign countries.
44. Activities are taking place in most countries to improve safety culture at different levels of the organizations. Special initiatives in some countries to promote safety culture at all levels were reported.
45. Many countries are revising their Quality Assurance programmes based on best international practices.
46. New subjects for safety assessment are emerging, such as the introduction of software based safety systems, etc., requiring new assessment tools.
47. It was noted that in some cases the containment function at existing nuclear power plants would not meet current standards. Therefore, additional information would be welcomed in the next National Reports regarding evaluation of the performance and efficiency of the confinement function at existing nuclear power plants. Such information should cover evaluation of the original design basis, impact of ageing, modifications with regards to the original design, and, finally, evaluation of its capability to cope with events beyond the design basis, including severe accidents.
48. Other topics on which additional information would be welcomed in the next National Reports include Probabilistic Safety Assessments, Periodic Safety Reviews and updating of safety analysis reports.

Radiation protection [Article 15 and 19 (viii)]

49. The ALARA principle (As Low As Reasonably Achievable) is implemented in all countries with regard to doses and releases. The Radiation Protection System recommended in ICRP 60 is already applied or is planned to be applied by all countries. Data provided show a general reduction in the collective doses and in releases.
50. Contracting Parties would welcome additional data in the next National Reports on the evolution of trends in collective doses and effluent releases.

Observations on emergency preparedness [Article 16 and 17 (iv)]

51. Integrated emergency response plans are in place in all countries with a nuclear power programme. Response plans are tested at varying frequencies. International exercises are performed on a regular basis. Many countries without nuclear power plants have also developed extensive

monitoring and response capabilities. It was observed that bilateral agreements with neighbouring countries regarding emergency preparedness should be completed, in those cases where nuclear installations are located in the vicinity of national borders and such a mechanism is not in place. In the next National Reports, information would be welcomed on improvements made from the results of national and international exercises.

Final conclusions

52. The Contracting Parties concluded that the review process had proven to be of great value to their national nuclear safety programmes, starting with the self-assessment involved in producing the national reports followed by the review of national reports by other Contracting Parties, with exchange of questions and comments, and finally the very open discussions at the Review Meeting. The review process thus truly provided learning through international co-operation. Although the review process thus was very successful, especially considering that it was the first of its kind, the Contracting Parties, based on observations made, decided on certain improvements and amendments to the procedural documents providing guidance for the review process. These decisions are recorded in a separate document, the Report of the President of the First Review Meeting.
53. The Contracting Parties concluded that the review process had demonstrated the strong commitment by all Contracting Parties to the safety objectives of the Convention. At the same time it was noted that there were variations among Contracting Parties with regard to the levels from which they started implementation of Convention obligations as well as in the resources available nationally for improvement programmes in progress. Even though additional steps are required in order to reach the principal objective of the Convention – to achieve and maintain a high level of safety at all nuclear installations – it is nevertheless noted that all Contracting Parties participating in the Meeting are taking steps in the right direction.
54. The Contracting Parties noted that the review process represented a substantial investment in working time of highly qualified experts. To obtain the most effective benefit from that investment, each Contracting Party would need to evaluate the lessons learned from the review process. Several Contracting Parties announced that they had already decided to perform such evaluations.
55. Finally, the Contracting Parties reconfirmed their commitment to the objectives and obligations of the Convention, and their commitment to make all reasonable efforts to provide the additional information called for in the next National Reports.

Russian Federation and the Federal Republic of Germany

Agreement between the Government of the Russian Federation and the Government of the Federal Republic of Germany on Nuclear Liability in connection with deliveries from the Federal Republic of Germany for Nuclear Installations in the Russian Federation*

The Government of the Russian Federation and the Government of the Federal Republic of Germany,

Hereinafter referred to as “the Parties”,

Desiring to develop co-operation in the field of the peaceful use of nuclear energy on the basis of the principles of reciprocity and equality,

Having regard to the Treaty of 9 November 1990 between the Union of Soviet Socialist Republics and the Federal Republic of Germany concerning Good Neighbourliness, Partnership and Co-operation, the Agreement of 6 May 1978 on the Development and Intensification of Long-Term Co-operation between the Union of Soviet Socialist Republics and the Federal Republic of Germany in the field of Trade and Industry and the Agreement of 22 July 1986 between the Government of the Union of Soviet Socialist Republics and the Government of the Federal Republic of Germany on Scientific-Technical Co-operation,

Considering that the Agreement of 25 October 1988 between the Government of the Union of Soviet Socialist Republics and the Government of the Federal Republic of Germany on Early Notification in the Event of a Nuclear Accident and the Exchange of Information about Nuclear Installations forms a basis for co-operation in the field of reactor safety and radiological protection.

Have agreed as follows:

Article 1

- (1) This Agreement shall serve to promote the economic, industrial and scientific-technical co-operation between the Russian Federation and the Federal Republic of Germany in the field of the peaceful use of nuclear energy, in particular the improvement of nuclear safety and radiological protection at civil nuclear installations in the Russian Federation.

* Unofficial translation. Only the German and Russian texts have the force of law.

- (2) The Agreement shall govern issues of nuclear liability in the event of a nuclear incident within the territory of the Russian Federation that results from deliveries from the Federal Republic of Germany to nuclear installations in the Russian Federation. The Agreement shall only apply in cases where the competent authorities designated in paragraph (4) below have notified each other in writing of the deliveries in question. Once notification of the delivery in question has been received from the German competent authority, the Russian competent authority shall confirm in writing to the German competent authority and to the supplier the application of this Agreement to the supplier in question, in accordance with the model letter of confirmation annexed to this Agreement.
- (3) In order to accomplish the purpose set out in paragraph (1) above, the German Party shall endeavour to ensure that the deliveries are of high quality and satisfy the safety requirements that apply to the nuclear installation in question.
- (4) The competent authorities for the Agreement are:
 - I. the Ministry of the Russian Federation for Atomic Energy for the Russian Party;
 - II. the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety for the German Party.

Article 2

For the purposes of this Agreement:

- (1) “Delivery” means delivery of nuclear installations and means of transport including containers for the transport of radioactive materials, delivery of components, spare parts and other equipment and goods required for nuclear installations and means of transport as well as the transfer of “know-how” and the provision of services for the construction, operation, retrofitting and decommissioning of nuclear installations in the Russian Federation;
- (2) “Supplier” means any natural or legal person with their domicile, headquarters or permanent residence in the Federal Republic of Germany, including their domestic and foreign branch offices, companies in which they own participating interests and associated companies (subsidiaries, joint ventures) as well as their sub-contractors, including their staff, that make deliveries of agreed quantities, ranges and quality to agreed deadlines to the recipient on the basis of a contract and in accordance with the national legislation of the Parties, except in those cases where the recipient is simultaneously the supplier;
- (3) “Recipient” means a Russian national or a Russian legal person who receives a delivery on the basis of a contract and in accordance with the legislation of the Russian Federation;
- (4) “Nuclear incident”, “nuclear damage” and “nuclear installation” are to be understood as defined in the Vienna Convention of 21 May 1963 on Civil Liability for Nuclear Damage.

Article 3

- (1) The Russian Party shall bring no claims against the German Party or against suppliers on grounds of nuclear damage resulting from a nuclear incident which has taken place within the territory of the Russian Federation.
- (2) The Russian Party shall grant the German Party and suppliers appropriate legal protection and shall exempt them from liability for damages in the event of claims by third parties on grounds of nuclear damage resulting from a nuclear incident which has taken place within the territory of the Russian Federation.
- (3) The Russian Party shall not exempt the German Party and suppliers from liability for damage pursuant to paragraphs (1) and (2) above if:
 - I. the nuclear incident and the resulting nuclear damage can be attributed to deliberate action on the part of the German Party or the supplier;
 - II. the German Party and the supplier have not immediately informed the Russian Party of claims for compensation brought against them or of judicial action taken against them.
- (4) The obligations undertaken by the Russian Party pursuant to this Article relating to nuclear installations shall remain in force regardless of any subsequent transfer of ownership of these installations.
- (5) Without prejudice to Article 2 (2) above, the present Article shall not be interpreted as an obstacle to judicial proceedings or claims vis-à-vis nationals of the Russian Federation or persons with permanent residence in the Russian Federation.
- (6) The provisions of this Article shall not prevent either Party from providing compensation in accordance with their respective national legislation.
- (7) This Article shall not be interpreted as recognition of the jurisdiction of a court or any other authority outside the Russian Federation with respect to claims by third parties where paragraph (2) above applies, unless the Russian Federation has undertaken to recognise and to enforce its decisions on the basis of international agreements to which the Russian Federation is a party. Nothing in this Article shall be understood as a renunciation by the Russian Federation of its immunity relating to possible claims against it by third parties.
- (8) As and when necessary, the Parties may hold consultations in connection with claims and judicial proceedings, which may arise under the terms of this Article.

Article 4

In the event of a nuclear incident in relation to which the fulfilment of obligations pursuant to Article 3 of this Agreement is foreseen, consultations shall be held upon the request of either Party.

Article 5

- (1) In the event of a dispute arising between the Parties concerning the application and interpretation of this Agreement, they shall commence consultations within one month with the aim of resolving the dispute.
- (2) If the consultations do not lead to the resolution of the dispute within three months, the Parties shall transfer the dispute to an ad-hoc arbitral tribunal pursuant to the Arbitration Rules of the United Nations Commission on International Trade Law (UNCITRAL). The result of the arbitral tribunal proceedings shall be binding for both Parties.

Article 6

- (1) This Agreement shall enter into force on the date of signature thereof.
- (2) This Agreement shall be concluded for an unlimited period and shall terminate on the day on which legislation enters into force in the Russian Federation equivalent to the provisions of the Vienna Convention of 21 May 1963 on Civil Liability for Nuclear Damage, and of the Joint Protocol of 21 September 1988 on the Application of the Vienna Convention and of the Paris Convention, or of a similar instrument of international law governing liability for nuclear damage vis-à-vis third parties to which the Federal Republic of Germany is a party. The Russian Party shall inform the German Party in writing thereof.
- (3) Without prejudice to paragraph (2) above, either Party may denounce this Agreement in writing at any time through diplomatic channels. In such an event the Agreement shall be terminated one year after the date of receipt of such notification by the other Party.
- (4) After termination of this Agreement through denunciation pursuant to paragraph (3) above, it shall continue to apply to nuclear damage due to a nuclear incident caused by a delivery made by the supplier to the recipient before termination of the Agreement.

Done at Bonn on 8 June 1998 in duplicate in the Russian and German languages, both texts being equally authentic.

Annex to the Agreement between the Government of the Federal Republic of Germany and the Government of the Russian Federation on Nuclear Liability in connection with Deliveries from the Federal Republic of Germany for Nuclear Installations in the Russian Federation

Model Letter of Confirmation

(Headed paper of the supplier of equipment)

Ministry of the Russian Federation for Atomic Energy

Moscow, 109180, Staromonetny, 26

cc: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Postfach 12 06 29, 53048 Bonn

(Date)

Exemption of suppliers of equipment and services for nuclear installations in the Russian Federation from liability for nuclear damage

Dear Sirs,

The Government of the Federal Republic of Germany and the Government of the Russian Federation on 8 June 1998 concluded an Agreement on nuclear liability in connection with deliveries from the Federal Republic of Germany for nuclear installations in the Russian Federation (hereinafter referred to as the "Agreement").

In accordance with Article 3 of the Agreement the Government of the Russian Federation has agreed to provide appropriate legal protection to those suppliers notified by the German competent authority who make deliveries to nuclear installations in the Russian Federation, and to exempt them from liability claims by third parties in connection with nuclear damage resulting from a nuclear incident occurring within the territory of the Russian Federation.

We hereby inform you that (supplier's name) has concluded a delivery contract within the meaning of this Agreement with (recipient's name) of (date). Please find enclosed a copy of this contract.

Our understanding is that, in accordance with the provisions of the Agreement:

- (a) the supplier within the meaning of the Agreement shall be exempted from liability pursuant to Article 3 of the Agreement;
- (b) the Government of the Russian Federation has agreed that, with regard to its obligations to the supplier under Article 3 of the Agreement, any dispute, difference or legal action between the supplier and the Government of the Russian Federation in connection with the Agreement and this letter of confirmation, including their effectiveness, shall, provided bilateral consultations have not led to a resolution within three months, be finally resolved by

an arbitral tribunal pursuant to the Arbitration Rules of the United Nations Commission on International Trade Law (UNCITRAL). The appointing authority within the meaning of the UNCITRAL Arbitration Rules shall be the Arbitration Institute of the Stockholm Chamber of Commerce in Sweden. The seat of the arbitral tribunal shall be Stockholm, Sweden. Unless the UNCITRAL Arbitration Rules provide for any specific procedure, the arbitral tribunal shall determine its own procedure;

- (c) the provisions of Article 3 of the Agreement relating to exemption from claims for damages are referred to in this letter of confirmation and are binding on (supplier's name) and the Government of the Russian Federation.

Please sign this document in the place indicated to confirm that the foregoing constitutes an agreement between us.

Yours faithfully,

(Authorised representative of the supplier)

ACCEPTED AND AGREED

(Authorised representative of the Ministry of the Russian Federation for Atomic Energy)

Date

Enclosures:

1. Copy of the contract
2. List of sub-contractors

BIBLIOGRAPHY AND NEWS BRIEFS

BIBLIOGRAPHY

OECD Nuclear Energy Agency

Compendium of Nuclear Safety Related Co-operation Agreements, Paris 1999, 137 pages

During this decade a number of bilateral agreements were concluded with the Russian Federation and Ukraine, to facilitate the setting up of specific assistance projects on nuclear safety through appropriate provisions dealing with nuclear liability exoneration and indemnity protection of the western contractors as well as states and international organisations. Some of these agreements also contain provisions on tax and customs duties exemption.

This compendium of selected bilateral agreements is an unofficial document prepared by the NEA. Its purpose is to serve as a source of information and reference for those involved in the administration of nuclear safety assistance programmes. Anyone interested in obtaining a copy of this compendium may write directly to the Secretariat of the NEA.

Netherlands

Contemporary Developments in Nuclear Energy Law: Harmonising Legislation in CEEC/NIS, Kluwer Law International, 1999, 697 pages

This book provides an insight into recent legislative developments in the fields of nuclear safety and third party liability within the countries of Central and Eastern Europe and in the New Independent States. It also examines national and international programmes of a legal, financial or technical nature, which have been established to assist these countries. The editor of this publication, Nathalie L.J.T. Horbach, is currently Director of the Centre for Transboundary Damage and Compensation; she obtained her doctoral degree in public international law with a thesis entitled "Liability versus responsibility under international law: Defending strict State responsibility for transboundary damage". This book was sponsored by Urenco Ltd.

The principal aim of this book is to assemble information gathered from the experiences of experts from academic, governmental and industrial circles, both in the East and the West, in order to provide a comprehensive analysis of the current situation. Emphasis has been put on the efforts undertaken by the international community with a view to improving the safety of Soviet-style nuclear installations. The improvement of safety levels in these countries has in fact proven to be a key question during discussions on enlarging the membership of international organisations like the European Union, the OECD and NATO.

The book is divided into four parts. The first section deals with international conventions adopted during recent years in the field of the peaceful uses of nuclear energy; the second examines nuclear legislation in several Eastern European States (Croatia, Hungary, Lithuania, Russian Federation, Slovenia and Ukraine) together with nuclear insurance and the decommissioning of nuclear installations. The third part examines the assistance granted to these countries by the European Union, the European Bank for Reconstruction and Development, the IAEA and the OECD Nuclear Energy Agency. The final section reproduces the texts of the three legal instruments adopted in 1997, namely the Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage, the Convention on Supplementary Compensation for Nuclear Damage and the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

A bibliography, which lists the legislative instruments in force in the countries of Central and Eastern Europe and an index are included at the close of this book.

International Atomic Energy Agency (IAEA), Supplement to the *International Encyclopaedia of Laws: Intergovernmental Organizations*, Nathalie L.J.T. Horbach, October 1998, Kluwer Law International, 172 pages.

This monograph in English provides a comprehensive description of the structure and activities of the International Atomic Energy Agency, a specialised agency of the United Nations. The author of this publication, Nathalie L.J.T. Horbach, is currently Director of the Centre for Transboundary Damage and Compensation. The book is divided into four main chapters: the first chapter is entitled “Genesis and Historical Development”; the second covers agreements concluded by the IAEA with inter-governmental organisations and specialised agencies. The third chapter, which sets out the activities and projects of the Agency, describes the role which this body plays in relation to, *inter alia*, the receipt of nuclear materials; technical assistance; research activities; food and agriculture; safeguards and verification; health and safety; nuclear power, the nuclear fuel cycle and waste management and the distribution of information. Chapter Four is entitled “Legal Matters” and describes the particular legal rules which apply to the Agency as a result of its status as an intergovernmental organisation.

Uruguay

***El Derecho Nuclear y el MERCOSUR*, by Diva E. Puig, Ed. Fundacion de Cultura Universitaria, 1998, 103 pages.**

El Derecho Nuclear y el MERCOSUR is a publication in Spanish which examines the nuclear situation in those countries party to the MERCOSUR Regional Agreement: Argentina, Brazil,

Paraguay and Uruguay. This Agreement, concluded on 26 March 1991, established a common market in the region of Latin America where these four countries are situated.

The author, Ms. Diva E. Puig, is the Chairperson of the Uruguayan Association for Protection against Ionising Radiation. In her study, she underlines the importance of harmonising these countries' legislation in the field of the peaceful uses of nuclear energy. The main section in this publication consists of a comparative study of the respective regulations and legislation in the following fields: regulatory authorities; third party liability; physical protection and nuclear safety; radioactive waste management; and environmental protection.

Through her analysis of the current situation in the MERCOSUR region, the author highlights the differences between these four countries in respect of their nuclear technology. While Argentina and Brazil both have an electronuclear programme, Paraguay and Uruguay do not operate nuclear power plants. They do, however, apply nuclear technology in the medical field, in agriculture and in industry. These underlying differences may therefore affect the future harmonisation of nuclear legislation.

NEWS BRIEFS

OECD Nuclear Energy Agency

International Symposium on the Reform of Civil Nuclear Liability (1999)

Governmental experts, nuclear industry representatives, specialists from international organisations, nuclear risk insurers and academics from over fifty countries met in Budapest from 31 May to 3 June, 1999, for an International Symposium on the Reform of Civil Nuclear Liability. This event, organised by the OECD Nuclear Energy Agency in co-operation with the International Atomic Energy Agency and the European Commission, provided a forum for discussion within the nuclear community on the national and international regimes which guarantee equitable compensation to all potential victims of a nuclear accident. The Symposium was hosted by the Hungarian Atomic Energy Authority and the Institute for Legal Studies of the Hungarian Academy of Sciences.

The primary purpose of this Symposium was to review nuclear liability and compensation issues in the context of the recent revision of the Vienna Convention on Civil Liability for Nuclear Damage, the adoption of the Convention on Supplementary Compensation for Nuclear Damage and the current negotiations on the amendment of the Paris Convention on Third Party Liability in the Field of Nuclear Energy and the Brussels Supplementary Convention

The Symposium provided an opportunity to evaluate progress already made in the international nuclear liability regime and to discuss those challenges which lie ahead. Working Sessions focused on the prospects of implementation of the new global regime, transport issues, and the equitable distribution of compensation to nuclear accident victims.

The Symposium also served as a forum for examining the difficulties faced by Central and Eastern European countries (CEEC) and by the New Independent States (NIS) in joining an international regime. The importance of their adherence to such a regime was reflected in the invitation of specialists from 14 of these countries to attend this event.

Proceedings of the Symposium will be published by the OECD Nuclear Energy Agency during the latter half of 1999. They will include full texts of all papers in their original language (English or French), a record of the discussions and a list of participants.

1998 Update of the Analytical Study on Nuclear Legislation in OECD countries

The third Update of the Analytical Study on Nuclear Legislation in OECD countries, published by the Nuclear Energy Agency in 1995, is now available from the NEA Secretariat. As with the original publication and the 1996 and 1997 Updates, it is organised on the basis of a standardised format for all countries, thus facilitating the search for and comparison of information. The 1998 Update consists of replacement chapters for Austria, Belgium, Germany, Japan, Spain and the United

States. In addition, there are completely new chapters for Iceland and New Zealand, which were not previously covered by this publication.

International Nuclear Law Association

Nuclear Inter Jura 1999

The International Nuclear Law Association (INLA) will hold its 14th Congress from 24 to 29 October 1999 in Washington, USA.

These Congresses, organised on a two-yearly basis, provide the INLA Members, together with other interested persons, with an opportunity to review recent developments in nuclear law, and serve as a forum to discuss legal questions concerning the peaceful uses of nuclear energy.

As in the past, the Congress will be divided into five sessions based on the following well-known themes: licensing and decommissioning; radiological protection; international nuclear trade; third party liability and insurance; and management of radioactive waste. A special session will be dedicated to the effects of privatisation and de-regulation on the future of nuclear energy. The presentations will close with observations on nuclear legislation of the 21st century.

Further information may be obtained from the Technical Secretariat of INLA by writing to the Chairman, Mr. Manning Muntzing, Morgan, Lewis & Bockius LLP, 1800 M Street, N.W. Washington D.C. 20036. Fax : +202 467 7176. E-mail: munt7474@mlb.com

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