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ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

The OECD is a unique forum where the governments of 30 democracies work together to address the economic, social and environmental challenges of globalisation. The OECD is also at the forefront of efforts to understand and to help governments respond to new developments and concerns, such as corporate governance, the information economy and the challenges of an ageing population. The Organisation provides a setting where governments can compare policy experiences, seek answers to common problems, identify good practice and work to co-ordinate domestic and international policies.

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NUCLEAR ENERGY AGENCY

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

The mission of the NEA is:

- to assist its member countries in maintaining and further developing, through international co-operation, the scientific, technological and legal bases required for a safe, environmentally friendly and economical use of nuclear energy for peaceful purposes, as well as
- to provide authoritative assessments and to forge common understandings on key issues, as input to government decisions on nuclear energy policy and to broader OECD policy analyses in areas such as energy and sustainable development.

Specific areas of competence of the NEA include safety and regulation of nuclear activities, radioactive waste management, radiological protection, nuclear science, economic and technical analyses of the nuclear fuel cycle, nuclear law and liability, and public information. The NEA Data Bank provides nuclear data and computer program services for participating countries.

In these and related tasks, the NEA works in close collaboration with the International Atomic Energy Agency in Vienna, with which it has a Co-operation Agreement, as well as with other international organisations in the nuclear field.

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FOREWORD

This edition of the *Nuclear Law Bulletin* marks the 40th anniversary of the NEA's flagship periodical in the legal field. Many significant developments have taken place in national and international nuclear law over the past four decades, and we are proud to have been able to report on them for the benefit of legal professionals, academics, researchers, students and others who are interested in the legal aspects of nuclear energy.

The *Bulletin* first came into existence in 1968, when *Pierre Strohl*, then Head of Legal Affairs at the OECD European Nuclear Energy Agency entrusted *Patrick Reyners*, then Administrator, with the publication of a *Bulletin de droit nucléaire*. They stated in the first foreword that the "frequency of publication of the Bulletin will depend on the amount of information and texts relating to nuclear law". Since that time and without interruption, the *Bulletin* has contributed to the exchange of information in this highly complex field of law and provides an invaluable source of articles, case studies, texts as well as reports on national and international regulatory activities.

This particular issue of the *Bulletin* contains four articles on very different topics written by authors representing the US Nuclear Regulatory Commission, the European Commission and the Canadian nuclear industry, as well as by private consultants.

With the coming of a "nuclear renaissance", we hope to continue providing our readers with thoughtful reflections on an ever-increasing number of interesting issues in nuclear law and related fields. This information is complemented by the reports on "*Nuclear Legislation in OECD Countries"* available on the NEA website. The latter provides comprehensive information on the regulatory and institutional frameworks governing nuclear activities in all OECD countries.

We would like to express our deep appreciation to our national correspondents, authors, contributors and of course our readers for their support in making this publication the success that it is today.

The NLB Editorial Team
June 2008

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Looking Backward, Moving Forward: Licensing New Reactors in the United States

*by Stephen G. Burns**

A resurgence of interest in new nuclear power generation as part of the energy mix has emerged around the world in the past few years. The reasons for this potential "nuclear renaissance" stem from a complex set of considerations, including the environmental benefits of no "greenhouse" gas emissions, the enhanced reliability of nuclear operations, advantageous fuel and operating costs and government incentives, among others. For the first time in a generation, electric generating companies are giving serious consideration to building new commercial nuclear power plants in the United States.

As the licensing and regulatory authority in the United States, the U.S. Nuclear Regulatory Commission (NRC or Commission) has received expressions of interest in the licensing of nearly 30 new nuclear power plants over the next decade, as well as in the certification of several new designs that would be used in many of these plants. In reviewing these new applications, the NRC will be implementing a licensing review process that is significantly different than the process used to licence the current fleet of 104 operating reactors in the United States. This process, codified in 10 C.F.R. Part 52 of the NRC's regulations, is itself the product of regulatory reform efforts that culminated in the late 1980s in response to severe criticism of the agency's original two-step licensing approach. In adopting a new framework in Part 52 to provide for early site permits and approval of standardised designs, both of which could then be referenced in an application for a combined licence to construct and operate a plant, the NRC intended to foster greater standardisation, encourage early resolution of safety issues, and improve the stability and predictability of the licensing process. The purpose of this article is to review the history of the adoption of Part 52, to review early experience with the process since it was originally adopted and to discuss some of the challenges that lie ahead as the NRC faces a potentially significant new workload of applications for new plant licences.

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Institutional framework

The NRC, established in 1975, is an independent federal regulatory agency within the Executive Branch of the U.S. Government. The NRC was one of two successor agencies to the U.S. Atomic Energy Commission (AEC) and carried forward the regulatory functions of the AEC over civilian uses of nuclear energy and material in commercial, academic, medical and research spheres.[1] The central legislative authority establishing the NRC's regulatory jurisdiction and powers is the Atomic Energy Act (AEA) of 1954, as amended, 42 U.S.C. §§ 2011 *et seq*. In broad terms, the NRC is authorised to

> "establish by rule, regulation or order such standards and instructions to govern the possession and use of special nuclear material, source material, and by product material as the Commission may deem necessary or desirable to promote the common defence and security or to protect health or to minimize danger to life or property. [AEA § 161b., 42 U.S.C. § 2201(b)]".[2]

In a well-worn phrase familiar to U.S. nuclear law practitioners, the authorities granted to the NRC under the AEA have been termed as virtually unique in the degree to which broad responsibility is reposed in the administering agency, free of close prescription in its charter as to how it shall proceed in achieving the statutory objectives.[3]

The NRC issues licences and exercises regulatory oversight of all commercial nuclear power reactors in the United States pursuant to authority conferred by the AEA and the Energy Reorganization Act of 1974.[4] With respect to commercial power reactors, the NRC may issue licences to persons who agree to

> "observe such safety standards to protect health and to minimize danger to life or property and who agree to make available to the Commission such technical information and data concerning activities under such licenses as the Commission may determine necessary to promote the common defence and security and to protect the health and safety of the public".[5]

Until recently the Office of Nuclear Reactor Regulation (NRR)[6] within the NRC was the lead office for review of initial applications for reactor construction permits and operating licences. In 2006, the Commission established an Office of New Reactors to be primarily responsible for the review and evaluation of new reactor designs and applications to site new reactors; NRR retained responsibility for ongoing oversight of operating reactors, including amendments to original licences.

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1. The Energy Reorganization Act of 1974, 42 U.S.C. §§ 5801 *et seq.*, abolished the AEC and established the NRC and the Energy Research and Development Administration, which was later incorporated into a new Department of Energy.

2. See also AEA §§ 161i. and o., 42 U.S.C. §§ 2201(b) and (o).

3. *Siegel v AEC*, 400 F.2d 778, 783 (D.C. Cir. 1968), *cert.* denied, 439 U.S. 1046 (1968).

4. The NRC does not licence nuclear facilities owned and operated by the U.S. Department of Energy, except for those facilities specifically enumerated in the Energy Reorganization Act of 1974. 42 U.S.C. § 5842. An explicit exclusion from NRC licensing of utilisation facilities of the Department of Defense is contained in 42 U.S.C. § 2140.

5. See AEA § 103b., 42 U.S.C. § 2133(b). Commercial power reactors are "utilisation facilities" under the AEA for which "any person" must have a licence to possess or use such facility. AEA §§ 11cc. and 101, 42 U.S.C. §§ 2014(cc) and 2131.

6. See 42 U.S.C. § 5843.

The two-step licensing process

All currently operating commercial nuclear power plants in the United States have been licensed under the two-step process which was originally implemented by the NRC or its predecessor, the AEC. Under authority conferred by the AEA, the AEC implemented a two-step process for licensing production and utilisation facilities which was modelled, at least in part, on the earlier Federal Communications Act of 1934 and its two phase process for construction and operation of radio transmission and broadcast facilities.[7] In simple terms the AEC, and later the NRC, would first issue a construction permit, based on evaluation of preliminary safety and design information, to allow construction of a nuclear power plant and then issue an operating licence, upon completion of construction, based on evaluation of the final design and other operational considerations. The U.S. Supreme Court sustained the AEC's approach as a permissible, if not the only, means of implementing the AEA.[8] The two-step approach to licensing plants is still available as an option for licensing a new plant and is reflected in the NRC's regulations contained in 10 C.F.R. Part 50.[9]

Construction permits and operating licences

The important statutory provisions framing the original process are found in Sections 182, 185, and 189 of the AEA.[10] Under the original provisions of the AEA, still reflected in Section 185a. and the Commission's regulations in 10 C.F.R. Part 50, an applicant to construct and operate a nuclear power plant must initially obtain a construction permit. The application for a construction permit must include the principal design criteria for the proposed plant as well as other information bearing on the suitability of the site, the applicant's financial qualifications, and other information on its safety and physical protection characteristics.[11] Until enactment of the Energy Policy Act of 2005, licensing of commercial reactors also entailed an antitrust review pursuant to Section 105(c) of the AEA.[12] It should be emphasised, however, that the applicant was not required as part of its application or "preliminary safety analysis report" under Section 50.34(a) to submit a complete design at the

7. See *Texas Utilities Electric Co.* (Comanche Peak Steam Electric Station, Unit 1), CLI-86-4, 23 N.R.C. 113 (1986).

8. See *Power Reactor Development Co. v Electricians*, 367 U.S. 376 (1961). Indeed, Section 161h. of the AEA, 42 U.S.C. § 2201(h), allowed for the consideration "in a single application one or more activities for which a license is required by this Act" and to "combine in a single license one or more of such activities". Part 52's combined licence provisions, when adopted in 1989, conformed to the existing statutory strictures on licensing. See *Nuclear Information and Resource Service v NRC*, 969 F.2d 1169 (D.C. Cir. 1992), reversing in part 918 F.2d 189 (1990).

9. See 10 C.F.R. §§ 50.35 and 50.57. For example, the Tennessee Valley Authority has indicated that it will seek an operating licence for its Watts Bar Unit 2 facility under Part 50. The plant received a construction permit in 1973, but largely suspended work in the mid-1980s and put the plant in a lay-up condition.

10. 42 U.S.C. §§ 2232, 2235 and 2239.

11. See e.g. 10 C.F.R. §§ 2.101, 50.33 and 50.34(a). The NRC developed Regulatory Guide 1.70, *Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants*, which applicants could use to ensure their applications addressed the information necessary for the NRC to conduct its review.

12. Pub. L. 109-58, 119 Stat. 784, amending 42 U.S.C. 2135(c). See *Alabama Power Co. v NRC*, 692 F.2d 1362, *cert*. denied, 464 U.S. 816 (1983) for a description of the earlier scheme for antitrust review. At the construction permit stage a separate hearing might be held on antitrust review issues. Applications for operating licences did not require formal antitrust review unless the Commission determined that "significant changes" in the applicant's activities had occurred since the earlier review of the construction permit application.

construction permit phase. The applicant would be required though to submit with the application an environmental report which addressed the anticipated environmental impacts of the project, which was used by the Commission staff in preparing a draft environmental impact statement (EIS), as described *infra*.

Once the NRC staff accepted the application as complete, they undertook a safety and environmental review of the proposed design and site for the plant, using the NRC's Standard Review Plan and Regulatory Guides that addressed the acceptance criteria for approving various aspects of the application. The application was subject to a hearing, which may have been contested or uncontested as more fully described below. The application was also required to be reviewed by the Advisory Committee on Reactor Safeguards (ACRS), a statutory committee of outside experts established to advise the Commission on the hazards of proposed facilities and the adequacy of proposed safety standards.[13] After meeting with the Commission staff and the applicant, the ACRS submitted a letter report to the NRC to present the results of its review and recommend whether a construction permit should be issued. Taking into account the ACRS review and determinations on technical or environmental matters raised during the hearing process described *infra*, the staff could then issue the construction permit. In this regard, it should again be emphasised that the NRC's findings were essentially based on a preliminary design which was sufficient to allow the agency to conclude that any remaining safety questions could be resolved by completion of construction and at the operating licence stage.[14] Although site clearing, grading and construction of safety structures, systems and components could not commence until the construction permit was issued, the Commission allowed for some preliminary activities under a Limited Work Authorization.[15]

Before the scheduled completion of construction (typically when the plant was 50% constructed), the applicant would file an application for an operating licence. At this point the applicant would provide in a final safety analysis report the complete design bases and other information related to the safe operation of the plant, technical specifications for operation of the plant, and a description of operational programmes such as those for training, physical security and emergency planning.[16] Updated environmental information would be provided to support the NRC's supplemental environmental review.

The purpose of the NRC review at this stage is to determine:

- Whether the nuclear power plant has been constructed in accordance with the construction permit, the application as amended and the Commission's regulations.

13. AEA §§ 29 and 182b., 42 U.S.C. §§ 2039 and 2232(b).

14. See 10 C.F.R. § 50.35(a).

15. The Commission could issue a Limited Work Authorization (LWA) in advance of the final decision on a construction permit if: (1) all environmental and site selection issues for a construction permit had been resolved, and (2) the presiding Licensing Board had concluded that there was reasonable assurance that the proposed site would be suitable from a radiological health and safety standpoint for a reactor generally equivalent to the size and type proposed in the application. The LWA could also authorise installation of the structural foundation. The NRC recently revised its LWA rule to re-define construction activities for which a LWA is required. Final Rule, *Limited Work Authorizations for Nuclear Power Plants*, 72 Fed. Reg. 57, 416 (9 October 2007).

16. See 10 C.F.R § 50.34(b)-(h).

- Whether there is reasonable assurance that the plant can be operated in compliance with the Commission's regulations and without endangering the health and safety of the public or the common defence and security.

- Whether the applicant has the requisite technical and financial qualifications.[17]

The staff must also prepare a supplemental EIS to update the original EIS. The application is subject to a hearing if one is requested. The ACRS must again review the application and provide its opinion. Again, subject to the ACRS review and the outcome of any hearing, the staff could then issue the operating licence.

Assessment of environmental impacts at both stages

In carrying out its licensing process, the Commission must also adhere to the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. §§ 4321-4347. NEPA obligates federal agencies to evaluate the potential environmental impacts of federal actions and requires preparation of an environmental impact statement for "major" federal actions.[18] Although the AEC initially resisted application of NEPA to facilities licensed under the AEA, the agency ultimately implemented NEPA's environmental assessment provisions in the face of an adverse court decision.[19] Current regulations governing the NEPA process at NRC may be found at 10 C.F.R. Part 51.

Because the issuance of a construction permit is considered a "major federal action" for NEPA purposes, the Commission was required under NEPA to prepare an EIS at the construction permit stage which evaluated the environmental impacts of constructing and operating the proposed plant as well as considered alternatives to the proposed facility. Although a supplemental EIS was required at the operating licence phase to consider environmental impacts of issuance of the operating licence, the review was limited to changes that had occurred since the EIS was issued in connection with the construction permit. No further consideration of alternative sites was necessary in this supplemental EIS. Under NEPA procedures, an agency first proposes and publishes a draft EIS for public comment, which is then followed by a final EIS that addresses the comments received. Although NEPA itself does not require public hearings, the Commission has permitted consideration of environmental issues in its hearing process (described *infra*) in the same manner as safety and security issues arising under the AEA.

Public hearings on construction permits and operating licences

In all proceedings to grant, suspend, revoke or amend a licence, or to issue or modify regulations, the AEA requires the Commission to grant a "hearing" upon the request of "any person whose interest

17. See 10 C.F.R. § 50.57(a); AEA §§ 182a. and185a., 42 U.S.C. §§ 2232(a) and 2235(a).

18. NEPA is one of a number of environmental laws (e.g. Clean Air Act, Clean Water Act) that require the consideration of a wide range of environmental matters during the licensing process. Reviews under these statutes, require the involvement of numerous federal and state agencies. Although resolution of many of these issues must be taken into account during NRC's licensing process, a company wishing to site a new nuclear – or indeed any kind of electric generating – plant will need multiple regulatory approvals from various federal, state and local agencies before the plant can be constructed.

19. See *Calvert Cliffs' Coordinating Comm. v Atomic Energy Commission*, 449 F.2d 1109 (D.C. Cir. 1971).

may be affected" by the proposed action and to admit such persons as parties to the proceeding.[20] Under a 1957 amendment to the AEA, the Commission is required to hold a hearing on a construction permit, whether or not anyone has requested one.[21] A public hearing on an operating licence application is not, however, mandatory, but may be conducted on request by an interested person or as a matter of discretion by the Commission.

In implementing its licensing and hearing processes, the Commission must follow the Administrative Procedure Act of 1946 (APA), 5 U.S.C. §§ 551-559 and 701-706. The APA codifies procedural requirements generally applicable to federal agency rulemaking, licensing and other proceedings.[22] For agency rulemaking, the Commission has generally followed the informal rulemaking process permitted by the APA under which the agency must first publish a rule in the *Federal Register* and invite public comment and then follow with issuance of a final rule that takes into consideration any comments received.[23] During the first wave of nuclear power plant licensing, both the AEC and the NRC provided for formal, trial-type hearings in licensing proceedings to satisfy the hearing requirements under Section 189 of the AEA. Agency procedures allowed opportunities for discovery and cross-examination similar to the procedures established for trials in the federal courts under the Federal Rules of Civil Procedure. However, the NRC adopted comprehensive changes to its adjudicatory procedures in 2004 which, among other things, provided for the use of more informal procedures in reactor licensing hearings.[24] The revised procedures still provide for an oral hearing on material disputes of fact, discovery and the opportunity to request cross-examination in appropriate circumstances. Past and current hearing procedures are generally codified in 10 C.F.R. Part 2 of the Commission's regulations.

A 1962 amendment of the AEA allowed the Commission to establish Atomic Safety and Licensing Boards composed of legal and technical experts to conduct licensing hearings.[25] The Boards generally were empowered to rule on the admission of parties and issues for litigation, oversee the

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20. AEA § 189a.(1)(A), 42 U.S.C. § 2239(a)(1)(A).

21. AEA § 189a.(1)(A), 42 U.S.C. § 2239(a)(1)(A); see Pub. L. 85-256 § 7, 71 Stat. 576 (1957).

22. The APA is one of a group of federal "openness" laws that are designed to provide greater transparency in federal agency decision-making. See Fung, A., Graham, M. and Weil, D., *Full Disclosure* 25-28 (Cambridge University Press 2007). The APA applies to all NRC actions taken under the AEA, as provided by AEA 181, 42 U.S.C. 2231. The debate over the fairness and formality of the AEC or NRC's hearing procedures – a subject beyond the scope of this article – has stretched across the history of both agencies, reaching at times the U.S. Supreme Court as well various courts of appeal. See e.g. *Vermont Yankee Nuclear Power Corp. v Natural Resources Defense Council*, 435 U.S. 519 (1978); *Citizens Awareness Network, Inc. v NRC*, 391 F 3d 338 (1st Cir. 2004).

23. *Siegel v AEC*, 400 F .2d 778, 783 (D.C. Cir. 1968), *cert.* denied, 439 U.S. 1046 (1968), established the principle that the notice and comment procedures were sufficient to satisfy the hearing requirement in Section 189 for rulemaking. During the 1970s, the AEC and NRC did conduct a few rulemakings using a more formal trial-like process; most notable was the rulemaking to establish emergency core cooling requirements for nuclear reactors. See Rulemaking Hearing on Acceptance Criteria For Emergency Core Cooling Systems For Light-Water-Cooled Nuclear Power Reactors, CLI-73-39, 6 A.E.C. 1085, 1973 WL 18177 (1973).

24. Final Rule, *Changes to Adjudicatory Process*, 69 Fed. Reg. 2, 182 (14 January 2004). The rule changes were challenged as violating the APA, but were sustained by a federal court of appeals. See *Citizens Awareness Network, Inc. v NRC*, 391 F.3d 338 (1st Cir. 2004).

25. AEA § 191, 42 U.S.C. § 2241. This amendment essentially provided an exception to the usual principle under the Administrative Procedure Act that hearing examiners or administrative law judges be lawyers.

discovery process among the parties, conduct the hearing on contested issues and render a decision on the evidence before the Board. Besides the AEC or NRC staff and applicant, participation in such proceedings is granted to those persons who can establish "standing", i.e. a specific cognizable interest that may be affected by the outcome of the proceeding and who proffer an admissible contention – or issue – for litigation.[26] Other parties to licensing proceedings might include state or local governments, advocacy groups or individuals.[27]

Board decisions were subject to appeal within the agency. From 1969 until 1991, the Commission deferred most of the appellate review to an Atomic Safety and Licensing Appeal Board, which heard appeals from Licensing Board decisions but also conducted *sua sponte* review of unappealed final decisions in licensing cases. The Commission itself conducted much more limited appellate review of decisions in hearing cases, a practice which was roundly criticised by the major reviews of the agency in the wake of the Three Mile Island accident.[28] A final agency decision could then be appealed by an aggrieved party to a federal court of appeals in accordance with Section 189 of the AEA 42 U.S.C. § 2239(b).

As we shall see, the NRC has undertaken extensive efforts in the past 20 years to construct what it believes will be a more effective licensing process. Although one expects most new licensing to be conducted under the new process provided in 10 CFR Part 52, the NRC has not repealed the two-step process and it remains available as an option for licensing new reactors.

Re-making the licensing process

Although the history of the early licensing process carried out by the AEC and later the NRC reflects a near constant debate over the need for reform,[29] the purpose here is to provide an overview of the initiatives and efforts that led to the NRC's adoption of the procedural mechanisms in 10 CFR Part 52. Instead of the two-phase process of construction permit and operating licence, Part 52 allows an applicant to seek a combined licence (COL) which authorises construction based on a complete design and provides conditional authority to operate the plant, subject to verification that the plant has been constructed in accordance with the licence, design and the Commission's regulations. Part 52 also provides two other significant procedures: (1) review and approval of standardised designs through a design certification rulemaking and (2) review and approval of a site's suitability, prior to a decision

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26. 10 C.F.R. § 2.309(a), (d) and (f) (2007). The Commission generally follows judicial concepts of standing to determine whether someone should be properly admitted as a party to a proceeding, though it is not required to do so. See *Sequoyah Fuels Corp.*, CLI-01-2, 53 NRC 9, 14 (2001); *Envirocare of Utah, Inc. v NRC*, 194 F.3d 72, 75 (D.C. Cir 1999). To demonstrate "standing" in NRC proceedings, a petitioner must allege "(1) an actual or threatened, concrete and particularized injury, that (2) is fairly traceable to the challenged action, (3) falls among the general interests protected by the Atomic Energy Act (or other applicable statute, such as the National Environmental Policy Act) and (4) is likely to be redressed by a favourable decision". *Sequoyah Fuels Corp.* at 13.

27. Many early proceedings were uncontested, and it was not until the late 1960s that significant intervention by advocacy organisations or individuals began to routinely occur in licensing proceedings. See NRC Special Inquiry Group, *Three Mile Island: A Report to the Commissioners and to the Public*, Vol. II at 3 (1980) (hereinafter Special Inquiry Group Rep't); Green, H.P., *Public Participation in Nuclear Power Plant Licensing: The Great Delusion*, 15 Wm. and Mary L. Rev. 503, 512 (1974).

28. See *Report of the President's Commission on the Accident at Three Mile Island*, at 51 (1979) (hereinafter Kemeny Commission Rep't); Special Inquiry Group Rep't, *supra* note 27, Vol. I at 140-41.

29. See generally Walker, Samuel J., *Containing the Atom* 37-56 (University of California 1992).

whether to build a particular plant, through an early site permit.[30] An applicant for a COL can reference either a design certification or an early site permit, or both. The design characteristics and site suitability determinations in the design certification or early site permit may not be reviewed again in the combined licence review except under limited circumstances.

As the NRC begins its review of the first COL applications under Part 52, it is worth recalling that the basic rule is itself now almost twenty years old. When the rule was proposed in 1988, the basic concepts – combined licences, certified designs and early site reviews – had been debated since at least the early 1970s. As we shall see, criticism of the two-step licensing process and the lack of any legislative consensus in the U.S. Congress on licensing reform legislation led the NRC to undertake administrative reform of the licensing process.

Criticism of the two-step process

When it published the proposed Part 52, the NRC stated its purpose was

> to improve reactor safety and to streamline the licensing process by encouraging the use of standard designs and by permitting early resolution of environmental and safety issues related to the reactor site and design. As a result the scope of the combined license proceeding for a facility can be far more limited than the scope of the two-step licensing process currently in use. Similarly, after the combined licensing proceeding the regulatory matters which would remain for resolution before authorization to operate under the combined license, would be more limited and well-defined than are the issues which remain to be resolved in an operating license proceeding under the current practice.[31]

This statement of the objectives of re-tooling the licensing process reflects the frustration with the two-step process: a lack of standardisation and a "design as you go" approach to constructing the plant, deferred resolution of important safety issues until plant construction was well underway, changing regulatory requirements and a seemingly inefficient and duplicative review and hearing process.

Essentially, the deferral of design details until construction was authorised allowed the construction of commercial reactors with "an unusual degree of variability and diversity" – in sum, a set of custom-designed and custom-built plants.[32] This lack of standardisation posed challenges to the NRC's ability to adequately monitor the safety of plant operations as well as the industry's ability to learn from operating experience.[33] From an economic standpoint, the variability in design implementation through the "design as you go" approach also contributed to the escalating cost and lead times, as long as 12 to 16 years, to bring a planned facility into operation. In this regard,

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30. A combined licence may also reference a manufacturing licence or a final design approval. 10 C.F.R. § 52.73(a).

31. Proposed Rule, *Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Reactors*, 53 Fed. Reg. 32060, 32062 (23 August 1988).

32. U.S. Congress Office of Technology Assessment, *Nuclear Power Plant Standardisation*, at 6 (1981) (hereinafter OTA Report).

33. See *ibid* at 3, 12, 38, 55-57.

advocates of greater standardisation cited favourably foreign experience, such as in France, as providing a model for greater achievement of safety and efficiency through standardisation.[34]

In the absence of a substantially complete design or resolution of pertinent safety issues, the two-stage process also opened the door to the consideration of new or changed regulatory requirements at the operating licence phase while construction was well underway. The "rachetting" or "backfitting" of new requirements was viewed as undisciplined and accomplished without necessarily appreciating the overall safety impact of the new requirements. Although it is hard to imagine licensing of plants without the significant regulatory requirements adopted in the 1970s and 1980s – fire protection, environmental qualification of electrical equipment, security plans, emergency planning, post-Three Mile Island design and operational enhancements – these requirements were largely retrofitted on plants already well under construction or in operation. Perhaps the most dramatic examples of the consequences of deferred decisions on critical licensing or sitting considerations were the Seabrook and Shoreham plants. Both plants, well under construction, were embroiled in divisive controversies over the ability to provide adequate emergency planning for their sites. The Seabrook plant eventually achieved full power operation, but the Shoreham plant never did. Although the utility initiated low power testing of the plant, New York State, which had challenged the efficacy of emergency planning at the site, effectively bought the utility out for the purpose of terminating operations and decommissioning the plant.[35]

While critics disagreed on whether the NRC's hearing process was detrimental to the overall licensing scheme,[36] there was general agreement that the two-stage process fostered the perception, if not the reality, that a favourable licensing decision was inevitable at the operating licence phase in the face of the significant investment of the applicant into a plant substantially constructed at the time the operating licence review was undertaken.[37] Ironically, this echoes the argument rejected by the U.S. Supreme Court in an early case under the AEA in which the Court sustained the Commission's approach to issuing construction permits based on only preliminary design information.[38] Nonetheless, the consensus of agency critics was that the NRC should move to a one-stage licensing process in lieu

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34. See *ibid* at 46-48; Testimony of Philip Bray, A., *Hearings before the Subcomm. on Energy and the Environment, House Comm. on Interior and Insular Affairs on Nuclear Licensing Reform*, 98th Cong., 1st Sess., at 254 (1983) (noting construction of two General Electric reactors in Taiwan in 5 years time). On this point, I would like to share a personal anecdote: When I visited the Paluel plant, a four-unit site on the Normandy coast in 1987, my French hosts proudly noted that it had taken them half the time – about six years – to build the units than it had taken its sister plant, the South Texas Project on the Texas coast, to be constructed.

35. For a flavour of the controversy in these cases, see *Massachusetts v NRC*, 924 F .2d 311 (D.C. Cir. 1991); *Seacoast Anti-Pollution League v NRC*, 690 F.2d 1025 (D.C. Cir. 1982); *Long Island Lighting Co.* (Shoreham Nuclear Plant, Unit 1), CLI-89-2, 29 NRC 211 (1989).

36. Compare Testimony of Bart, Z. Cowan and Testimony of Bradford, Peter A., *Hearings before the Subcomm. on Nuclear Regulation of the Senate Comm. on Environment and Public Works on S.893 and S.894*, 98th Cong., 1st Sess., at 226 and 239 and 477 and 567 (1983).

37. See e.g. Kemeny Commission Report, *supra* note 28, at 52; NRC's Notice of Request for Comments on Proposed Legislation; Nuclear Standardisation Act of 1982, 47 Fed. Reg. 24044, 24045 (2 June 1982); Testimony of Gellhorn, Ernest, F., *Hearing before the Subcomm. on Energy and Power of the House Comm. on Energy and Commerce on Nuclear Licensing Reform*, 100th Cong., 2nd Sess., at 36 (1988).

38. See *Power Reactor Development Co. v Electricians*, 367 U.S. 376 (1961). The Court stated: "We cannot assume that the Commission will exceed its powers, or that these many safeguards to protect the public interest will not be fully effective". *Op.cit.* at 415-16.

of a system in which "one lengthy safety review is conducted too early to be useful, and the other is too late to be fully effective".[39]

Early attempts at licensing reform

Even in the early 1970s, the AEC moved to encourage greater standardisation in plant designs. Although the assertion seems remarkable now, knowing the changes and challenges to come to a then-nascent industry, the AEC encouraged standardisation through the issuance of policy statements in 1972 and 1973.[40] The AEC also proposed legislation that reflects early conceptual approaches to the key components of the current Part 52 – provision for combined licences, approval of generic designs by rulemaking and approval of sites before a specific application for a plant is submitted.[41] In the 1973 policy statement the AEC identified three standardisation approaches: *reference systems,* by which significant portions of a plant design would be standardised and could be referenced once approved by the agency; *duplicate plants*, by which the design would undergo a single review and then could be applied to identical plants; and *manufacturing licences* for facilities that would be built and then installed at separately approved sites. The AEC later adopted these concepts in its regulations, which were continued in the original Part 52 and still are reflected in the recent updating of the rule.[42] The AEC would later add a fourth option, *replication*, by which approved designs could be used and only the site itself, or changes to the approved design would undergo agency review.

Although the AEC's efforts bore some fruit in its last years and in the early years of the NRC, the NRC recognised in its 1978 policy statement that the depressed market for new nuclear plant orders reduced the likelihood of extensive use of standard designs at that time.[43] Nonetheless, the NRC provided in the policy statement additional guidance on implementation of the standardisation options in addition to assurance, based on consultation with U.S. Department of Justice, that pursuit of standardisation would not *per force* raise concerns about anti-competitive behaviour under federal antitrust laws. A number of preliminary design approvals were granted under the reference plant concept but they subsequently expired, and no design was adopted through the rulemaking option provided in 10 C.F.R. Part 50, Appendix O. Only one manufacturing licence was issued for the Offshore Power Systems design, but it was never built.[44] Although about 20 applications were

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39. Special Inquiry Group Rep't, *supra* note 27, Vol. I at 139; see *op.cit.* at 141; Kemeny Commission Report, *supra* note 28, at 65.

40. Policy Statement on Standardisation of Nuclear Power Plants (28 April 1972).

41. *Hearings before the Joint Comm. on Atomic Energy on Nuclear Powerplant Siting and Licensing*, 93rd Cong. 2nd Sess., Vol. 2, 985-1005 (1974) (AEC bill H.R. 13484). See Shapar, H., and Malsch, M., *Proposed Changes in the Nuclear Power Plant Licensing Process: The Choice of Putting a Finger in the Dike or Building a New Dike*, 15 Wm and Mary L. Rev. 539, 549-50 (1974). The legislation also would have eliminated the mandatory construction permit hearing and ACRS review, at 545-46.

42. The manufacturing license concept was adopted as Appendix M to 10 C.F.R. Part 50 at *Standardisation of Design; Licenses to Manufacture Nuclear Power Reactors*, 38 Fed. Reg. 302151 (2 November 1973); Appendices N and O to Part 50 were adopted to reflect the duplicate plant and reference system concepts, respectively, at *Licensing of Duplicate Nuclear Power Plants; Review of Standard Nuclear Power Plant Designs*, 40 Fed. Reg. 2974 (17 January 1975). The three approaches are substantially included in the recent updating to Part 52. See 10 C.F.R. Part 52, Subparts E, F, and Appendix N, at 72 Fed. Reg. 49, 352, 49, 538-44, 49, 559 (28 August 2007).

43 43 Fed. Reg. 38, 954, 38, 955 (31 August 1978).

44. See *Offshore Power Systems*, LBP-82-49, 15 NRC 1658 (1982), *aff'd* ALAB-718, 17 N.R.C. 384 (1983).

submitted under the duplicate plant or replication concepts, only a few units, including the Callaway and Wolf Creek plants under the Standardised Nuclear Unit Power Plant System (SNUPPS) consortium and Commonwealth Edison's four Byron and Braidwood units, were licensed to operate.[45]

With utilities shedding construction plans in the late 1970s and with attention directed to reforms needed in the NRC and the industry in the wake of the Three Mile Island accident,[46] there was little resolve to pursue licensing reform and standardisation until the 1980s. As noted before, the two major studies of the Three Mile Island accident severely criticised the NRC's approach to plant licensing and recommended a greater encouragement of, if not mandatory, standardisation and a change to one-step licensing of any new plants. The Congressional Office of Technology Assessment issued a 1981 report on standardisation in response to House and Senate committee requests.[47] Chairman Nunzio Palladino, newly appointed to the Commission by President Reagan, established a Regulatory Reform Task Force in late 1981 to explore legislative and internal reforms of NRC's licensing process.

The NRC task force produced a legislative proposal that was published for public comment in the *Federal Register* prior to its submission by the Commission to the Congress.[48] The Department of Energy submitted its own legislative proposal on behalf of the Reagan Administration. Both bills contained the major aspects of the licensing process embodied in Part 52: combined licences, certified designs and site permits. Although hearings were held on this legislation, the bills never passed the Congress. The experience would repeat itself in 1985 and 1987.[49] Reform legislation was introduced, hearings were held, but no serious effort to enact the legislation gained ground.

By 1987, the NRC decided that it would pursue both a legislative and an administrative approach to encouraging standardisation and reforming its licensing process. While it continued to believe that legislation should be enacted, the Commission stated in a revised Policy Statement on standardisation that much of its legislative proposal could be accomplished under the NRC's existing statutory authority and that it would develop proposed regulations to address licensing reform and

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45. For a synopsis of early experience under the standardisation programme, see SECY-85-382, Memorandum from Dircks, W., Executive Director for Operations (EDO), to Commission, Standardisation Policy Statement, Enclosure 2 (4 December 1985). This document is available in NRC's Agency wide Documents Access and Management System (ADAMS) under Accession No. ML8512120471, www.nrc.gov/reactors/new-licensing/related-documents.html#history.

46. See generally Walker, Samuel J., *Three Mile Island* 209-25 (University of California 2004).

47. OTA Report, *supra* note 32.

48. Notice of Request for Comments on Proposed Legislation; Nuclear Standardisation Act of 1982, 47 Fed. Reg. 24044 (2 June 1982).

49. See *Hearings before the Subcomm. on Nuclear Regulation of the Senate Comm. on Environment and Public Works on Nuclear Licensing Reform: S.893 and S.894*, 98th Cong., 1st Sess. (1983); *Hearings before the Subcomm. on Energy and the Environment, House Comm. on Interior and Insular Affairs on Nuclear Licensing Reform: H.R. 2511 and 2512*, 98th Cong., 1st Sess., at 3 and 33 (1983) (NRC and DOE bills); *Hearing before the Subcomm. on Nuclear Regulation of the Senate Comm. on Environment and Public Works on Nuclear Regulatory Reform*, 99th Cong., 1st Sess. (1985); *Hearings before the Subcomm. on Energy and the Environment, House Comm. on Interior and Insular Affairs on Nuclear Licensing and Regulatory Reform Legislation*, 99th Cong., 2nd Sess., at 19 (1986) (NRC bill H.R. 1447); *Hearing before the Senate Comm. on Energy and Natural Resources on Nuclear Facility Standardisation Act of 1986, S. 2073*, 99th Cong., 2nd Sess. (1986).

standardisation.[50] The 1987 Policy Statement focused on the approval through rulemaking of the reference design concept in Appendix O to 10 C.F.R. Part 50 as the framework under which to encourage standardisation and thereby increase the efficiency of the review process and improve safety performance of future plants.

NRC fulfilled its commitment in the Policy Statement to develop its own regulations by publishing the proposed 10 C.F.R. Part 52 for public comment in August 1988.[51] The final rule was issued in April 1989.[52] Several advocacy groups challenged the final rule in a federal court of appeals. Although it sustained significant portions of the NRC's approach under Part 52, the three member panel that originally heard the appeal struck down the NRC's approach to hearings for combined licences. On *en banc* review, the entire court, however, reversed this initial determination and sustained the NRC's rule outright.[53]

Key features of and early experience with Part 52

In providing an overview of the key features and initial experience with the licensing process established under Part 52, the important aspects of the final rule and any significant changes since the rule's original adoption in 1989 have been identified. Although the principal approaches are the same, some features have been modified either to reflect the provisions of the Energy Policy Act of 1992, which codified significant aspects of Part 52, or as part of the significant updating of the rule that the Commission accomplished in 2007 to clarify the rule and to build on the initial experience with reviewing design certifications and early site permits.[54] The 2007 Rule was intended in part to bring greater clarity to the interrelationship among design certifications, early site permits and combined licences as well as to the relationship between the technical criteria and requirements in 10 C.F.R. Part 50 applicable to nuclear plants and the procedural requirements in Part 52. The revised rule was also intended to lay out in greater detail the licensing and hearing process associated with NRC findings on inspections, tests, analyses and acceptance criteria (ITAAC). These changes were directed at ensuring that the NRC's adjudication of contentions on ITAAC findings would not unnecessarily delay the licensee's scheduled plans for fuel loading and operation.

It should also be noted that the changes effected by the adoption of Part 52 focused primarily on the encouragement of greater standardisation and streamlining the licensing process but did not focus particularly on the procedures by which hearings would be conducted.[55] Although dissatisfaction with

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50. Policy Statement, *Nuclear Power Plant Standardisation*, 52 Fed. Reg. 34884 (15 September 1987). NRC General Counsel William C. Parler testified to such effect in 1988. See *Hearing before the Subcomm. on Energy and Power of the House Comm. on Energy and Commerce on Nuclear Licensing Reform*, 100th Cong., 2nd Sess., at 5-20 (1988).

51. Proposed Rule, *Early Site Permits; Standard Design Certifications: and Combined Licenses for Nuclear Power Reactors*, 53 Fed. Reg. 32, 060 (23 August 1988).

52. Final Rule, 54 Fed. Reg. 15, 372 (18 April 1989).

53. *Nuclear Information and Resource Service v NRC*, 969 F.2d 1169 (D.C. Cir. 1992), reversing in part, 918 F.2d 189 (1990).

54. See Energy Policy Act of 1992, Pub. L. 102-486, 106 Stat. 2776, conforming changes adopted at 57 Fed. Reg. 60, 975 (23 December 1992); Final Rule, *Licenses, Certifications, and Approvals for Nuclear Power Plants*, 72 Fed. Reg. 49, 352 (28 August 2007).

55. See 54 Fed. Reg. at 15, 373 (18 April 1989).

of AEC and NRC's hearing procedures surfaced as part of the overall critique of the licensing process, the question of how to conduct the hearing was largely left to other rulemaking efforts.[56]

Below is a description of the chief features of the licensing process established under Part 52: early site permits, standard design certifications, manufacturing licences and combined licences. Except as otherwise noted, the references to particular provisions of Part 52 are to the final rule published in August 2007.[57]

Early Site Permits (10 CFR Part 52, Subpart A)

An early site permit (ESP) is, in effect, a partial construction permit under the AEA which allows an applicant to resolve site suitability issues from a radiological safety and a security standpoint, environmental issues including the evaluation of environmentally superior sites and emergency preparedness issues. If granted, an ESP may be referenced in later applications for a construction permit and operating licence under Part 50 or a combined licence under Part 52.[58] An ESP may be granted for a period of 10 to 20 years and may be renewed for a similar period.[59]

To seek an ESP, the applicant must provide, among other things, a final safety analysis report that describes the number, type and thermal power level of the plants which may be built on the site, information about the site characteristics to allow evaluation of site suitability under the relevant requirements of 10 CFR Parts 50 and 100, an environmental report, and emergency preparedness information that can range from identifying major impediments to emergency planning to consideration of complete, detailed plans themselves.[60] The applicant does not need to specify the particular design being used, but may use a "plant parameter envelope", that set of values of plant design parameters that the applicant believes bounds the actual design characteristics of a plant which it might build at the site in the future. The applicant may also request authorisation to conduct limited construction activities prior to issuance of the ESP under a Limited Work Authorization (LWA), provided the necessary safety and environmental information is provided and a site redress plan is prepared should the applicant terminate activities under the LWA or be denied a construction permit or combined licence.[61]

To aid in the review of ESP applications, the NRC staff has issued a review standard.[62] In addition to conducting its review under applicable siting and safety criteria, the NRC must prepare an EIS in accordance with its regulations implementing NEPA in 10 C.F.R. Part 51. A hearing is required on the application under Section 189 of the AEA because an ESP is a partial construction permit.[63]

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56. See e.g. Final Rule, *Changes to Adjudicatory Process*, 69 Fed. Reg. 2, 182 (14 January 2004), *aff'd*, *Citizens Awareness Network, Inc. v NRC*, 391 F.3d 338 (1st Cir. 2004); Procedural Changes in the Hearing Process, 54 Fed. Reg. 33, 168 (11 August 1989), *aff'd*, *Union of Concerned Scientists v NRC*, 920 F 2d 50 (D.C. Cir. 1989).

57. 72 Fed. Reg. 49, 352 (28 August 2007).

58. See 10 C.F.R. §§ 52.13 and 52.73(a).

59. 10 C.F.R. §§ 52.26 and 52.33.

60. 10 C.F.R. § 52.17.

61. 10 C.F.R. §§ 50.10(c), 52.17(c), published at 72 Fed. Reg. 57, 416, 57, 442 and 57, 447 (9 October 2007).

62. RS-002, *Processing Applications for Early Site Permits* (2004) (ADAMS No. ML040700099).

63. 10 C.F.R. § 52.21.

The ACRS must also review the application.[64] Assuming the requisite safety and environmental findings can be made as prescribed in 10 C.F.R. § 52.24, the NRC may issue the ESP. In this regard, the NRC must find that the proposed inspections, tests, analyses and acceptance criteria (ITAAC), if any, including those for emergency planning, are "necessary and sufficient" to determine whether the plant has been constructed and will be operated in conformity with the licence, the NRC's regulations and the AEA. The ESP must also identify appropriate site characteristics, design parameters and other terms which, under the finality provisions of 10 C.F.R. § 52.39(a), the NRC generally may not change except to bring into compliance with NRC requirements existing at the time that the ESP is issued or are necessary to meet the fundamental "adequate protection" standard under the AEA.

In any subsequent proceeding on an application for a construction permit and operating licence under Part 50 or combined licence under Part 52 that references an Early Site Permit, those matters resolved in the ESP proceeding are deemed resolved and are not re-visited in subsequent hearings.[65] Under the 2007 revisions to Part 52, applicants for a combined licence which reference an ESP must identify, however, any new and significant information for issues resolved in the ESP proceeding and a description of the methodology for identifying such information.[66] This requirement may affect the efficacy of an ESP for early resolution of site issues.

Three ESP's have been issued to date for the North Anna, Grand Gulf and Clinton sites, all of which have existing reactor facilities located on them.[67] An additional ESP application for the Vogtle site is under review. A combined licence application has now been filed for the North Anna site which will incorporate the ESP by reference. The NRC does not expect to receive many ESP applications in the foreseeable future primarily because the applicants who have expressed interest in new plants are likely to apply directly for combined licences by which site suitability can be determined.

In some respects, the ESP reviews (which received some support from the U.S. Department of Energy) have been used as a test bed for the licensing process under Part 52, with an eye toward future combined licence reviews and hearings. Of the three ESP's issued, only the North Anna and Clinton proceedings involved contested issues raised by third party intervenors. The issues in both cases were resolved on the filings and did not go to trial. For the mandatory hearing required under Section 189, the Commission provided guidance on the conduct of the uncontested portions of the hearings and the role of the presiding Atomic Safety and Licensing Boards in conducting such hearings,[68] although the Commission has since indicated that it plans to conduct most mandatory hearings itself.[69]

Standard design certifications (10 CFR Part 52, Subpart B)

Design certification by rulemaking is the cornerstone of Part 52's provisions to enhance standardisation in a new generation of nuclear plants. Indeed, design certification rules were the first actions to be issued using Part 52 in the 1990s. To date, the NRC has issued four design certifications

64. 10 C.F.R. § 52.23.

65. See 10 C.F.R. § 52.39(c).

66. 10 C.F.R. § 51.50(c)(1); see 72 Fed. Reg. at 49431.

67. Dominion Nuclear North Anna, LLC (North Anna ESP), CLI-07-27, 66 NRC 215 (November 2007); Exelon Generation Co., LLC, (Clinton ESP), CLI-07-12, 65 NRC 203 (March 2007); System Energy Resources, Inc. (Grand Gulf ESP), CLI-07-14, 65 NRC 216 (March 2007).

68. *Exelon Generation Co., LLC, et al.*, CLI-05-17, 62 NRC 134 (2005).

69. See note 103 *infra*.

for the U.S. Advanced Boiling Water Reactor, the System 80+, the AP-600 and AP-1000 designs.[70] Part 52 allows any person to seek a certification of evolutionary light water reactor or advanced reactor designs, although advanced designs may require prototype testing.[71] The certification may be issued for a term of 15 years and may be renewed.[72] A certified design may be referenced in applications to construct or operate a plant under Part 50 or in a COL application under Part 52. Issues concerning the adequacy of a design which were resolved during the course of the design certification rulemaking are not reconsidered in a combined licence proceeding.[73]

The contents of the application are specified in 10 C.F.R. § 52.47 and must provide the essential information necessary to demonstrate that the design will comply with the NRC's radiological safety, environmental and security standards.[74] Among other things, the application must address relevant post-Three Mile Island technical requirements, information to close out generic and unresolved safety issues and severe accidents. The applicant must also provide a probabilistic risk assessment and identify the necessary inspections, tests, analyses and acceptance criteria (ITAAC) to verify proper installation of key design features. The NRC recently published for comment a proposed rule that would require applicants for design certification to assess the level of protection built into the design to avoid or mitigate the effects of a large commercial aircraft impact.[75] A final decision on the rule is expected in 2009.

Procedurally, design certifications are adopted through notice and comment rulemaking, although the Commission may, at its discretion, hold a legislative-style hearing on comments received on the proposed certification.[76] From the agency's standpoint, the rulemaking process, which is generally used to adopt generic standards and requirements, gives the NRC greater flexibility than adjudicatory procedures. Unlike agency adjudications which require demonstration of a person's particular interest affected by the proceeding and the specification of admissible issues for litigation, any person may comment on any aspect of the proposed design certification rule. The ACRS also reviews design certifications and reports on their safety aspects.[77] Although applicants were originally required to obtain a final design approval under the former Appendix O to Part 52, the requirement to

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70. See 10 C.F.R. Part 52, Appendices A through D.

71. Prototypes could be required for non-light water reactors or light water reactors with unique features or relying on untested principles. 10 C.F.R. § 52.41 and § 52.47(c) (2) [referencing § 50.43(e)].

72. 10 C.F.R. §§ 52.55 and 52.57.

73. 10 C.F.R. §§ 52.63 and 52.98.

74. See 10 C.F.R. § 52.48.

75. Proposed Rule, *Consideration of Aircraft Impacts for New Nuclear Power Reactor Designs*, 72 Fed. Reg. 56, 287 (3 October 2007). The rule would require an applicant to describe and evaluate "design features, functional capabilities, and strategies to avoid or mitigate the effects of the aircraft impact … objective of this rule is to require nuclear power plant designers to perform a rigorous assessment of design features that could provide additional inherent protection to avoid or mitigate, to the extent practicable, the effects of an aircraft impact, with reduced reliance on operator actions".

76. 10 C.F.R. § 52.51. Under the original 1989 rule, the Commission provided for an informal adjudicatory hearing before a Licensing Board which could request authorisation to employ more formal procedures such as cross-examination. The revised Part 52 provides that the Commission may in its discretion hold a legislative style hearing under 10 C.F.R. Part 2, Subpart O. Final Rule, *Changes to Adjudicatory Process*, 69 Fed. Reg. 2, 182 (14 January 2004).

77. 10 C.F.R. § 52.53.

do so was abolished in the 2007 updating of the rule.[78] After resolution of public comment and the ACRS report, the NRC will adopt a final design certification rule and publish it in the Code of Federal Regulations as an Appendix to Part 52. The rule incorporates by reference the applicant's detailed Design Control Document (DCD).

The issue of the sufficiency of the design information arose early after the promulgation of Part 52 in 1989, as the industry moved toward the development of the first proposed certified designs. Commission and industry viewpoints were often far apart on the level of design detail for a complete design– an issue that was at the very heart of the quest for standardisation and finality that had eluded the first generation of reactors. Although the full history of the debate over the level of detail design cannot be recounted here, eventually the NRC accepted several compromises on the level and importance of detailed design in the certifications. The NRC allowed a distinction between the essential information considered part of the certified design ("Tier 1") and other information ("Tier 2") approved in the rule but not "certified".[79] Tier 2 must be followed and might demonstrate, for example, how the Tier 1 requirements were met but is not subject to the same change and control requirements.[80] The NRC also reached a compromise on the level of detail by adopting a policy that permitted reliance on "Design Acceptance Criteria" (DAC) in lieu of detailed design information in some design areas in order to reach final conclusions on the safety questions required by 10 C.F.R. § 52.47.[81] The primary reasons offered by vendors for relying on DAC in lieu of detailed information involved

> "(1) technologies that are changing so rapidly that it would be unwise for the NRC to freeze the details of the design many years before an actual plant is ready to be constructed, and (2) design areas such as pipe stress and support analyses, where vendors do not have sufficient as-built, or as-procured information to complete the final design".[82]

The applicant must still develop ITAAC for the DAC to ensure verification that the as-built plant conforms to the certified design. The NRC encourages the development, to the extent practicable, of ITAAC that are objective and non-discretionary in order to maximise regulatory

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78. See 72 Fed. Reg. at 49442. The NRC still provides for issuance of Final Design Approvals in accordance with Subpart E to Part 52, although design certification is believed to be the preferred approach to obtaining early resolution of design issues. 72 Fed. Reg. at 49, 391. A Final Design Approval does not have the same binding effect as a design certification rule. 10 C.F.R. § 52.145.

79. See e.g. Notice, *Rulemakings to Grant Standard Design Certifications for Evolutionary Light Water Reactor Designs*, 58 Fed. Reg. 58, 664 (3 November 1993) (using Tier 1 and 2 definitions). See also SECY-90-377, Memorandum from Taylor, J., EDO, to Commission, Requirements for Design Certification under 10 CFR Part 52 (8 November 1990), available in NRC's Agencywide Documents Access and Management System (ADAMS) under Accession No. ML003707889, www.nrc.gov/reactors/new-licensing/related-documents.html#history and; Staff Requirements Memorandum from Chilk, S., Secretary, to Taylor, J., on SECY 90-377 (ADAMS No.ML003707892).

80. See e.g. 10 C.F.R. Part 52, Appendix D, § II.D and E (definitions in AP1000 certification).

81. See NRC Reg. Guide 1.206, *Combined License Applications for Nuclear Power Plants*, § C.III.5 (June 2007).

82. See SECY-92-053, Memorandum from Taylor, J., EDO, to Commission, *Use of Design Acceptance Criteria During 10 CFR Part 52 Design Certification Reviews* (19 February 1992) (ADAMS No. ML003707942).

stability and predictability and to enhance the possible replication of the "inspections and tests" exception to the conduct of hearings in the Administrative Procedure Act.[83]

Once a design certification is approved, the original Part 52 provided that no change would be made to a certification during its term unless the change is necessary for compliance with NRC requirements in effect at the time the certification was issued or to meet the statutory adequate protection standard.[84] This effectively enforced a higher degree of standardisation, but prevented the original design certification applicant from proposing design improvements to enhance safety or for other reasons or to complete detail previously left to DAC. In addition to the compliance and adequate protection criteria, the 2007 revisions to the rule adopted a broader standard for revision of a design certification by allowing any person, not only the design vendor, to request changes that would reduce unnecessary regulatory burden, provide necessary design detail to remove selected DAC, correct errors, substantially increase on a cost benefit basis overall safety, reliability or security, or contribute to increased standardisation.[85] To the extent that such changes are adopted by the NRC through a rulemaking to amend the certification, the changes are imposed on all plants referencing the design.[86] Westinghouse Electric Company has recently filed such an amendment application for the AP-1000.[87] The NRC is also reviewing three other designs for certification: the Areva U.S. EPR, the General Electric ESBWR and the Mitsubishi US-APWR.[88]

Manufacturing licences (10 CFR Part 52, Subpart F)

Although NRC has not issued a manufacturing licence since adopting Part 52 (and only one was issued under the original rule adopted in 1974), the Commission has continued to make this approach to standardisation available through its regulations. The manufacturing licence essentially allows a person to apply to fabricate a nuclear power plant at a location other than the one where it is to be installed and operated.[89] The manufacturing licence may be a useful option for the fabrication of small modular reactors under development. The primary change to the manufacturing licence concept is that a final design equivalent to that required for design certification or an operating licence under Part 50 must be submitted in order to receive approval of the licence.[90] The applicant must include ITAAC and an environmental report.[91]

A manufacturing licence application is subject to an adjudicatory hearing if requested by an interested person; an environmental assessment is prepared and the application is reviewed by the

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83. 5 U.S.C. § 554(a)(2).

84. See 10 C.F.R. § 52.68, 54 Fed. Reg. at 54, 392 (1989).

85. 10 C.F.R § 52.63.

86. 10 C.F.R § 52.63(a)(3).

87. See Notice, *Acceptance for Docketing of a Design Certification Rule Amendment Request for the AP1000 Design*, 73 Fed. Reg. 4, 926 (28 January 2008).

88. Information on the status of these reviews and combined license reviews and other information on the NRC's new reactor activities may be accessed at NRC's website at www.nrc.gov/reactors/new-reactor-licensing.html.

89. 10 C.F.R. § 52.153.

90. 72 Fed. Reg. at 49, 392; see 10 C.F.R. § 52.157. The applicant can reference a standard design certification. 10 C.F.R. § 52.158.

91. 10 C.F.R. § 52.158.

ACRS.[92] If the appropriate findings to support it can be made, the manufacturing licence may be issued for a term of 5 to 15 years.[93] The manufacturing licence has stricter provisions on finality as compared to a design certification. The NRC may not impose changes or modifications except to ensure adequate protection of public health and safety or to ensure compliance with the NRC requirements in effect at the time of licensing, and the licence holder may not make changes except by applying for a licence amendment.[94]

Combined licences (10 CFR Part 52, Subpart C)

A combined licence (COL) under Part 52 provides an authorisation to construct a nuclear power plant and a conditional operating licence. To date, no COL has been issued, but the NRC had received through, April 2008, applications for 15 new units. As noted above, a combined licence application may, but is not required to reference an ESP, a design certification, design approval or a manufacturing licence issued under Part 52.[95] To the extent it does so, the prior decisions made, for example, in the ESP, manufacturing licence, or design certification are not re-determined when reviewing the COL application. The applicant must show however, that the actual design of the facility falls within the site characteristics and design parameters specified in the ESP or the design certification.

As provided in 10 C.F.R. § 52.79, the applicant must provide all of the information necessary to support the findings that the facility can be constructed and operated in conformance with public health and safety and the common defence and security. The applicant must also provide ITAAC, described below, to verify the facility has been constructed in accordance with its design.[96] In addition, emergency plans meeting the NRC's emergency planning requirements must be submitted.[97] An environmental report is also required and must include information to address environmental issues not considered in a previous proceeding on the site or design, as well as significant new information pertaining to previously considered environmental impacts.[98] As noted for the ESP, the applicant may also seek a Limited Work Authorization which allows some construction activities to occur before the combined licence is issued.[99]

The ACRS must also perform a review of the application,[100] and the NRC must comply with its NEPA obligations in 10 C.F.R. Part 51 by preparing a draft Environmental Impact Statement (EIS) for public comment that addresses both construction and operational impacts and evaluates alternatives to

92. 10 C.F.R. §§ 51.54, 52.163 and 52.165.

93. 10 C.F.R. §§ 52.167 and 52.173.

94. 10 C.F.R. §§ 52.171. See 72 Fed. Reg. at 49, 392-93.

95. 10 C.F.R. § 52.73.

96. 10 C.F.R. § 52.80(a).

97. 10 C.F.R. § 52.79 (a)(21) and (25).

98. 10 C.F.R. § 52.80(b). NRC had previously issued draft guidance for preparing the environmental report, which may be subject to change to account for recent changes to the LWA rule. See NUREG-1555, Standard Review Plans for Environmental Reviews for Nuclear Power Plants (2000 and 2007 rev.).

99. 10 C.F.R. §§ 50. 10(d)-(f) and 52.91, as revised in Final Rule, *Limited Work Authorizations for Nuclear Power Plants*, 72 Fed. Reg. 57, 416 (9 October 2007). The revised LWA rule excludes certain preparatory activities from the definition of construction within NRC's jurisdiction to regulate.

100. 10 C.F.R. § 52.87.

the project. Environmental issues may be raised in the hearing on the COL, except to the extent that the COL application references an ESP for which the EIS remains valid. A final EIS is prepared that addresses the comments received. Under Section 657 of the Energy Policy Act of 2005, the NRC must consult with the U.S. Department of Homeland Security prior to issuing a licence for purposes of identifying vulnerabilities of the proposed location of the facility to a terrorist attack.[101]

The important distinction between the two-stage licensing approach and the COL is that *all* issues are to be decided up front, before construction begins, which begs the fundamental question as to whether or not compliance with the acceptance criteria (including what they should be) in the COL will provide reasonable assurance that the facility has been constructed and will operate in accordance with the Commission's requirements.

As with a construction permit under the two-stage process, a hearing is required before issuance of a COL under Section 189a. of the AEA. The hearing may be contested, if interested persons request a hearing, or uncontested. With respect to the hearing process, two recent developments are worth noting. First, the Commission has issued a policy statement providing additional guidance on the hearing process.[102] Among other things, the policy statement encourages consolidated consideration of cross-cutting generic issues in licence proceedings. The Commission also provides guidance on integrating combined licence hearings for applications that rely on a standardised design which is still undergoing review. Second, the Commission has recently indicated that it plans to hold uncontested hearings itself, rather than delegating them to a Licensing Board as has been the practice in the past.[103]

Two important aspects of the COL process have been shaped by specific legislation: the specification of acceptance criteria (ITAAC) in the COL and the procedural steps necessary for operation to commence under the COL. Previous discussion of ESP's and design certifications has alluded to the incorporation of ITAAC as acceptance criteria in those regulatory approvals. For the COL, a favourable decision on compliance with ITAAC is critical in order for the plant to begin operation. The ITAAC that are approved as part of the ESP or design certification are incorporated into the COL that relies on an ESP or design certification.

ITAAC and the nature of the post-construction hearing were addressed in the 1989 Rule. NRC had developed the ITAAC concept to answer the criticism lodged against the two-step process to the effect that operational decisions under it were undisciplined and subject to malleable acceptance criteria. In contrast to the old process, the NRC would approve a set of ITAAC at the time of initial licensing, which was intended to provide greater stability and predictability in making the decision whether the plant conformed to the accepted design and could commence operation. Thereafter, at periodic intervals during construction, the NRC staff would publish notices of the successful completion of ITAAC in the *Federal Register*.[104] In addition, the NRC, seeing no clear way under the existing terms of Section 189a. to wholly eliminate a second hearing *prior* to plant operation,

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101. Pub. L. 109-58, 119 Stat 814; *Memorandum of Understanding between NRC and the Department of Homeland Security Regarding Consultation Concerning Potential Vulnerabilities of the Location of Proposed New Utilisation Facilities*, 72 Fed. Reg. 9959 (6 March 2007).

102. *Conduct of New Reactor Licensing Proceedings*; Final Policy Statement, 73 Fed. Reg. 20, 963 (17 April 2008).

103. Staff Requirements Memorandum, Vietti-Cook, A., Secretary to Reyes, L., EDO, *et al.,* COMDEK–07-0001/COMJSM-07-0001 – Report of the Combined License Review Task Force (22 June 2007) (ADAMS No. ML071930224).

104. 10 C.F.R. § 52.99(e).

structured the second hearing to focus on the licensee's compliance with the ITAAC in the combined licence.[105]

The NRC's approach to the post-construction hearing became the focal point of the most serious challenge on judicial review of Part 52. As noted above, the panel of the federal appeals court that originally heard the appeal of NRC's rule held that the NRC could not limit its pre-operational hearing to questions of conformance with ITAAC.[106] Although the entire court sitting *en banc* reversed this initial determination and sustained the NRC's approach, legislation was enacted that codified in significant respects the NRC approach. Thus, the provisions on ITAAC and post-construction hearing are now guided by the provisions of Section 185b., a paragraph added by the Energy Policy Act of 1992:

> [A]fter holding a public hearing under Section 189a.(1)(A), the Commission shall issue to the applicant a combined construction and operating license if the application contains sufficient information to support the issuance of a combined license and the Commission determines that there is reasonable assurance that the facility will be constructed and will operate in conformity with the license, the provisions of this Act, and the Commission's rules and regulations. The Commission shall identify within the combined license the inspections, tests, and analyses, including those applicable to emergency planning, that the licensee shall perform, and the acceptance criteria that, if met, are necessary and sufficient to provide reasonable assurance that the facility has been constructed and will be operated in conformity with the license, the provisions of this Act, and the Commission's rules and regulations. Following issuance of the combined license, the Commission shall ensure that the prescribed inspections, test, and analyses are performed and, prior to operation of the facility, shall find that the prescribed acceptance criteria are met. Any finding made under this subsection shall not require a hearing except as provided in Section 189a (1)(B).[107]

In amendments to Section 189a. of the AEA, the Energy Policy Act of 1992 focuses the post-construction hearing on the ITAAC.[108] Under the amended Section 189a., the NRC is required, at least 180 days prior to anticipated fuel-loading of the reactor, to publish a notice of opportunity for hearing "on whether the facility as constructed complies, or on completion will comply, with the acceptance criteria of the license".[109] To be granted, a request for hearing must "show, prima facie, that one or more of the acceptance criteria in the combined license have not been, or will not be met, and the specific operational consequences of non-conformance that would be contrary to providing reasonable assurance of adequate protection of the public health and safety". If this is granted, then

> the Commission shall determine, after considering petitioners' *prima facie* showing and any answers thereto, whether during a period of interim operation, there will be reasonable assurance of adequate protection of the public health and safety. If the Commission determines

105. See 54 Fed. Reg. at 15,380-15, 381.

106. *Nuclear Information and Resource Service v NRC*, 918 F.2d 189, 194-196 (D.C. Cir. 1990), *rev'd* in part, 969 F.2d 1169 (1992).

107. AEA § 185b., 42 U.S.C. § 2235(b) (added by Energy Policy Act of 1992 § 2801, 106 Stat 3120).

108. 42 U.S.C. § 2239 (a)(1)(B), (added by Energy Policy Act of 1992 § 2801, 106 Stat. 3120-21).

109. 42 U.S.C. § 2239 (a)(1)(B)(i).

that there is such reasonable assurance, it shall allow operation during an interim period under the combined license.[110]

The Commission has discretion to adopt formal or informal procedures to govern the hearing and is directed, to the maximum extent possible, to render a decision within 180 days of the hearing notice or the anticipated date of fuel loading, whichever is later.[111] The statutory provisions on the post-construction hearing before operation under a COL are now reflected in 10 C.F.R. §52.103. The NRC also provides an opportunity for petitioners to seek modification of the terms of the COL, but such requests do not require a hearing on their merits and, even if granted, do not necessarily prevent operation or other activities pending their resolution.[112]

In preparing for the possibility of combined licence applications, the NRC has been faced with questions about the depth and extent of the ITAAC that will need to be developed to support a licence. Some of that discussion continues today, but one important issue resolved in recent years is the extent to which so called programmatic ITAAC are required for licensing. Although the need for acceptance criteria for construction of safety structures and installation of hardware was clear, there was no consensus on the need for such criteria to apply to programmes to cover radiological safety, quality assurance, operator training, physical security and the like. The Energy Policy Act of 1992 required ITAAC for emergency planning, but was otherwise silent. The Commission directed that the matter be put out for public comment and finally determined, contrary to the NRC staff's recommendation, that programmatic ITAAC would not be required for programmes other than emergency planning.[113] In the Commission's view, most operational areas could be resolved prior to issuance of the combined licence, but the Commission left open the possibility that programmatic ITAAC might be necessary in some limited areas.

A few final notes should be made on the combined licence provisions in Part 52. The term of the COL is 40 years from the time the NRC determines the acceptance criteria have been met or the period of interim operation begins in the event that an ITAAC hearing is commenced.[114] Like ESP's and design certifications, the terms of the combined licence are subject to the strictures of the backfit rule.[115] To the extent that amendments are made to the COL, the amendments may be made immediately effective pending the outcome of any hearing, similar to the procedures applicable to amendments to other reactor licences.[116] Like final NRC decisions on issuing construction permits and operating licences, issuance of a COL is subject to judicial review in a federal court of appeals.

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110. 42 U.S.C. § 2239 (a)(1)(B)(iii).

111. 42 U.S.C. § 2239 (a)(1)(B)(v).

112. 10 C.F.R. § 52. 103(f).

113. Notice, *Public Comment on Inspections, Tests, Analyses and Acceptance Criteria (ITAAC)*, 66 FR 33718 (25 June 2001). For a discussion of the history of ITAAC and this issue, see SECY-02-0067, Memorandum from Travers, W., EDO, to Commission, *Inspections, Tests, Analyses and Acceptance Criteria (ITAAC) for Operational Programs* (Programmatic ITAAC) (15 April 2002) (ADAMS No. ML020700641). Staff Requirements Memorandum, Vietti-Cook, A., Secretary, to Travers, W., EDO (11 September 2002) (ADAMS No. ML022540755).

114. 10 C.F.R. § 52.104.

115. 10 C.F.R. § 52.98.

116. 10 C.F.R. § 52.98(e); see AEA § 189a.(2)(B), 42 U.S.C. § 2239(A)(2)(B).

Ready for new build in the United States

The previous discussion has outlined the development and early experience with the NRC's revised licensing process for construction and operation of commercial power reactors. As noted, the NRC has under consideration several applications for new or amended design certifications as well as 15 combined licence applications with possibly that many more expected in the next few years. Most of these proposed plants are located in the south-eastern United States, along a crescent that stretches from North Carolina to Texas. The need for greater electric generating capacity in the region has certainly spurred interest in potential new nuclear construction. The Energy Policy Act of 2005 also provided incentives to new nuclear construction. This legislation extended the Price-Anderson Act, the comprehensive indemnification and liability scheme for nuclear incidents in the United States, through 2025.[117] The 2005 Act also provides for risk insurance for up to six reactors for costs in the event of delays in NRC's licensing process and for loan guarantees for nuclear and other projects using "innovative technologies".[118]

For the NRC, preparation for the expected new licensing work has required a focus on staffing and enhancing the regulatory infrastructure. The NRC gained over 200 additional employees last year. As experienced employees who were the technical reviewers, inspectors and lawyers during the wave of nuclear licensing in the 1970s and 1980s retire, the transfer of knowledge and experience has become an agency priority.

The NRC has also continued to work on the agency's readiness to handle new licensing. The NRC staff have revised key guidance documents, such as standard review plans and regulatory guides that are used to assess the adequacy of an application against the agency's regulations and standards.[119] The NRC also expects to adopt final rules in early 2009 which will update its security and physical protection requirements to reflect changes and enhancements made in response to the 11 September 2001 terrorist attacks in the United States.[120] The NRC staff are implementing a "design-centered approach" to reviewing applications by focusing technical reviews around the primary reactor designs and reaching decisions that can be applied across the COL applications referencing the particular design. The NRC hopes this approach will not only leverage its resources to carry out its licensing responsibility, but will also contribute to achieving standardisation and regulatory consistency. The NRC is also looking to gain insights from the Multinational Design Evaluation Programme (MDEP), which NRC established with its regulatory counterparts in France and Finland in 2005, as a way for national regulators to enhance co-operation, share experience and

117. AEA § 170c., 42 U.S.C. § 2210(c), as modified by Pub. L. 109-58 § 602(b), 119 Stat. 779 (2005).

118. Pub. L. 109-58 § 638 and Title XVII, 119 Stat. 791, 1117 (2005). The U.S. Department of Energy has implemented these provisions though rulemaking. See Final Rule, *Standby Support for Certain Nuclear Power Plant Delays*, 71 Fed. Reg. 46, 306 (11 August 2006); Final Rule, *Loan Guarantees for Projects that Employ Innovative Technologies*, 72 Fed. Reg. 60, 116 (23 October 2007).

119. Regulatory Guide 1.206, *Combined License Applications for Nuclear Power Plants* (2007); NUREG-0800, *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants* (2007); NUREG-1555, *Standard Review Plan for Environmental Reviews for Nuclear Power Plants* (2000 and 2007 draft rev.).

120. A proposed rule was published for comment. *Power Reactor Security Requirements*, 71 Fed. Reg. 62, 664 (26 October 2006). The NRC issued a revised design basis threat rule which informs security requirements in 2007. Final Rule, *Design Basis Threat*, 72 Fed. Reg. 12, 705 (18 March 2007).

research, and strive for convergence on acceptable technical requirements and reciprocity on oversight and other activities among participant countries that are undertaking or considering new reactors.[121]

The NRC has been engaged in earnest for more than 20 years in building a licensing framework to achieve the goals of greater standardisation and a more effective and stable decision-making process. The development of the new framework has come from a continuing dialogue over the years with various stakeholders, not all of whom are wholly satisfied, as the NRC developed the new process and tested it. Much has been achieved and new insights have come from the early experience with the new process. The most challenging test of whether the goals will be fully realised still awaits us as the NRC begins reviewing new plant applications.

121. The construction of the Olkiluoto plant in Finland, which uses the French Areva design that is being considered for design certification in the United States provided the impetus for MDEP. The OECD Nuclear Energy Agency (NEA) is now acting as the secretariat for MDEP, NEA (2006), NEA News, No. 24.2, OECD, Paris.

The EU and Non-Proliferation: Need for a Quantum Leap?

*by Roland Kobia**

The renewed interest in nuclear energy which is taking place within the wider framework of unabated growth in energy demand and consequential concerns with both security of supply and climate change, raises issues and calls for answers that go well beyond that context. Indeed, besides short and medium-term considerations and challenges, however important they indeed are, what is at stake might fundamentally be the peaceful future of international relations in the long-term.

In such a context, this paper will analyse the possibilities of a strategic and all-encompassing European policy that could constitute an efficient and structured system against non-proliferation. A full-fledged European "common policy" seems too ambitious at this stage, but a single overall framework could be set up for delivering European Union (EU) positions and actions. EU Member States and the EU institutions all agree on the basic fundamentals, i.e. that non-proliferation must be a priority and that proliferation constitutes a threat to the vital security interests of the EU. There is also wide consensus that answers do exist if political will exists. On the basis of these premises, one should endeavour to take a two-step approach: first, to gather all instruments, whatever their legal status under one single umbrella; secondly, to fill possible gaps to ensure an efficient non-proliferation policy under the same umbrella. There is a clear window of opportunity to set up a "non-proliferation culture" in the EU. It has the instruments to deal with two pillars of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), i.e. co-operation and non-proliferation.

This paper will concentrate on actions and developments at the level of the EU *sensu stricto*, i.e. where common actions under the EU umbrella are set up and contribute to the efforts in non-proliferation. It will not cover all measures and mechanisms under the "Nuclear Non-Proliferation Regime",[1] the integrated and evolving network of unilateral, bilateral, regional and multilateral treaties

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1. The notion of "regime" is not a legal concept but normally refers to an orderly system of measures that regulate a particular action or actions or a well-defined situation. However, in the area of non-proliferation, the situation is neither orderly in the sense of building-blocks organising a thought-out scheme nor is there a single authority organising the system. It is thus used here for lack of a better generic term, and hopefully in anticipation of a future when non-proliferation will indeed constitute an organised "regime".

and other standard-setting arrangements, which collectively provide a framework guiding the behaviour of states, international organisations, enterprises, associations and all non-state actors generally active in the nuclear sector.

For the purposes of this paper, the "utilitarian and teleological" prisms will be used. The *utilitarian*[2] perspective will aim at maximising the "net expectable utility for all parties affected by a decision or action"[3] knowing that traditional utilitarianism favours the options that bring about the best consequences and aim at the "good". The *teleological* approach will lie in an interpretation that favours the ultimate goals of any provision and action as well as their spirit, rather than accepting to remain in a more narrow exegetic interpretation that favours the strict letter thereof.

When it comes to non-proliferation, the EU occupies a particular place on the international chessboard and presents *sui generis* features:

- two nuclear-weapon states (NWSs);
- several Member States that could, technically speaking, become NWSs if they wished so;
- diverging opinions between Member States as to the use of civil nuclear energy altogether;
- Member States having multiple memberships in various bodies;[4]
- all Member States having an Additional Protocol with the IAEA;
- some Member States have deep-rooted traditions of neutrality and are committed to full disarmament;[5]
- Member States show different degrees of enthusiasm *vis-à-vis* their participation in NATO and their transatlantic vision;

and to add to the complexity

- increasingly varying socio-economic levels.[6]

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2. Utilitarianism is defined as "the way in which the major social institutions fit together into a single system, and how they assign fundamental rights and duties and shape the division of advantages that arise through social cooperation" by Rawls, R. (1978), "The Basic Structure as Subject", in *Goldman AKJ Ed.*, Values & Morals, Boston, Reidel, p. 47.

3. Kay, C., "Notes on Utilitarianism", January 1997, at http://webs.wofford.edu/kaycd/ethics/util.htm.

4. Some Member States are also members of other bodies, such as the G8, G10 and NATO 7-Group, which makes co-ordination even more difficult as these bodies have different but also sometimes overlapping mandates.

5. Sweden, Ireland and Austria have explicitly renounced nuclear weapons and participated in the "White Angels" group with other countries having a very strong attachment to non-proliferation (e.g. Australia, New Zealand, Canada). This group had a strong influence on the course of the Second NPT Review Conference.

6. Particularly since the last two accession rounds of the former Central and Eastern European Countries.

The European Union is thus a "microcosm of the multilateral world: a community of countries with different attitudes to the nuclear question. Any solution achieved by the EU could therefore provide a useful benchmark for the international community as a whole".[7]

One of the most striking points when analysing the regime of non-proliferation in the EU lies in the fact that the 1957 Treaty establishing the European Atomic Energy Community (hereafter referred to as "Euratom Treaty") is still considered separately from other political initiatives, or even from non Euratom-based legislative developments in the area of non-proliferation. In many instances, even in official documents of the EU, that segregation can often be witnessed. The contribution of the Euratom Treaty to the European Union Strategy on Weapons of Mass Destruction and vice-versa does not seem to have been publicly analysed so far. The various pillars of the EU seem to lack bridges linking them, an obvious shortcoming when analysing almost any area of European Union law or policy.

It is even more surprising that nothing comprehensive has ever been written in the doctrine on such an overall approach to the subject of non-proliferation. Therefore, this paper enters into a *terra incognita*. The aim is thus to develop ways and means to reconcile all instruments and tools which the EU has at its disposal in order to contribute to non-proliferation in a more holistic way. That means that a full-fledged European policy is still to be set up, in spite of major steps forward in recent years, notably the adoption of the European Union Strategy on Weapons of Mass Destruction. The EU does not maximise the use of all the instruments in its toolbox; action is still hampered by institutional constraints and anxiously preserved national sovereignties, even in areas that should ideally be dealt with at supranational level and thus reasonably be seen in an international context. If the EU policy in non-proliferation is seen as embryonic by some actors, it is not for the lack of instruments, but rather because of the way these instruments are used, or not used. This paper shall strive to present innovative paths in this respect.

A. Non-proliferation and the European Union in a political and historical context

Over the last few decades, non-proliferation has gained increasing importance as a major global security issue. The renewed interest in nuclear energy around the world, particularly outside Europe, will add to the need to remain attentive to the potential implications of the proliferation of Weapons of Mass Destruction (WMD). Indeed, in certain cases, the underlying reasons to engage in nuclear energy go beyond strict energy and economic considerations and have geopolitical, strategic and political goals. The EU is too important and powerful a player to remain passive or even sub-optimally efficient on a subject of such significance. It will have to face calls to act, and to follow-up, by maximising the use of its existing instruments, which often remain under-utilised. Non-proliferation is not an area in which the EU has acted in a way commensurate with its intrinsic potential.

While it has a range of instruments across the pillars, namely the Euratom Treaty, the Common Foreign and Security Policy (CFSP) and the European Security and Defence Policy (ESPD), a more important preliminary question is whether international actors and partners consider the European Union as a fully-fledged actor in non-proliferation. For many years, the EU kept a low profile and had little ambition in the realm of non-proliferation, and it has only recently shown that ambition more

7. Fischer, D. and Müller, H., "United Divided. The European and the NPT Extension Conference" in *PRIF Reports*, No. 40, November 1995, p. 46 cited by Trezza, C., "The EU between Non-Proliferation and Disarmament", *ISPI Policy Brief, Global Watch*, Issue No. 51, April 2007, p. 1.

forcefully. However, the United States has stated, at the highest political level,[8] that it considers the EU as an important player in non-proliferation. The International Atomic Energy Agency (IAEA) has also recognised the EU as an important player and as a partner in many instances. Many specialised international bodies expressly list the EU in their inventories of international and functional organisations active in that area.[9]

The international context has evolved rapidly over the last few years. It appears that since the United States has embarked on a slippery slope with its nuclear co-operation agreement with India, thereby questioning the very essence of the NPT, the EU could be considered as an emerging defender of the fundamental sense of non-proliferation. The terminology used in the European Council's Common Position[10] relating to the Review Conference of the Parties to the NPT is a striking example, as on paper, the 27 Member States of the EU have sound credentials in terms of non-proliferation: they have all signed and ratified the 1968 NPT and the 1996 Comprehensive Nuclear-Test-Ban Treaty (CTBT); they are members of the Nuclear Supplier Group (NSG) and the Zangger Committee and they all have an Additional Protocol with the IAEA in force. These are clear signs of legal and political commitments to non-proliferation and multilateralism. However, EU Member States have diverging views on nuclear altogether, be it for civilian or military purposes. If all European Union Member States agree that non-proliferation and disarmament are at the core of European Union policy,[11] opinions diverge as to how and when complete nuclear disarmament should be achieved.

The legal and policy bases for non-proliferation have existed since the early days of the European Communities, through the 1957 Euratom Treaty which primarily aims at fostering the development of nuclear energy but also contains a relatively advanced system of safeguards and export controls. However, conscious European Union action in the field of non-proliferation can only be dated to the 1980s,[12] when a working group on non-proliferation met under the European Political Cooperation in1981, and the foreign ministers of the then ten Member States issued an agreement on guidelines for nuclear export policy. The 1980s were the period some authors describe as that in which the "European Non-Proliferation *acquis*"[13] and the "accumulated body of experience"[14] relating to

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8. Statement of the President of the United States of America, Bill Clinton, to the Congress transmitting the Euratom-United States of America Nuclear Energy Cooperation Agreement, 29 November 1995, where he stated "that the European Union has…*impeccable non-proliferation credentials*…" (emphasis added).

9. See for instance Nuclear Threat Initiative (www.nti.org), the Centre for Non-Proliferation Studies at the Monterey Institute of International Studies (http://cns.miis.edu/) and the Arms Control Association (ACA) on their website at www.world-nuclear.org.

10. Common position of the European Union Council n° 2005/329/PESC of 25 April 2005, OJEC L106/32 of 27 April 2005.

11. See for instance the declaration by the European Union Presidency, then Portugal, on the occasion of the 30th anniversary of the entry into force of the NPT, 5 March 2000, on www.portugal.ue-2000.pt.

12. Before the 1980s, non-proliferation and disarmament had not been the objective of any concerted or organised European policy; rather, it mainly comprised bilateral initiatives and negotiations (Strategic Arms Limitation Talks, Strategic Arms Reduction Talks, FNI). The first common declaration adopted by the European Union was in 1987, at the occasion of the UN Conference on the peaceful use of nuclear energy, then in 1989 at the 33rd General Assembly of the IAEA (see CEA, *Note d'information*, n° 4, 1989, pp. 5-6).

13. Grand, C., "The European Union and the Non-Proliferation of Nuclear Weapons", Western European Union Institute for Security Studies, in *Chaillot Papers*, n° 37, January 2000, p. 6.

14. Feaks, D., "The Emerging European Disarmament and Non-Proliferation Agenda on Chemical and Biological Weapons", *The Acronym Institute, Disarmament Policy*, Issue No. 65, July-August 2002, p. 1.

nuclear non-proliferation started. Non-proliferation was then "established as a goal for EPC".[15] The modest profile which the EU had shown beforehand was just a sad confirmation of the famous way Mark Eyskens, a former Belgian Foreign Minister, had described the EU in 1991: "Europe is an economic giant, a political dwarf and a military worm". It took time for that condemnation to lead to a quantum change. Indeed, apart from some exceptions[16] and even through most of the 1990s, the EU continued on the path of its "soft security" approach, not managing to gather enough political consensus amongst its Member States to engage in issues such as non-proliferation, disarmament or the prevention of biological and chemical warfare. For almost ten years after the success of the NPT Review Conference, between 1994 and 2003, the EU launched no major initiative in the area of non-proliferation. It even seemed to step back,[17] accepting to be lead by the smallest common denominator between Member States.

Apart from some common positions and declarations from the Presidencies, that period of nuclear selfishness only saw two important initiatives: a common action in 1995 on the participation of the EU in the Korean Peninsula Energy Development Organization (KEDO) on the basis of Euratom[18] and a common action in 1997 on the promotion of transparency in export controls in the nuclear field.[19] The latter was politically more important and aimed at increasing the legitimacy and perennial character of export control regimes, a trust-building element between countries providing and countries buying nuclear technologies. In 1998, faced with an open crisis between India and Pakistan, the EU reacted weakly as Member States were divided, leaving the United States at the diplomatic forefront. In sum, progress towards common norms and joint actions having a real impact have been limited, uneven, and "given the collective diplomatic and economic weight of the EU States, the results of the policies have been limited".[20] However, the KEDO initiative should not be underestimated, at least at the level of principles (the merits of the case being less relevant as it ended in a dead end). It was an unusual exercise for the EU as it involved the European Commission, the European Council and the European Parliament working together and streamlining their positions on a topic of real importance. It should be used as a precedent to enable a more active participation of the EU in non-proliferation issues around the globe.

Fortunately, compared to this dull past, things gradually changed for the better, politically and legally. That can be explained by endogenous as well as by exogenous factors. Internally, since the

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15. Fischer, D. and Müller, H., "Non-Proliferation Beyond the 1985 Review", in *Centre for European Policy Studies (CEPS) Papers*, Brussels, n° 26, 1985, p. 34.

16. For example, the success reached on the basis of the joint action of the European Union under the Common Foreign and Security Policy, taken in view of the preparation of the Review and Extension Conference on the Non-Proliferation of Nuclear Weapons, in 1995.

17. The resumption of nuclear tests was announced by France in 1995 and triggered an internal crisis in the European Union.

18. The European Union participation in KEDO is basically financial. The interesting political aspect of KEDO lies in the fact that it shows the interest of the European Union in acting globally. A very recent common position of the European Council was adopted on 14 November 2007 which basically provides for the position of the European Union in the orderly winding up of KEDO and the termination of the light water reactor project. To that end, Euratom will remain a formal member of KEDO, but only to defend its financial and legal interests. See Council of the European Union, 14 November 2007, 14864/07/PESC.

19. Common action of 29 April 1997, http://ue.eu.int/pesc.

20. Anthony, I. (2001), "European Union approaches to arms control, Non-Proliferation and disarmament", in *SIPRI Yearbook 2001: Armaments, Disarmament and International Security,* Oxford University Press, 2001, p. 614.

mid-1980s, the EU has engaged in an almost continuous series of changes to its founding treaties. This quasi-permanent evolutionary mood led to structural changes, to increased common ambitions and above all, to a new political will in order to finally evolve into a recognised actor on the international scene. An obvious "quest for visibility" combined with a willingness to gain, in political terms, the influence the EU had in economic and commercial terms, clearly constituted strong drivers for change. The main "constitutional developments" and their links to non-proliferation are as follows:

1. The 1986 Single European Act (SEA)

It was the first major revision of the 1957 Treaty of Rome and, apart from its major goal of formally establishing the Single European Market by 1992,[21] it integrated for the first time in the treaty a reference to the previously informal European Political Cooperation. Since 1969, security issues, notably non-proliferation and disarmament, were increasingly on the political agenda but were tackled by initiatives under the European Political Cooperation, which itself was based on weak legal grounds, being merely a political and purely inter-governmental area. In formally introducing the concept of the European Political Cooperation into the treaty, it became the forerunner of the EU's later Common Foreign and Security Policy (CFSP).

2. The 1992 Treaty of Maastricht

Building on the European Political Cooperation, this treaty formally established the CFSP as the second pillar of the European Union, maintaining its intergovernmental character. The April 1990 Dublin European Council had decided to examine the need to amend the Treaty establishing the European Community (EC Treaty) so as to move towards European integration, thereby accelerating the political construction of Europe. The Dublin Declaration established the principle, taken up later by the United Nations Security Council, that proliferation was "a threat to global and regional security". The objectives of the Maastricht Treaty clearly went beyond the original economic objective and its political ambitions came to the fore.[22] The CFSP covers "all areas of foreign and security policy" and includes "all questions relating to the security of the Union", which provides a legal basis and a political ground to embrace non-proliferation and disarmament firmly within the scope of the EU. The entry into force of the Maastricht Treaty coincided with the accession of France to the NPT, five years after Spain, which opened new opportunities to agree on consensual policies. This resulted in a "major achievement of European diplomacy",[23] i.e. the fact that from 1994 to 1995 one of the first "joint actions" by the EU in the framework of CFSP was on non-proliferation of nuclear weapons, a success that was followed by Member States playing a determining role in the 1995 NPT Review Conference, together with the United States of America, to ensure the indefinite extension of the NPT.

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21. Although the European Community had been in existence for nearly 30 years, it had not achieved its aim of a genuine common market.

22. The Treaty of Maastricht responds to five key goals: to strengthen the democratic legitimacy of the institutions, improve the effectiveness of the institutions, establish economic and monetary union, develop the Community social dimension and to establish a common foreign and security policy.

23. Grand, C., *op.cit.*, p. ix.

3. The 1997 Treaty of Amsterdam

It aimed at creating the political and institutional conditions to enable the EU to meet the challenges of the future, such as the fight against terrorism, international crime and drug trafficking. The chapter on an "effective and coherent external policy" sets out the improvements made by the Treaty of Amsterdam to enable the EU to defend its interests more effectively on the international stage. The section on the CFSP promotes certain reforms,[24] which are instrumental in enhancing the efficiency of the actions of the EU in the field of non-proliferation, notably in toning down the distinctions between the different "pillars" of the European Union.

4. The 2001 Treaty of Nice

The institutional reform achieved in Nice has been described as "technical" and "limited". The Treaty of Amsterdam allowed for the possibility of closer co-operation within the single institutional framework, to enable certain Member States to work together in the interests of the Union, when not all of the Member States wanted to or could do so at that point. The mechanism, however, was hedged with strict conditions that limited the practical scope for its application. In order to make the mechanism more workable, the Treaty of Nice removed the right of each Member State to veto the launch of enhanced co-operation, currently provided for in the treaty. It requires a minimum of eight Member States for establishing enhanced co-operation and provides for the possibility of enhanced co-operation in the field of CFSP, with the exception of defence. It ensures that enhanced co-operation occurs within the framework of the European Union, respects the role of the institutions and allows the Member States that do not participate immediately to join in whenever they wish.

5. The 2007 Lisbon Treaty

On 13 December 2007, the new Reform Treaty was signed by Heads of State and Government in Lisbon. It needs to be ratified by all countries according to their national procedures before entering into force. Assuming it enters into force on 1 January 2009, its provisions may enhance the capacity of the EU to act more efficiently in the non-proliferation area. The Lisbon Treaty will indeed give the EU tools that can enable it to perform better on the international scene. Institutionally, some important changes will help ensure more coherence and possibly help to gradually "speak with one voice". This will be the case through the creation of a President of the European Union appointed for two and a half years and the strengthening of the role of the High Representative who will also be a Vice-President of the Commission in charge of all external relations. This should enhance the EU's capacity to combine political and financial powers to maximise leverage and political dividends.

Finally, it must be highlighted that the 1957 Euratom Treaty has never been substantially amended. It was only revised in the margins to take account of institutional changes in the EU, notably accession rounds and internal institutions, but its substantive provisions have never been changed. The

24. Notably the common strategy improved decision making thanks to greater use of qualified majority voting in the Council, the creation of the post of a High Representative for the Common Foreign and Security Policy to give it greater prominence and coherence, the establishment of a policy planning and early warning unit to encourage joint analysis of international developments and their consequences, the incorporation of the 1992 "*Petersberg tasks*" (humanitarian actions, evacuations, peace-keeping and civil crisis management) into the CFSP, to demonstrate the Member States' common desire to safeguard security in Europe through operations to provide humanitarian aid and restore peace, the simplification of the procedures for funding the CFSP.

Lisbon Treaty will not affect the Euratom Treaty, which will remain in force even if some adaptations will be made in a Protocol modifying it to ensure its compatibility with the new institutional set up.

External factors – such as the fall of the Berlin Wall and the German reunification, the collapse of communism in Eastern Europe, the first Gulf War in 1991 – led to a need, an opportunity and a commitment to reinforce the Community's international position. Later on, the events of 11 September 2001 and further terrorist attacks[25] led to an increasing awareness of the potential and actual effects of terrorism and thereafter to increased diplomatic and legislative activities.[26] It is particularly since the end of the Cold War that the EU has started to be more successful in the fields of non-proliferation and disarmament with notable operations promoting nuclear security in Russia and in the New Independent States, Ukraine, Belarus and Uzbekistan. Member States of the EU have also realised that international, regional or national terrorism are not threats that concern only specific Member States, or even only the United States of America. Several EU Member States[27] have been the target of terrorist attacks, thereby dramatically raising awareness of the potential for a more massive threat through WMD.

The signing of a privileged co-operation agreement by the United States and India on civilian nuclear co-operation on 2 March 2006[28] constitutes yet another event raising a particular concern. Analysts see it somewhere between a setback and the epitaph of the NPT.[29] Indeed, as the United States and the EU have been the most prominent defenders of the NPT, the fact that the United States acted in a way that "rewards a state that chose not to sign the NPT… and even further weakens the normative power of the NPT by lowering the incentive to stick to one's commitments",[30] raises doubts about the United States' current commitment to the NPT. It also weakens the latter in a period in which it is already going through a crisis of credibility and legitimacy. Even if it is composed of a series of commitments by both parties, the US-India agreement on civil nuclear co-operation marks a fundamental change in three decades of American policy on trade in nuclear equipment and applied technology which allowed no exceptions. This new situation might place the EU in a shrinking circle of unequivocal guardians of that treaty.

B. Instruments of the European Union in the context of non-proliferation

A renewed interest in nuclear energy – some call it a nuclear "renaissance" even if most of the time declarations and ambitions still need to be translated into facts – will inevitably increase the risks

25. The rise of fundamentalism and political Islam, the terrorists activities of some sects like Aum Shinrikyo in Japan, the anthrax letters episode, the Botox and Ricin experiments in Afghanistan, to mention but a few.

26. See for instance the initiative on the "implications of the terrorist threat on the non-proliferation, disarmament and arms control policy of the European Union", launched in the Council of the EU, conclusions of the 2397th meeting of the General Affairs Council, 15078/1, Brussels, 10 December 2001.

27. Spain on 11 March 2004 and the United Kingdom on 7 July 2005 notably.

28. This agreement was approved by the House of Representatives by a very large majority (369 against 68 votes).

29. For a balanced view, see du Preez, J., "Half Full or Half Empty? Realizing the Promise of the Nuclear Non-Proliferation Treaty", in *Arms Control Association*, December 2006, at www.armscontrol.org/; see also Michel, Q. (2007), Critical Reflections on the Treaty on the Non-Proliferation of Nuclear Weapons, in *Nuclear Law Bulletin* No. 80, p. 21.

30. Pelopidas, B., "Non-Proliferation through International Norms: a European Preference?", in *Cahiers Européens*, Centre d'études européennes, n° 02/2006, p. 18.

associated with that technology, notably the proliferation aspects. Even if the possession of nuclear energy for electricity generation does not entail an automatic proliferation risk *per se*, more nuclear installations, more transport of nuclear materials, more people involved in all sorts of nuclear activities will be synonymous with increased risks (security, safety, double standards, dual use and technical capacities). Many countries inside[31] and outside[32] the EU have declared that they want to engage in nuclear energy or reinforce their capabilities, and many have already taken concrete steps in that direction. Unless there is an accident, which could trigger the fear of "an accident anywhere is an accident everywhere", the nuclear market is bound to grow over the next years.[33] This could impact the non-proliferation system and may even jeopardize it if the right actions are not taken, particularly if more countries decide to engage in enrichment and reprocessing activities. This will also inevitably increase the need for close scrutiny by the EU and the IAEA through safeguards and safety and security instruments. There are indeed many steps of "latent proliferation"[34] in the nuclear ladder, ranging from no nuclear capability to the possession of nuclear weapons.

It has been shown in the previous chapter that the EU has gradually developed instruments capable of enabling it to play a greater role in the area of non-proliferation on the international scene. The toolbox is varied, but not yet organised into a coherent system where clear bridges exist, and institutional considerations do still, at times, prevail over effectiveness. This chapter reviews the most important instruments that can be used directly or indirectly in the fight against the proliferation of nuclear materials, equipment and technologies.

1. European Atomic Energy Community

The European Atomic Energy Community (Euratom) was created in 1957 "to establish the conditions for the development of nuclear energy in Europe by sharing resources (funds, knowledge, materials, experts etc.), protecting the general public and associating other countries and international organizations in this work".[35] Even if some words in the preamble to the treaty indicate that non-proliferation was an issue which its founding fathers had in mind,[36] and a number of provisions clearly have consequences on non-proliferation, the Euratom Treaty is often seen as a treaty that had "no

31. Countries as Poland, Romania, Bulgaria, Lithuania, Slovak Republic, France, the United Kingdom or Finland want to start or further their civilian nuclear capacity.

32. Many countries from the Middle East, North Africa, Asia, Latin America and Gulf have declared, sometimes at the highest political level, their willingness to engage in nuclear energy for peaceful purposes. Just to name but a few: Egypt, Morocco, Algeria, Tunisia, Libya, Saudi Arabia, Jordan, Vietnam, Argentina, Chile. Some have already concretely approached the IAEA and the European Union. On the reasons why some countries want to engage on the nuclear path and the relationship between armament and development, see the special Volume "Désarmement et Développement" (1986), in *Désarmement*, UN ed. Vol. IX, No. 1. Even dating back to the 1980s, the articles therein explain the fundamental problem and dialectics in a very real way.

33. This is particularly the case in the context of the current international agenda on climate change and skyrocketing oil and gas prices.

34. Müller, H. (1984), "Nuclear Proliferation: Facing Reality", Centre for European Policy Studies (CEPS) Papers, Brussels, No. 14/15, p. 16. The author identifies 13 different steps in the nuclear ladder.

35. Communication from the Commission to the Council and the European Parliament, "50 years of the Euratom Treaty", COM (2007) 124 final, SEC (2007), 347, adopted on 20 March 2007.

36. The preamble mentions "The peaceful development of atomic energy".

explicit Non-Proliferation goals".[37] The treaty more directly aimed at promoting the pooling of all resources, at regulating the development of a then new technology, at establishing a European Free Zone for nuclear fuel and at controlling the fuel cycle in the six founding states. However, it was only some years after the entry into force of the Euratom Treaty that the military aspects emerged with the French nuclear tests in Reggane in 1960. After 50 years of experience, it can be said that analysts understood from the very beginning that the Euratom Treaty had primary goals in the fields of nuclear energy and non-proliferation, but that it was ultimately a political endeavour.[38] Euratom was yet another example of an approach, using sectoral solidarities, to try and reunite a divided Europe mentally and physically wounded by two World Wars. It has shown "utmost flexibility in providing a common legal framework for NWSs and NNWSs alike".[39] Today, the Euratom Treaty has, to a certain extent, lost its promotional significance, particularly after the 1986 Chernobyl and 1979 Three Mile Island events, which heralded a strong decrease in interest in nuclear, but many of its provisions remain highly relevant in terms of non-proliferation.

In general terms, the fundamental political objective underlying the Euratom Treaty was to prevent proliferation – mainly by Germany – which was still suspected of building a nuclear capacity in secret. Notably the Commission "opinions" on new investments in the sector (Chapter IV) and the Community ownership of nuclear materials (Chapter VI) were designed so that some Member States (France in particular which was already a nuclear power at that time) could keep a close eye on what Germany especially was doing on the nuclear front. The safeguards chapter was simply a logical instrument to verify that the reported data/information was true, and an important tool to prevent proliferation.

Now that the Treaty establishing the European Coal and Steel Community (ECSC Treaty) has expired, the Euratom Treaty is the only remaining *lex specialis* at the level of primary law. Where its provisions are in conflict with those of the *lex generalis*, the EC Treaty, the former prevail over the latter. The Euratom Treaty has its own language, its own techniques, procedures and concepts (which have inspired some of the developments in the EC Treaty) and also its own philosophy. In a way, Euratom is more similar to the Statute of the IAEA than to its "fellow" Treaty of Rome and the late ECSC Treaty. This may be logical in a functional and sectoral perspective, but it also stems from political considerations as both the IAEA Statute and the Euratom Treaty were largely influenced by the United States of America in their early drafting stages.

At international level, the Euratom Community, on the basis of Chapter X (External Relations) has the capacity to enter into international agreements or conventions with states, international organisations or nationals of a third state. It has done so with its major suppliers (Canada, Australia, USA and more recently Kazakhstan) and with customers (e.g. Japan). However, the existence of a formal agreement is not legally compulsory as trade with Russia[40] shows. The European Union is a

37. Goldschmidt, P. (1987), "Proliferation and Non Proliferation in Europe", in Müller, H. (ed.), *A European Non Proliferation Policy, Prospects and Problems*, New York, Oxford University Press, p. 9.

38. See for instance one of the earliest articles on Euratom by Hahn, H.J. (1958), "Euratom: the Conception of an International Personality", in *Harvard Law Review*, Vol. 71, Issue 6, Cambridge (Mass.), pp. 1001-1056. More recently, see Fischer, D., "History of the International Atomic Energy Agency. The First Forty Years", IAEA publication, September 1997, pp. 435-438.

39. Grunwald, J., "Euratom Treaty History and the Way Forward", speech at the Nuclear Inter Jura Congress, October 2007.

40. Russia is not party to the World Trade Organization, neither part of the Energy Charter; trade between Russia and the European Union would gain in being framed at least by a new Partnership and Co-operation Agreement (PCA), which has been discussed for some time.

world leader in nuclear technology and masters the whole nuclear fuel cycle, notably enrichment, which is why its international relations bear important consequences on non-proliferation. In concluding these agreements, the EU ensures that non-proliferation aspects are covered (safeguards, additional protocols, respect of NSG guidelines, membership in IAEA conventions…). Likewise, bilateral agreements should be concluded with all countries willing to engage in nuclear activities with the EU, in addition to their compliance with the NPT and other IAEA Conventions.

1.1 Nuclear safeguards

Nuclear safeguards are laid down in Chapter VII of Title II (Articles 77 to 85) of the Euratom Treaty, which establishes a comparatively innovative system of nuclear material control and assigns to the European Commission regulatory and wide (unmatched at international level) enforcement powers. It was indeed given the task and exclusive responsibility of ensuring that fissile materials are not diverted from their intended and official use as declared by the users, whoever they are. At the time, the safeguards system in the European Community "reflected the United States of America bilateral requirements, but gave Euratom direct responsibility for fulfilling security demands".[41] The European Union safeguards system is a supranational system in which sovereign rights have been transferred from Member States to the European Commission,[42] which has to perform conformity and finality controls. Broadly speaking, as safeguards provisions are described in a minimalist way, as is often the case in primary law instruments, safeguards cover "three functions: accountancy, containment and surveillance and inspection".[43] But in the EU system, the provisions on nuclear safeguards also have a further objective, which is to guarantee that the Community complies with its international obligations concerning the supply and use of nuclear materials. Thus, nuclear safeguards notably take the form of inspections[44] and related nuclear material accountancy. Safeguards constitute the frontline in the fight against non-proliferation as they aim at ensuring that there is no diversion of nuclear materials from declared activities to non-peaceful purposes, such as illicit trafficking or making a nuclear explosive device. They are thereby a key factor for the more general concept and objective of nuclear security, which also includes physical protection.

The Commission revised its approach to safeguards in 2007 to emphasise the role of the nuclear operator bearing prime responsibility for material control within its installation. The Commission now wants to intervene as an oversight body, through appropriate control and direct legal action when required. Fulfilment of this primary responsibility of the operator will be assessed through independent verification of nuclear material flows and inventories and of installation characteristics, along with audits of the systems of nuclear material accounting and control (NMAC) of the nuclear operator. The Commission services will seek assurance that nuclear operators implement a nuclear material

41. Patel, B. and Chare, P. (2007), "Fifty years of safeguards under the Euratom treaty – a regulatory view", in *ESARDA Bulletin*, No. 36, p. 4.

42. In this sense see Carchon, R. (2006), "La Non-Prolifération d'armes nucléaires et les contrôles internationaux", updated by van der Meer, K., in *Centre d'étude de l'énergie nucléaire (CEN.SKC)*, Boeretang, p. 28.

43. Stoiber, C., Baer, A., Pelzer, N., Tonhauser, W. (2003), "Handbook on Nuclear Law", IAEA, p. 121.

44. European Union nuclear inspectors – a body of around 180 individuals – have wide-ranging powers to apply nuclear safeguards. They must be granted free access at all times to nuclear material in all civil nuclear installations. The Commission may impose penalties on people and undertakings failing to meet their obligations under the safeguards regime. Sanctions can go up to the withdrawal of nuclear material from installations. This system of inspections has been at the origin of and has created a precedent for other areas of European Union law (competition notably), which inspired themselves from that Euratom "supranational" system.

accounting and control system that is credible, effective and using data based on measurements conforming to the latest international standards. This system has to be able to provide an accurate and timely account of the location and quantity of nuclear materials under its control and therefore be able to detect with high assurance in a timely fashion any losses or apparent losses. This system imposes responsibility on operators and can thus create yet another line of defence against non-proliferation.

When analysing the European contribution to non-proliferation, one should remember that the EU safeguards were the first full-scope safeguards. Without the need for additional instruments, they cover all nuclear material within the EU and thus most of the nuclear material used in the nuclear fuel cycle is subject to safeguards. Given that the EU has the largest enrichment and reprocessing plants (Urenco, Areva/Eurodif and GB2) within its borders, such plants are under a strict EU safeguard system, which leaves room for IAEA controls under the IAEA/Euratom co-operation agreement.[45] Thus Euratom acts as a primary safeguards authority and transmits reports to Vienna. The only other case where commercial-scale enrichment and reprocessing plants need to be safeguarded outside Euratom in a NNWS is in Japan, where some material losses have raised concern.

The Euratom experience could therefore be useful in enhancing other systems and practices. This, nevertheless, requires an "umbrella system" which ensures mutual confidence in delocalised systems as regional systems are nothing more than "self-inspection"[46] by states that share enough mutual interests to engage in regional dynamics and could thereby trigger suspicion from other parts of the world. The development of a network of regional systems[47] should thus be promoted, but only under the overall control of the IAEA, which should be allowed to cross-check the monitoring done at regional or national (Japan) levels and be granted the widest inspection possibilities. Since the accession of all EU Member States to the NPT and since the conclusion of the IAEA/Euratom agreement, the two systems have increasingly converged.[48] The EU system, because of its maturity, could be "exported" and used by other regional organisations, and some of its more integrated features could be taken over by the IAEA if political hurdles can be overcome. The EU system indeed still differs from IAEA safeguards on a number of points:

- Euratom safeguards do not need additional instruments to ensure a full-scope system as they directly stem from treaty provisions;
- Euratom safeguards are based on a legal obligation stemming from an instrument of primary law while the NPT for instance only has a contractual character;
- Euratom covers uranium ore, at least in principle while the IAEA covers further processed materials; and

45. INFCIRC/193. The IAEA/Euratom relationship is notably based on the model agreement INFCIRC/153.

46. Wilmshurst, M.J. (1984), "The Development of Current Non Proliferation Policies", in *The International Nuclear Non-Proliferation System. Challenges and Choices*, Simpson, J. and McGrew, A. ed., Macmillan, p. 41.

47. The Tlatelolco, Rarotonga, Bangkok and Pelindaba Treaties are examples of laudable attempts to tackle proliferation on a regional or continental basis. There are also examples of smaller scale such as the 1990 agreement between Argentina and Brazil creating a bilateral inspectorate to apply full scope safeguards in both states.

48. For example, previously, Euratom safeguards did not formally prohibit the military from non-peaceful uses of nuclear plants and material but simply verified that the material was used in conformity with the purpose stated by the user or with agreed supply conditions; that accommodated France at the time as a NWS in the making.

- in some instances EU nuclear inspectors can serve in the state of their nationality, which is not a practice in the IAEA apart from isolated exceptions.

With regard to experience, the EU system of safeguards has a very good track record. The system has existed since 1957, which gives the European Union an experience hardly matched. Not only do the safeguards function at a European Union level, they have contributed to a wider international system of control under the auspices of the IAEA since 1970. The IAEA also has a remarkable safeguards record, even if some particular cases[49] have shown the limits of safeguards, notably of safeguard methods (material accountancy, use and performance of containment and equipment surveillance) and of certain safeguards procedures.[50] But the strain on the nuclear safeguards system has increased over the years and is likely to increase even more if the renewed interest for nuclear energy is confirmed.

A heightened collaboration between the IAEA and actual or future regional organisations performing safeguards, notably the EU, is therefore needed more than ever. To foster the entry into force of the strengthened safeguards system, the EU and Member States have signed additional protocols with the IAEA that foresee a wider range of controls to ensure that there is no undeclared material or in nuclear or non nuclear facilities suspected of being used in potentially proliferation-prone activities. Also, with the Safeguards Agreement[51] between Euratom, the European Union NNWSs and the IAEA, the Commission collects all nuclear material accountancy information from European Union installations and submits them in a consolidated way to the IAEA. However, there is still room for improvement. Some issues remain unsettled in the relations between the IAEA and Euratom, such as the issue of unannounced IAEA inspections according to the standards of the Additional Protocol; but if some outstanding points still need to be overcome, in general the *modus vivendi* between the two actors is on the right track.

Recently, the relationship between IAEA and Euratom has improved significantly in terms of good co-operation and constructive spirit, and both parties now recognise that the period of past tensions is behind them. The IAEA/Euratom Joint Statement on "Reinforcing Cooperation between Euratom and the IAEA", which was signed on 7 May 2008, is a concrete sign thereof. The division of labour and the need to avoid duplication of work should ensure optimised use of scarce qualified workforce and is all the more necessary as the EU grows in the number of its Member States.[52] Economies of scale in safeguarding activities become an unavoidable necessity to ensure cost-effectiveness and efficiency in a potentially increasing nuclear world. The IAEA itself would welcome a stronger involvement of the EU in the Iranian case, exploiting technical tools for political purposes, thereby helping to dissolve the current crisis.

Nuclear safeguards in the EU are an important tool, which has proved its utility, but they are not a panacea. They are a necessary but insufficient instrument to prevent diversion of nuclear material, both in relative and absolute terms. In relative terms, safeguards are only one pawn on the wider non-proliferation chessboard but more importantly, nuclear safeguards in the European Union could be

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49. Iran, Iraq, Libya, Democratic People's Republic of Korea.

50. On that subject, see Fischer, D. and Szasz, P. (1985) "Safeguarding the Atom. A Critical Appraisal", in *Stockholm International Peace Research Institute (SIPRI)*, Taylor and Francis ed., London and Philadelphia, pp. 47-66.

51. INFCIRC/193.

52. For an analysis of the interaction between Euratom and the IAEA, see Thorstensen, S. and Chitumbo, K., "Safeguards in the European Union: the New Partnership Approach", *IAEA Bulletin*, Volume 37, No. 1, online at http://f40.iaea.org/worldatom/Periodicals/Bulletin/Bull371/chitumbo.html.

stepped up in absolute terms. Indeed, the provisions of the Euratom Treaty that lay its legal basis could be interpreted in a way that would give Chapter VII enhanced utility. The safeguards system, essentially *a posteriori*, could develop some *a priori* mechanisms for the most sensitive cases.

Finally, it is worth noting that nuclear safeguards should not be confused with physical protection, nuclear safety or even radiological protection, as these are distinct concepts even if some overlapping and complementarities do exist.[53]

1.2 Physical protection of nuclear facilities

The Convention on the Physical Protection of Nuclear Material[54] (CPPNM) is the reference international legislation and the first international treaty to establish standards on physical protection of nuclear materials.

The need for physical protection exists for nuclear material in storage, use or transit. European Union Member States as parties to the CPPNM apply the convention in using the recommendations of the IAEA. Modalities reflecting the structures and internal organisations of Member States may vary from one Member State to another, but the core principles have to be abided by. The Commission and European Union Member States are proceeding with the ratification of the revised convention. Euratom's accession to the CPPNM was approved by the European Council on 10 July 2007 and Commission Decision on 19 December 2007 concerning the deposit of the instrument of accession with the Director General of the IAEA.[55] The Council will co-ordinate the simultaneous deposit of instruments of accession of Euratom and its Member States to the amended CPPNM, in accordance with the procedures established in Article 102 of the Euratom Treaty.

Many proposals and ideas have been flagged over the years as to how to increase physical protection. The idea of creating international plutonium storage facilities is not a new one, but is certainly attractive in terms of non-proliferation. Both the Statute of IAEA and the Euratom Treaty contain provisions that could allow respective authorities to establish these facilities for the deposit and common control of fissile material. The issue is more political than technical. The safeguards system would have to be adapted, at least at IAEA level.

At this point, the importance of safety as a non-proliferation instrument should be pointed out. There are very tight links between safeguards and safety and between safety and security in general. The absence of expertise, of skilled workforce, of a relevant legal framework and of a sufficient safety culture in most of the countries that envisage embracing nuclear power will not only increase safety and security risks, but will also increase the burden on countries that will have to provide material equipment and technology. This will, in turn, lead to a rise in safety[56] and radiological risks. The

53. See Jankowitsch-Prevor, O., speaking about the "three S concept of safety, security and safeguards" in "New frontiers of nuclear law: is there an emerging international legal regime on nuclear terrorism", speech at Nuclear Inter Jura Congress on 3 October 2007, p. 1.

54. INFCIRC/274/Rev.1, IAEA, Vienna, 1980.

55. Council Decision 2007/513/Euratom of 10 July 2007 and Commission Decision of 19 December 2007 concerning the accession of the European Atomic Energy Community to the Convention on the Physical Protection of Nuclear Material and Nuclear Facilities (2008/99/EC, Euratom).

56. The Convention on Nuclear Safety will be essential in this regard. For an analysis of the convention, see Jankowitsch-Prevor, O., "The Convention on Nuclear Safety", *op.cit.*, p. 156.

European Union has an effective Nuclear Safety Cooperation Instrument[57] for this purpose. Under this new tool, EUR 525 million (2007 to 2013) will be available to improve safety, protection against ionising radiation, waste management and safeguards in a wider geographical scope than its predecessor as it now has a global geographical scope.

1.3 Control of exports of nuclear materials

Very few states are, or can objectively be, self-sufficient in the development and use of nuclear material and technology. This situation is likely to be more apparent in the future if the development of nuclear technology is put into action. Therefore, the need for transfers between providers of material and technology and buyers thereof will increase. In a context of non-proliferation, that calls for an enhanced system of control and monitoring of cross-border movements, in other words of a "policy of denial".[58] The NPT contains obligations in this regards (Article I, II and III notably). The Euratom Treaty and its secondary legislation also address the import and export of nuclear materials as export and import controls concern virtually all states, whether they are exporting, importing or transit states.

Uncoordinated action in controlling exports and imports has shown its limits in the past. With the creation of the Zangger Committee and the London Club in the mid-1970s, the foundations of a co-ordinated approach emerged. That came as a complement to the NPT, the provisions of which could not guarantee that entirely.

The EU plays its part in ensuring that nuclear export controls are as robust as possible. The Council Regulation on dual-use items[59] sets up a legally-binding Community regime for the control of dual-use items and technology, which may be exported outside the EU only after a valid authorisation has been granted. This regulation even provides for derogations to the normal principle of free movement of goods inside the European Union.[60] The EU also assists third states in enhancing their export controls. Export control is also linked to safeguards; "safeguards and ... export controls must be compatible with each other and provide for consistent organizational arrangements".[61]

The so called Shipment Directive[62] provides for prior notification and compulsory approval of all shipments of radioactive wastes and spent fuel between Member States and in case of imports or exports outside the EU. This directive has just been amended and its scope enlarged; the amended directive will enter into force on 25 December 2008. Also linked thereto, the Euratom Directive on sealed sources requires Member States to control the movement of high activity sealed radioactive sources,[63] the purpose of which is to prevent exposure to ionising radiation arising from inadequate controls and to harmonise requirements at European Union level. By virtue of the system of prior

57. Council Regulation (Euratom) 300/2007 of 19 February 2007, OJEC L81 of 22 March 2007, pp. 1-10. This instrument replaces, the previous TACIS Nuclear Safety Programme, which allocated no less than EUR 1.3 billion to New Independent States between 1991 and 2006.

58. Sanders, B. (1998), "A Short History of Nuclear Non-Proliferation", *Nuclear Law Bulletin*, No. 62, p. 16.

59. Council Regulation 1334/2000 of 22 June 2000 setting up a Community regime for the control of exports of dual-use items and technology, as amended.

60. Annex IV of Council Regulation 1504/2004 provides for the list of items for which there are exceptions.

61. Stoiber, C., Baer, A., Pelzer, N., Tonhauser, W. (2003), *Handbook on Nuclear Law*, IAEA, p. 135.

62. Council Directive on the shipment of radioactive waste and spent fuel, 92/3/Euratom.

63. Council Directive 2003/122/Euratom, adopted on 22 December 2003 on the control of high-activity sealed sources and orphan sources.

authorisation for any practice involving high activity sources, together with the tracking, identification and marking of sources (specific provisions are made for orphan sources also), this instrument is an important preventive complement to non-proliferation instruments.

1.4 Joint Research Centre of the European Commission

The European Commission's Joint Research Centre (JRC), set up under Article 8 of the Euratom Treaty (Title II, Chapter 1), could further the EU's contribution to non-proliferation, by for instance working on the dialectics between current ideas that try to prevent proliferation and expected future technological developments. There is a real question as to whether the latter is going to outpace some non-proliferation initiatives currently under discussion. Future generation reactors such as the Generation IV nuclear energy systems will most probably be more proliferation-resistant (e.g. with sealed fuel cores) than current ones and if spent fuel, reprocessing and security issues are reduced or largely solved by future technologies, this would decrease the necessity of initiatives like multilateral fuel supply assurances (e.g. GNEP[64]), multinational fuel-cycle centres, stronger export guidelines and enhanced self-restrictions by nuclear fuel suppliers.

1.5 Euratom Supply Agency

The Euratom Supply Agency (ESA) was set up in 1960 on the basis of the Euratom Treaty which aimed at establishing a common European policy of supply by granting the ESA a specific status and *sui generis* powers (*inter alia* right of option, exclusive right to conclude contracts, its own legal personality, financial autonomy). Chapter VI of Title II of the Euratom Treaty provides that the Community is responsible for ensuring that all users in the EU receive equitable and regular supplies of ores and nuclear fuels, and the monitoring of supplies is entrusted to the ESA, which is to guarantee a balanced supply and demand in the EU. The activities of the ESA are closely linked to nuclear safeguards.

The ESA's major difficulty lies in the gap between its powers and objectives on paper and the way it has worked over time. Member States have, since the very outset, been rather reluctant to see this supranational agency using all the powers it has been given. Many of its provisions have either never been used or have been used in a 'soft' way with simplified mechanisms basically depriving ESA of its real potential leverage. The problem might stem from the fact that management and regulation can bring conflicts of interest. Indeed, "the mixture of roles has not worked well… and the ownership of nuclear fuel by Euratom… has remained purely nominal".[65] Blurring property ownership rights and (self) safeguards can indeed bring difficulties. But, in view of the fact that "compared to previous years, the outlook for demand shows more potential for increase",[66] ESA's scope is bound to become more important.

Today, ESA's contribution to non-proliferation is essentially centred around the verification of supply contracts to ensure that they are concluded for peaceful purposes and that they contain a safeguard clause to initiate the Commission's export authorisation procedure (for nuclear materials produced in the EU), and to check the validity of supply contracts when nuclear materials are physically imported into the EU or exported from there. These are important tasks in non-proliferation,

64. Global Nuclear Energy Partnership (GNEP) is a comprehensive strategy to*, inter alia*, increase US and global energy security and reduce the risk of nuclear proliferation.

65. Müller, H., "Short-term steps on the multilateral fuel cycle arrangements: screening through the proposals", paper presented at the IAEA General Conference, 25 September 2006, p. 3.

66. Euratom Supply Agency Annual Report 2006, Publication of the European Communities, 2007, p. 11.

but ESA could a more important non-proliferation actor. Concretely, if the Japanese multilateral fuel cycle proposal,[67] or something along these lines, was to become a reality requesting IAEA to step up its work as an international market monitoring agency, then the ESA could provide expertise and experience to the IAEA with modalities of co-operation to be determined. Also, in cases of contracts concluded for the supply and/or return of nuclear fuel, a quadrilateral approach (between the importer, the exporter, the IAEA and Euratom/ESA) to these contracts could enhance effectiveness.

2. European Union strategy on weapons of mass destruction

In the wake of a more general "European Security Strategy", the European Council at the Thessaloniki Summit adopted its "European Union Strategy Against the Proliferation of Weapons of Mass Destruction" (hereafter the "Strategy") on 12 December 2003.[68] It is important to note that this Strategy has been adopted at the level of the European Council, the highest political level of the EU gathering Heads of State and Government. Thus, while non legally-binding, it bears a very high political commitment. The EU has formally entered a field that would previously have been regarded as a *chasse gardée* of NATO, and is thereby bold as to the transatlantic significance.

This Strategy is linked to the post-September 11 fight against terrorism and to the various international obligations stemming from different instruments. It is a pragmatic document which is completed by a concrete action plan that tries to improve a situation in which the EU was ill-equipped. It puts emphasis on the fact that non-proliferation, disarmament and arms control policy can make an essential contribution to the global fight against terrorism by reducing the risk of non-state actors gaining access to WMD, radioactive materials and all means of delivery. Apart from its international commitments, the EU has its own endogenous reasons to give greater political attention to non-proliferation. Indeed, on top of the renewed willingness of the EU to emerge as a global player (see *supra*), it has realised that terrorism and the threat that WMD pose also concerns Europe.[69]

The cornerstone of the Strategy is multilateralism and confirms once more the commitment of the EU to an international treaty system that provides the legal and normative basis for all non-proliferation efforts. The EU continues to play a very active role[70] in multilateral non-proliferation and disarmament fora, such as its positions on the NPT, IAEA safeguards agreements and additional protocols, the Chemical Weapons Convention and the Biological and Toxin Weapons Convention. The Strategy also contains other guiding principles, such as the mainstreaming of non-proliferation in all policies and agreements,[71] support to multilateral institutions, the commitment to co-operate with

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67. Proposal presented in 2006 (INFCIRC/683), which involves supplier states regularly informing the IAEA of the capacities of all their front-end production capacities, i.e. enrichment, conversion, fuel fabrication.

68. The strategy also recalls the conclusions of the 10 December 2001 European Council on the implications of the terrorist threat on Non-Proliferation, disarmament and arms control policy of the European Union.

69. Beyond the events of 11 September 2001, several European Union Member States have been the victims of terrorist acts over the last years (UK, Spain, France).

70. For a recent updated summary, see the last "Sixth-monthly report on the implementation of the European Union Strategy against the proliferation of Weapons of Mass Destruction", Council of the European Union, 2007/II, 11 December 2007, No. 16411/07.

71. The European Council of 17 November 2003 decided to include WMD provisions in all future agreements with third countries. The clause requests full compliance with multilateral obligations and fosters steps for future adherence to other relevant multilateral instruments. Such "Weapons of Mass Destruction" clauses have already been included in the agreements between the European Union and

like-minded partners, and the recognition that increased efforts are necessary. However, being part of a multilateral system has *per se* little relevance. What is needed is a multilateral system that is efficient and reaches its goals. For the future, the European Union therefore intends to do more, notably to reinforce compliance.[72]

Under the new 2007 "Instrument for Stability"[73] the EU will have resources to continue and strengthen work to enhance security against nuclear proliferation threats. This will enable the Commission to go beyond the present scope of the G8 Global Partnership co-operation with countries in the area of the Former Soviet Union. In areas such as export control and illicit trafficking in nuclear and radiological materials, the Commission will be able to support the European Union WMD Strategy at the global level. Under the Instrument for Stability, in the period 2007 to 2013, over EUR 260 million will be available for risk reduction activity on WMD including in the nuclear area. Amongst others, it will allow for border security improvements in regions with proliferation concerns and strengthening third country export controls.

With and within the Strategy, the EU could work with other partners on the feasibility, development and eventual political promotion of other initiatives to reduce the risk of diversion of nuclear material, to facilitate the implementation of safeguards and to reduce the need for international transport of nuclear materials. The idea of nuclear fuel assurances is widely seen as one "whose time has come",[74] even if consensus does not yet exist and if many points still need to be clarified. The EU has a system and a legal regime of its own when it comes to fuel supply under Articles 52 to 76 of the Euratom Treaty which is complemented by the safeguards provisions (Articles 77 to 85). The Community indeed has the property of all special fissile materials produced in the territory of the EU, or imported thereto. The IAEA has recently proposed a possible "new framework for the utilisation of nuclear energy: options for assurance of supply of nuclear fuel",[75] which shows the maturity at least of the idea. This issue will surely be high on the agenda for months and years to come. The European Union needs to be present.

There are, however, other initiatives and proposals to reduce non-proliferation risks, which they are often complementary rather than exclusive. Hereafter are some of the most discussed ideas to avoid the unnecessary spread of enrichment technologies and facilities and to the benefit of non-proliferation more generally:

- to create an international centre for enrichment under international supervision;[76]

Albania, Tajikistan, Syria, ACP countries, Gulf Countries and negotiations are going on with several other countries.

72. On the European Union's implementation of the Weapons of Mass Destruction Strategy, see Council of European Union, report 10527/06 of 14 June 2006.

73. Regulation (EC) No. 1717/2006 of the European Parliament and of the Council of 15 November 2006 establishing an Instrument for Stability, OJEC L 327 of 4 November 2006, p. 1-11.

74. Stratford, R., "New framework for the utilisation of nuclear energy in the 21st century: assurances of supply and Non-Proliferation", conference at IAEA special event at the General Conference 2006, 19 to 21 September 2006, p. 1.

75. Report by the Director General of IAEA, GOV/INF/2007/11 of 13 June 2007.

76. This has been concretely proposed for the first time Solana, J., the European Union High Representative for Foreign Policy, not later than early December 2007; see *Le Monde* of 5 December 2007.

- to create a network of regional centres,[77] and notably to "Europeanise" the nuclear fuel cycle for all Member States;

- to store plutonium under international supervision (IAEA and/or a group of states);

- to create international fuel-cycle projects and the co-location of facilities that would operate under some form of international authority;

- to set up an internationally supervised agreement on the cut-off of the production of nuclear materials for weapons purposes, the Fissile Material Cut-Off Treaty (which had already been mentioned in the 1995 NPT Extension Conference);

- to improve cross-border enforcement of the law on non-proliferation;

- to strengthen border security and management;

- to support the activities taking place in the Proliferation Security Initiative (PSI).[78]

The EU, having a leadership position worldwide in enrichment and reprocessing activities, the most sensitive issues for proliferation, can naturally make an important contribution to mitigate efforts and international co-operation in this field. To concretely contribute to progress in these areas, the EU should adopt a "functional approach… (and) states should think about how to develop a EU-wide toolbox".[79] There is scope anyhow for different and co-existing tools to multilateralisation. The EU could without difficulty set up an EU regional enrichment centre, which could benefit from the Euratom overall framework. Precedents for such regional set ups do exist, e.g. the Russian-Kazakh enrichment centre. The EU is already very active in Russia, notably in the area of safety, through its TACIS programme. This greatly enhances the fight against proliferation in a particularly sensitive part of the world.

Finally, the development of Internal and Justice Affairs at European Union level, the actual third pillar of the European Union temple, gives the European Union a better framework for sound co-operation between states and will thus lead to co-ordinated and efficient policing actions against traffickers of nuclear materials.

3. Maximising the European Union's political role and influence

In addition to its legal and political instruments, the European Union has other opportunities to exert leverage, influence and promote non-proliferation in important fora.

3.1 United Nations Security Council

With France and the United Kingdom, the European Union has two Member States that are permanent members of the United Nations Security Council. Both countries are NWSs, with all the political,

77. Proposals by several countries have already been made in this regard, e.g. by Russia and Saudi Arabia.

78. The European Union has issued statements supporting the activities of the PSI.

79. Finaud, M. and Anthony, I. "The role of the European Union in international Non-Proliferation and disarmament assistance", *Genève Centre for Security Policy*, Occasional papers series, No. 50, April 2006, p. 20.

strategic and deterrent effects that this brings about. For issues of such importance, legally-binding resolutions adopted on the basis of Chapter VII of the UN Charter have been and should continue to be used, even if – read literally – the UN Charter does not appear to present an immediate legal or political basis for the fight against nuclear proliferation.[80] But more importantly, these resolutions should be enforced. In the absence of effective enforcement instruments (sanctions are usually relatively inefficient, in making the sanctioned country abide by its obligations in the short-term), there is need for a subtle combination of factors, notably political influence and a "carrot and stick" approach that could do the trick. The EU, because of its presence in the UN Security Council through permanent and non permanent rotating members, and resulting networks and links with certain countries, has the possibility of playing a more important role in this sort of approach as it can also offer financial compensatory packages and access to technologies. The EU, notably through the Commission, is a major provider of assistance for international non-proliferation efforts.

A strategic and diplomatic European identity could thus rather easily be developed on the issue of non-proliferation, as positions converge on the most fundamental points of the subject.

The EU is also bound by the 2004 United Nations Security Council Resolution 1540. It has to develop approaches to tackle the issues contained in that resolution, both at the level of Member States and at that of the European Union. The European Union has launched joint actions, notably awareness-raising and capacity-building, in Asia-Pacific, Africa and Latin-America and Caribbean.[81] The European Union Strategy on WMD, which puts emphasis on the need to reinforce the role of the United Nations Security Council, is seen as progress, but some authors still show perplexity as to its real clarity.[82] The creation of a post of Personal Representative of the European Union High Representative for CFSP is an attempt to create synergy.

3.2 Non-Proliferation Treaty Review Conferences

There is a clear window of opportunity for the EU to inject political will, if not a visionary leadership, into the preparations for the next 2010 NPT Review Conference. It has the legitimacy and credibility to do so, particularly in a context in which the United States has compromised since entering into the agreement with India. The last conference[83] is widely considered as a failure. This negative momentum, now reinforced by current cases on the international agenda (Iran, India), should be broken in order to avoid further jeopardy of the NPT.

The EU should use the combined weight of its institutions and its Member States, as well as its own internal experience as a deal-broker to achieve a set of objectives. To give new impetus, and possibly a quantum leap forward, to the NPT, this paper advocates a "new deal". The plea would be to:

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80. Some authors have advocated in favour of a stronger implication of the United Nations Security Council in Non-Proliferation, see Labbe, M.-H. (1992), "La prolifération nucléaire en 50 questions", Jacques Bertoin éditions, p. 204.

81. See lastly the Council Joint Action 2006/419/CFSP of 12 June 2006 in "support of the implementation of the United Nations Security Council Resolution 1540/2004 and in the framework of the implementation of the European Union strategy against the Proliferation of Weapons of Mass Destruction".

82. Portela, C., "The Role of the European Union in Non-Proliferation of Weapons of Mass Destruction. The Way to Thessaloniki and Beyond", *PRIF Report*, No. 65, Peace Research Institute Frankfurt, 2003, p. 27; also Pelopidas, B., *op. cit.*, p. 3 footnote 6.

83. Held from 2 to 27 May 2005 at the United Nations Headquarters in New York.

- reaffirm its support for the NPT, emphasise the good track record it has and the positive role it has played, in spite of the recent setbacks and of the international context;[84]

- engage in a diplomatic confidence-building exercise with all actors. This could be done through initiatives on nuclear disarmament and vertical proliferation to get buy-in from states who still emphasise the unbalanced character of the NPT between NNWSs and NWSs;

- confirm and strengthen the *acquis* and the core objectives of the NPT;

- propose ambitious but realistic objectives;

- call for universal adherence to the NPT through bilateral demarches to Israel, India and Pakistan (and as the case may be others such as the DPRK);

- get more involved in and propose diplomatic assistance in the Iranian case;

- reaffirm support for the recently acquired unlimited validity of the NPT;

- pinpoint the NPT's weaknesses so as to propose initiatives to overcome them.

All these elements are currently being worked on at European Union level, and there is keen awareness of their importance to ensure sound delivery at the next Review Conference.

3.3 Some specialised groups

The participation of the EU in the London Club and in the Zangger Committee, two voluntary inter-state agreements, gives the EU leverage for influence and control over export controls. The European Commission is a permanent observer in both bodies. The European Commission is also a member of the Missile Technology Control Regime and the Wassenaar Arrangement for the broader arms non-proliferation aspects where it participates in the EU Presidency Delegation; it is a full member of the Australia Group,[85] and it participates in the EU Presidency Delegation in the Missile Technology Control Regime.

The G8 is also an important forum in which non-proliferation can be discussed at the highest level. Initiatives such as the "G8 Global Partnership against the Spread of Weapons and Materials of Mass Destruction" are a concrete example thereof. The EU has actively participated in the mid-term review of the Global Partnership, to which the EU also remains an important financial contributor. One important example is the one billion Euros that has been pledged[86] by the EU for assistance in the

84. It is interesting to read literature indicting that, decades ago, most analysts thought that the number of countries that would have or be able to have a nuclear weapon would be much higher than it is actually the case today. See for instance, Courteix, S. (1978), "Exportations nucléaires et non-prolifération", in *Economica*, Paris, p. 2.

85. The Australia Group is an informal forum of countries which, through the harmonisation of export controls, seeks to ensure that exports do not contribute to the development of chemical or biological weapons. Co-ordination of national export control measures assists Australia Group participants to fulfil their obligations under the Chemical Weapons Convention and the Biological and Toxin Weapons Convention to the fullest extent possible.

86. In 2002, at the Kananaskis (Canada) G8 Summit.

former Soviet Union. At this point, almost EUR 800 million have been committed and over EUR 400 million spent. This should help in combining efficiency and getting higher political returns.

Conclusion

A European Union composed of 27 Member States sharing the same fundamental views, principles and commitments on non-proliferation constitutes a sound basis to ensure co-ordinated or, better, common positions and actions. All EU Member States are indeed members of the NPT, of the CTBT and have signed additional safeguards agreements with the IAEA. This is a sign of strong support for multilateral governance in important issues that concern not only Europe but the world. It is recognised that global challenges can only be addressed on the basis of a shared assessment and co-ordinated action.

The EU has demonstrated clear credentials in non-proliferation. There are not many today who could reasonably regard any Euratom Member State as posing a real proliferation risk. What the European Union now needs are real vectors for change: political will, enhanced co-ordination and the setting up of a unified single framework to deal with non-proliferation. The European Union cannot afford to continue in what too often resembles a "prisoner's dilemma", in which every party needs to take a position without knowing what the other party will actually say, with obvious sub-optimal consequences in most cases. This framework could be organised according to the already proven systems of concentric circles or of variable geometry if some Member States want to go further and faster than others. But it needs to go beyond the actual variegated structure and be result-driven in order to ensure that bottlenecks are overcome. It is necessary for the European Union to go beyond a policy of the smallest common denominator.

The founding treaties of the EU, their secondary legislation instruments and political initiatives do lay the groundwork for a single European Union policy on non-proliferation issues provided the political will exists to go beyond institutional rivalries. That needs a utilitarian and teleological interpretation of the instruments and needs to spill over on the EU political will. Entry points do exist, notably with the Euratom Treaty and the 2003 European Union Strategy on WMD. The EU is making efforts to complete its legal and political frameworks: the Commission Communication "An Energy Policy for Europe"[87] adopted in January 2007 as a milestone in the creation of an EU energy policy mentioned non-proliferation as one of the key priorities to be pursued in the context of an effective external EU energy policy. The EU has also started an "evolutive action plan",[88] it is working on communications from the Commission on nuclear safety and on the contribution of Euratom to non-proliferation, which should be adopted in the coming months. These are important first steps, but they do not constitute the quantum leap which is required. To achieve the latter there must notably be more synergy between the various institutional levels in the EU and amongst the different committees of the same institutions.

The current political and strategic equation is simple: new alliances and strategic co-operation are developing regionally and globally in a multi-polar world in which certain policies and ideologies that some saw as dominating are now being questioned. A coalition might be in the making against the West.[89] There is a declared interest of many new countries to engage in nuclear energy, amongst which are those where guarantees for security may be a concern. These factors will lead to an inescapable

87. COM (2007) 1 final, 10 January 2007.

88. Report of the Inter-parliamentary Assembly for security and defence of the Western European Union, 52nd Session, 21 June 2006, document A/1938, p. 23.

89. By e.g. countries such as Venezuela, Iran, Cuba, DPRK.

increase of proliferation risks and to a world in which instability will never have been so relevant, even in the darkest periods of the Cold War. The Iranian case today should not be seen as an isolated one; rather it may foreshadow what could happen on a much larger scale in the future. As a result, either sound solutions are found to avoid increased proliferation, essentially in the form of regionally or internationally managed and monitored centres for the most sensitive parts of the nuclear cycle, or one accepts that a nuclear Pandora's box will soon be opened with little or very long-term prospects to close it again.

An international approach is the only option for all parties to build trust and consensus and bypass the criticisms of developed countries eager to maintain the current "unbalanced balance". It will be difficult, even if desirable, to limit the access of developing countries to nuclear energy; proliferation is a reason to ensure tight controls, not a reason to prevent new countries benefiting from that source of energy. A different approach would reinforce the discrimination charges that the nuclear sector already faces. The NPT has long been criticised in that respect, so a degree of self-limitation by the NWSs and real efforts in vertical proliferation, as a first step to ultimate full disarmament, is a difficult but essential path towards peace. Counter-proliferation will have to be accompanied by "de-proliferation". The EU has it all: both political leverage and financial means to maximise a "carrot and stick" approach, if need be by using conditionality in linking economic aid or technology transfers to the fulfilment of strict non-proliferation conditions by the recipient state. Also, the convergence between Euratom and the IAEA, which both share an irreplaceable experience and expertise will be needed in the future more than ever.

Faced with such a situation, a "business-as-usual" scenario aimed at buying time is no longer an option. The EU has been in listening mode for too long. The 2010 NPT Review Conference might be one of the most important ones since the NPT entered into force. A failure of the Conference, particularly when the NPT is going through a serious credibility crisis, could lead the world into highly troubled waters.

Beyond the analysis carried out in this paper and beyond the sustainability and viability of the ideas that have been presented, one fundamental thesis should at least emerge: a *new deal* in nuclear non-proliferation is needed. If the EU wants to play a role and develop an *effet utile*, it needs to use its entire toolbox, technical and political, but in a coherent rather than in a kaleidoscopic way. The EU cannot segregate any longer the instruments it has at its disposal, to promote non-proliferation. A partial approach will lead to sub-optimal outputs and lower political dividends. This is for the first time formally recognised in Chapter II of the European Union Strategy against the proliferation of WMD, even if the potential of the Euratom Treaty remains under-valued. Looking for or even proposing an overall single framework in a matter that concerns the future of mankind may seem idealistic, but one should go beyond short-term scepticism: Non-proliferation cannot afford to be trapped in a Sisyphean effort.

From urgent needs to brave deeds, there is one important step called political will. For the sake of global peace, can we thus reasonably aim at a "Common EU Non-Proliferation Policy" or an *"integrated EU nuclear security programme"*[90] as a contribution to a universally accepted nuclear security culture in the near future?

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90. Bremer Maerli, M., Fedchenko, V. and Anthony, I., "Nuclear Security: Reinforcing EU Cooperative Threat Reduction Programmes", in *Stockholm International Peace Research Programme*, Background paper 2 to the Conference on "Strengthening European Action on WM Non-Proliferation and Disarmament: how can community instruments contribute?" Brussels, December 2005, p. 1.

Environmental Law Developments in Nuclear Energy*

*by Stanley David Berger***

Climate change, the world's unquenchable thirst for power and the geopolitical tensions and price instability associated with oil have combined to spark a renewed interest in nuclear energy. None of these factors would mean much if the nuclear industry had been plagued with significant safety concerns, but it has been 28 years since the Three Mile Island incident and 21 years since Chernobyl. In the interim, nuclear energy has provided a reliable source of base-load electricity to the United States, the United Kingdom and Canada.[1] As of July 2007, over three-quarters of the operating nuclear reactor units in the U.S. have renewed or are seeking renewal of their operating licences for extended periods of up to 20 years.[2] There are 19 separate locations at existing plants in the south eastern and north eastern United States, as well as Texas, which are currently considering constructing new nuclear reactors.[3] In late May 2007, Tennessee Valley Authority brought back into operation on time

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1. In 2005 the nuclear industry in the U.S. produced 782 billion kWh of electricity, which comprised 19.4% of the total U.S. energy mix. The capacity factor, a measure of the percentage of time that nuclear units are available to generate electricity, was 89.3%. See Ginsberg, Ellen C., "Industry and Regulatory Overview, 2007", paper presented to Canadian Bar Association National Environmental, Energy and Resources Law Summit, 27 April 2007. In the United Kingdom, nuclear energy provides about 18% of the total electricity mix. See U.K., Department of Trade and Industry, Consultation Paper, The Future of Nuclear Power: The Role of Nuclear Power in a Low Carbon UK Economy (May 2007), at p. 8, online at www.dtistats.net/ewp. In 2005 in Ontario, Canada's most populous province, Ontario's nuclear facilities produced approximately half of the province's electricity. The capacity factor for all the units was 78.59% for that year. Ontario Power Authority, "Discussion Paper 4: Supply Resources" (9 November 2006) at pp. 11, 61, Exhibit C-8-1 to the Integrated Power Supply Plan (29 August 2007), online at www.powerauthority.on.ca/ipsp.

2. U.S. Nuclear Regulatory Commission (NRC), Plant Applications for License Renewal, online at www.nrc.gov/reactors/operating/licensing/renewal/applications.html#-plant.

3. Ginsberg, *op. cit.*, footnote 1.

and on budget its Browns Ferry 1 reactor in Alabama after a two-decade shutdown.[4] Similarly in Canada, recent applications have been brought to refurbish the reactor units at Point Lepreau in New Brunswick and the Bruce A and Pickering B units in Ontario. Applications to build new reactor units at the existing Bruce and Darlington units have also been filed with the regulator for the Canadian nuclear industry, the Canadian Nuclear Safety Commission (CNSC or the Commission).[5] The World Nuclear Association reported at the end of 2006 that nations planned to build more than 220 power reactor units.[6] Nuclear power accounted for 16% of the worldwide electricity supply in 2005 and to increase that share to 18% would require about 300 nuclear plants worldwide by 2030.[7]

This article canvasses some of the key environmental law developments in the nuclear energy industry in Canada, the United States and the United Kingdom from December 2006 until the end of 2007. The topics selected are of relevance in all three jurisdictions. Included, in the order they appear, are the following: public consultation, the procedural track of the environmental assessment, aspects of scoping nuclear generation projects and the inclusion and scope of environmental assessment factors. Finally, the article provides a brief update on nuclear liability and nuclear waste.

Consultation

On 15 February 2007, the High Court (Administrative Court), on a judicial review application by Greenpeace, granted a declaratory judgement that a decision made by the United Kingdom's Secretary for State for Trade and Industry was procedurally flawed and unlawful.[8] The Secretary's decision supported nuclear new build as part of the U.K.'s future electricity-generating mix. The reasoning, drawing as it does on administrative law principles applicable throughout common law jurisdictions, offers useful guidance on consultation in environmental assessment, always bearing in mind the legislative context in any particular jurisdiction.

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4. U.S. Nuclear Energy Institute, Nuclear Energy Insight, June 2007, online at: www.nei.org/resourcesandstats/publicationsandmedia/newslettersandreports/insight. The restart took five years and a budget of USD 1.8 billion.

5. For New Brunswick, the 29 July 2005 announcement of the provincial government is recorded in New Brunswick Power's hearing before the CNSC on 16 February 2006. The New Brunswick government announced on 1 August 2007 that it accepted a proposal by Team CANDU to conduct a feasibility study for the construction of a Generation III+ advanced CANDU Reactor (ACR-1000). The feasibility study will be funded by Team CANDU and is designed to evaluate the potential for an ACR-1000 to be constructed at the Point Lepreau Generating Station near Saint John, New Brunswick, and will examine the business case for private sector investment, identify prospective markets for this new source of power, and indicate the potential environmental and socio-economic impacts of this project. Team CANDU New Brunswick represents five of the world's leading nuclear technology and engineering companies – Atomic Energy of Canada Limited, Babcock & Wilcox Canada, GE-Hitachi Nuclear Energy Canada Inc., Hitachi Canada Ltd. And SNC- Lavalin Nuclear Limited. The ACR-1000 is an advanced CANDU reactor, building on the pedigree of the existing technology to deliver the same benefits at an even lower cost. If constructed at Point Lepreau, the ACR-1000 will have a projected output of 1,085 MW of electricity and a planned operating life of 60 years. Canadian Nuclear Safety Commission (CNSC), Environmental Assessments, online at www.nuclearsafety.gc.ca/eng/resource/environmental_assessments.

6. U.S. Nuclear Energy Institute, *Nuclear Energy Insight*, January 2007.

7. U.S. Nuclear Energy Institute, *Nuclear Energy Insight*, June 2007.

8. *R. (Greenpeace Ltd.) v Secretary of State for Trade and Industry*, [2007] All E.R.(D) 192 [H.C. (Admin)].

The chronology of events leading up to the decision was as follows: In 2003 the U.K. Government's *Energy White Paper 2003: Our Energy Future – Creating a Low Carbon Economy*[9] set out its goals and long-term framework for energy policy. The paper noted:

> While nuclear power is currently an important source of carbon free electricity, the current economics of nuclear power make it an unattractive option for new generating capacity and there are also important issues for nuclear waste to be resolved. This white paper does not contain proposals for building new nuclear power stations. However, we do not rule out the possibility that at some point in the future new nuclear build might be necessary if we are to meet our carbon targets. Before any decision to proceed with the building of the new nuclear power stations, there would need to be the fullest public consultation and the publication of a white paper setting out the Government's proposals.[10]

In November 2005, a review of the 2003 Energy White Paper was announced by the Secretary of State to a Parliamentary committee. On 23 January 2006, the Government issued its consultation document, *Our Energy Challenge – Securing Clean, Affordable Energy for the Long Term.* The paper referenced the 2003 Energy White Paper's concerns with the economics of nuclear energy and the important issues of nuclear waste to be resolved. The Government proposed that the current review would examine whether changes in energy prices had changed that assessment, as well as reviewing the nuclear waste liabilities, including their management and financing and concluded by reiterating that there would be the fullest public consultation. In Annex A to the document, consultees were told that the Committee on Radioactive Waste Management (CORWM) "has confirmed that the waste from a new build programme could be technically accommodated by the options it is considering". The court regarded this statement as misleading[11] because while CORWM had so concluded about a month previously, they had added that consideration of future as opposed to existing waste "raise [s] different political and ethical issues". Finally, consultees were told that the closing date for responses to the consultation document was 24 April 2006, twelve weeks from the issuance of the consultation document. This was the minimum period suggested for written consultation in the Cabinet Office *Code of Practice on Consultation*.

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9. U.K., Department of Trade and Industry, *Energy White Paper 2003: Our Energy Future – Creating a Low Carbon Economy* (February 2003), online at ww.dti.gov.uk/energy/policy-strategy/energy-white-paper-2003/page21223.html.

10. *Ibid,* at para. 4.68, quoted in *R. (Greenpeace Ltd.) v Secretary of State for Trade and Industry*, *supra*, footnote 8, at para. 9. Sullivan J. pointed out later at para. 49 that the U.K. government was a signatory to the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (the "Aarhus Convention"). The Convention provides that citizens have a right to live in an environment adequate to their health and well-being, a duty to protect and improve the environment for present and future generations and a right to access information, participate in decision-making and access to justice in environmental matters. Article 7 of the Convention provides, "To the extent appropriate, each Party shall endeavour to provide opportunities for public participation in the preparation of policies relating to the environment." Sullivan J., at para. 51 concluded, "Given the importance of the decision under challenge – whether new nuclear build should now be supported – it is difficult to see how a promise of anything less than *the fullest public consultation* would have been consistent with the Government's obligations under the Aarhus Convention" (emphasis added).

11. *R. (Greenpeace Ltd.) v Secretary of State for Trade and Industry*, *supra*, footnote 8, at paras. 102-105.

The Energy Challenge: Energy Review Report 2006,[12] the subject of the judicial review, was published on 11 July 2006, less than six months following the issuance of the consultation document. The Government concluded that "nuclear has a role to play in the future U.K. generating mix alongside other low carbon generation options". At the end of July 2006, the CORWM published its draft recommendations, two weeks after the closing of the consultation process. The final report was issued three months later.

In granting the declaratory judgement, the High Court judge stated that the "consultation exercise was seriously flawed".[13] The January 2006 consultation paper would have been adequate for its ostensible purpose as an issues paper, followed by a further paper containing proposals on which the public would be able to make informed comment. As it was, the information given to consultees was wholly insufficient for any intelligent response on the two issues identified in 2003 as ones of critical importance – the economics of new nuclear build and nuclear waste disposal. Besides the misleading information provided on the CORWM, the cost-benefit analysis and the draft recommendations and final report for CORWM only emerged after the conclusion of the consultation period.

As Sullivan J. noted, "Elementary fairness required that consultees, who had been given so little information hitherto, should be given a proper opportunity to respond to the substantial amount of new material before any 'in principle' decision as to the role of new nuclear build was taken."[14] The court concluded that there could be no proper consultation, let alone "the fullest public consultation", if the substance of the economic and nuclear waste issues was not consulted upon before a decision was made. He concluded by finding procedural unfairness and a breach of Greenpeace's legitimate expectation that there would be the fullest public consultation before a decision was taken to support new nuclear build.[15]

Canadian law recognises the doctrine of legitimate expectation,[16] at least with respect to procedural relief as opposed to substantive relief.[17] Procedural relief was what was awarded by the United Kingdom court. Nevertheless, the U.K. decision must be considered in the context of the Canadian legislative framework for environmental assessment (EA). Under the Canadian Environmental Assessment Act (CEAA),[18] the applicable assessment law for federal nuclear energy projects, assessments must be conducted "as early as is practicable in the planning stages of the project and before irrevocable decisions are made". This, no doubt, has contributed to the CNSC further refining its informational base as part of the licensing process, even following the completion of an

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12. U.K., Department of Trade and Industry (2006), *The Energy Challenge: Energy Review Report 2006,* online at www.dti.gov.uk/energy/review/page31995.html.

13. *R. (Greenpeace Ltd.) v Secretary of State for Trade and Industry, supra*, footnote 8, at para. 116.

14. *Supra,* at para. 117.

15. *Supra.*

16. *Do Rav Right Coalition v British Columbia (Environmental Assessment Officer)* (2006), 26 C.E.L.R. (3d) 16 at para. 39 (B.C.C.A.), leave to appeal to S.C.C. refused 6 September 2007.

17. *Mount Sinai Hospital Centre v Quebec (Minister of Health and Social Services)*, [2001] 2 S.C.R. 281, at paras. 22-38 per Binnie J. and McLachlin C.J.C., and *Baker v Canada (Minister of Citizenship and Immigration)*, [1999] 2 S.C.R. 817, at p. 839.

18. Canadian Environmental Assessment Act (CEAA), S.C. 1992, c. 37, s. 11(1).

environmental assessment.[19] This position was accepted by the Federal Court of Appeal in *Inter-Church Uranium Committee Educational Co-operative v Canada (Atomic Energy Control Board)*.[20] The court stated:

> [T]he ICUCEC points to several changes in the Project since 1993, including a change in the proponent and majority owner, design changes, the discovery of new environmental threats from arsenic, a scientific study indicating radioactive contaminant can migrate over long distances in groundwater faster than originally thought, a new regulatory climate with regard to water quality guidelines for arsenic, and the addition of radionuclides from uranium mills to the List of Toxic Substances in Schedule I to the *Canadian Environmental Protection Act, 1999,* S.C. 1999, c. 33. In my view, none of these changes transform the McClean Lake Project into a new proposal. The Panel recognized that changes in science and technology would occur over the life of the Project and acknowledged that it would be the Board's responsibility to evaluate the effects of these developments in the context of its licensing responsibilities.

The appropriate environmental assessment track – screening, comprehensive study or review panel?

The CEAA provides for three tracks of environmental assessment: a screen, a comprehensive study or a panel review. A screening can be the least demanding assessment in terms of both public consultation and the inclusion and scope of assessment factors.[21] A screening applies by default when a project does not come within the comprehensive study list.[22] A review panel may summon witnesses to appear to give evidence orally at a public hearing.[23] Its members are chosen by the Minister of Environment, and unlike a screen[24] or comprehensive study,[25] the assessment is not the responsibility of the responsible authority, but of the panel members.[26] As a result, the review panel has the potential to be the most rigorous form of assessment. CEAA empowers the CNSC to refer a project which is tracked for screening to the Minister for a panel review,[27] or to recommend to the Minister that a project within the comprehensive study list be referred to a panel following a public consultation with

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19. See e.g. CNSC, Member Document 00-H29, Pickering NGS – A Return to Service (5 September 2000), at p. 18.

20. [2005] 1 F.C.R. 372 at para. 49 (C.A.), leave to appeal to S.C.C. refused [2005] 1 S.C.R. xi.

21. CEAA, s. 18.

22. For the conditions required to trigger a comprehensive study report, see the *Comprehensive Study List Regulations*, SOR/94-638, Schedule, s. 19.

23. CEAA, s. 35(1)(a).

24. CEAA, s. 18.

25. CEAA, s. 21.1(1)(a).

26. CEAA, s. 34(c). It should however be noted that the CNSC, as a federal agency with responsibilities with respect to the environmental effects of nuclear energy projects, could be included by the Minister of Environment in a joint review panel pursuant to CEAA, ss. 42 and 40(1)(c), or the Minister could substitute the CNSC's review process under the licence for environmental assessment by a review panel pursuant to CEAA, s. 43(1).

27. This can be done at any time: CEAA, ss. 20(1), 25.

respect to the proposed scope of the project, the factors to be assessed, the scope of those factors and the ability of the comprehensive study to address issues relating to the project.[28]

Over the past year the CNSC has issued three separate decisions dealing with nuclear waste, nuclear reactor refurbishment and new nuclear build which clarify the Commission's approach to proceeding to a full panel review as opposed to a screening or comprehensive study.

The first decision which recommended a panel review to the Minister concerned site preparation, construction and operation of a Deep Geologic Repository on the Bruce Nuclear Site in Kincardine, Ontario.[29] The purpose of the DGR would be for the long-term storage of low- and intermediate-level radioactive waste. This waste could include contaminated clothing, reactor components and reactor equipment, including pressure tubes, ion exchange resins and filters used to keep reactor water systems clean. The DGR was to be located approximately 1.5 km from the Lake Huron shoreline and would be constructed in sedimentary rock approximately 500-700 m below the ground surface. Since the proposed repository was to be used for the disposal of radioactive substances outside the boundaries of an existing nuclear facility, it initially fell within the *Comprehensive Study List Regulations.*

While CNSC staff had recommended that the project was adequately addressed through the comprehensive study assessment, the Commission disagreed. First, the Commission expressed concern with the uncertainties relating to potential adverse environmental effects. Lack of detail respecting the shale and limestone stratigraphy, potential subsurface fractures and proximity to one of the Great Lakes was a factor. The uncertainty regarding the mitigation measures described to eliminate or minimise potential adverse effects was also troublesome. Second, there were a number of identified public concerns that the Commission considered would best be dealt with through a full public hearing. These included the unprecedented nature of the project, its proximity to Lake Huron, the long-lived radioisotopes posing a risk for future generations, the suitability of the sedimentary rock for the DGR, the unpredictability of the subsurface water movement, the possibility of leak and the added stress on the Great Lakes. Third and related to public concerns, the Commission concluded that some of these concerns could best be addressed in a panel review. For example, transboundary effects would be better addressed because the full hearing process would facilitate a broader consultation with potential stakeholders and interested parties, including the International Joint Commission on the Great Lakes.[30] A review panel would further provide the public and First Nations with additional beneficial consultation opportunities that could address the perceived credibility and transparency of the assessment process.[31] In this regard the Commission noted earlier in their reasons that Saugeen Ojibway Nation (SON) had submitted to them that the DGR could affect its vital interests throughout its traditional territory, including residential communities, places of cultural and spiritual significance and fisheries. The SON maintained that the project would not be acceptable until a high degree of certainty that harm to the environment would be avoided over many hundreds of years had been established.[32] Finally, absent significant scientific and engineering data, the review panel would have

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28. CEAA, s. 21(1), (2).

29. CNSC, *Environmental Assessment Track Report regarding Ontario Power Generation Inc.'s Proposal to Construct and Operate a Deep Geologic Repository within the Bruce Nuclear Site in Kincardine, Ontario* (decision 23 October 2006, reasons released 21 December 2006), CEA Registry No. 06-05-17520. The Federal Minister of the Environment announced on 29 June 2007 that the project was referred to a panel.

30. *Ibid,* at para. 112.

31. *Ibid,* at para. 116.

32. *Ibid,* at para. 94.

the necessary access to international expertise independent of the licensee and Commission staff, particularly with respect to complex geological and hydrological issues raised by the project.[33]

A second decision by the CNSC released early in 2007 rejected calls for a panel review for the environmental assessment of the proposed refurbishment of the Pickering B reactor units and life extension of the units for operation until 2060.[34] The Commission's decision to continue with the screening level assessment focused on the question of whether public concerns warranted the recommendation of a panel review pursuant to CEAA, s. 25. In this regard the Commission appeared to accept the criteria for judging the level of public concern proposed by their staff. These criteria were the following:

- whether questions or issues raised by members of the public and stakeholder can be thoroughly addressed in a screening EA;
- the nature of the concerns;
- whether a panel review would provide more meaningful opportunities for the public to communicate its concerns;
- whether negative concern expressed is coming from a large proportion of the population living in communities that would likely be affected by the project.[35]

The proponent, Ontario Power Generation Inc., did state that the project was supported by local officials. The public concerns expressed by such groups as Lake Ontario Waterkeeper included the environmental effects on the lake of thermal plumes, water contamination and the indefinite temporary storage of nuclear waste. Joined by Greenpeace, Great Lakes United and the Council of Canadians Toronto Chapter, they further demanded the inclusion of other factors such as sustainable development, renewable resources and alternatives to the project. Greenpeace raised the issue of the project's capacity to sustain a catastrophic accident, in view of the proximity of the project to densely populated regions particularly affected to the west of the facility by any contamination to Lake Ontario, the source of drinking water. The effects of climate change on the nuclear facility and seismic activity were also raised as significant issues. The Commission qualified its decision by requiring its staff to keep the Commission informed in a timely manner of any public concerns or significant issues which might warrant further consideration of the need for a review panel.[36] Finally, due to the high level of interest in the project, the Commission was prepared to consider conducting a public hearing on the EA screening report in the Greater Toronto area.[37]

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33. *Ibid,* at para. 119.

34. CNSC, *Environmental Assessment Guidelines (Scope of Project and Assessment) for the Proposed Refurbishment and Continued Operation of Pickering B Reactors at the Pickering B Nuclear Generating Station* (decision 24 January 2007, reasons released 3 April 2007), CEA Registry No. 06-01-21226.

35. *Ibid,* at para. 16.

36. *Ibid,* at para. 17.

37. *Ibid,* at para. 81.

The third CNSC decision concerned Bruce Power's proposal to construct and operate a new nuclear power generating station in Kincardine, Ontario.[38] The proposal involved site preparation, construction and operation of up to four new nuclear reactors at the current Bruce nuclear site for the generation of an additional 4 000 MW of electrical generating capacity. Bruce Power was proposing various technologies of Canadian and foreign design. The project would normally fall within the Comprehensive Study List Regulations but the Commission, acting pursuant to CEAA, s. 25, requested the Minister to refer the project to a review panel. Significantly, Bruce Power, the project proponent, had requested that the Commission take this course of action, as did impacted First Nation communities.[39] The province conceded it had no mandate to bring nuclear facilities under the Ontario Environmental Assessment Act[40] and foresaw no possibility for triggering clause 7(1) of the Canada-Ontario Agreement for Environmental Assessment Cooperation.[41] The Commission therefore decided against a joint EA with the province, but it did recommend that in light of the experience and expertise of its members, and its status as an independent quasi-judicial tribunal, the Commission itself could substitute for the review panel, or at least a joint review panel.[42]

In recommending a panel review, the Commission found that following the posting of the project description on the registry there was an unusually high volume of request for documents, and that coupled with potential uncertainties relating to the proposed use of new technology and the concern with managing radioactive waste resulting from operations and decommissioning of new reactors, the public concern relating to the project would be significant.[43] Finally, the Commission concluded that a comprehensive study would not be able to address the proposed new complex technology as well as a review panel. The interactions between the proposed project and existing and potential future nuclear facilities and the proximity to Lake Huron were part of this determination, but perhaps of greater significance, "independent international expertise might be a benefit to the panel in order to consider the experience of facilities that use new reactor and reactor cooling technology".[44]

By looking at those facts common to the three projects considered by the CNSC in the past year and those facts which distinguish the projects, a picture emerges of what kinds of projects the CNSC considers warrant referral to a review panel. Any project which will increase the longevity of nuclear energy provokes public interest and this factor alone, as is evident from the screening decision on the Pickering B refurbishment, will not be enough to tip the scales in favour of a review panel. The CNSC decision is consistent with the Federal Court's reasoning under similar provisions in the predecessor to CEAA, the Environmental Assessment and Review Process Guidelines Order (EARPGO).[45]

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38 CNSC, *Environmental Assessment Referral regarding Bruce Power Inc.'s Proposal to Construct and Operate a Nuclear Power Generating Station in Kincardine, Ontario* (reasons released 4 May 2007), CEA Registry No. 07-05-25738.

39. *Ibid,* at paras. 9, 34, 36.

40. Environmental Assessment Act*, R.S.O.* 1990, c. E.18.

41. CNSC, Bruce NGS referral, *op.cit.*, footnote 38, at para. 17.

42. *Ibid,* at paras. 41, and see footnote 26, *supra*.

43. *Ibid,* at paras. 26, 29.

44. *Ibid,* at paras. 31-33.

45. Environmental Assessment and Review Process Guidelines Order, SOR/84-467 (now repealed).

The Federal Court, Trial Division in *Community Before Cars Coalition v National Capital Commission*[46] upheld a refusal to refer the Champlain Bridge expansion project to a review panel. Applicants for a judicial review argued:

> "This is a process that says, if there is still public concern after going through the EA process that the proponent has initiated, the initial stages, you should look at the issue of the public panel".

The court rejected this submission, stating:

> [T]he court rejects this submission. Accepting it would mean that as long as there exists a steadfast opposition to a proposal, a public review panel is the inevitable result. As the respondent's counsel remarked, this would eliminate the need for a self-assessment process. Further, realistically there will always be opposition to some proposals, particularly in cases such as this one where the public is so starkly polarized: home property value and quiet neighbourhoods versus access to work. The staff's conclusion is tied in with the bottom-line reason for not submitting the proposal for review: nothing new will be raised. The conclusion has to be a relevant factor. If the public had not been given adequate opportunity to express their concerns during the environmental process it would be very difficult to justify not sending a proposal for further public scrutiny.[47]

What does distinguish the Pickering B refurbishment project from the two projects – deep geologic repository and new build – which were referred to review panels is that in the latter two projects the proposed technology was untested in Canada, and the Commission sought to open the assessment process to potentially wider international expertise which could be summoned independent of any experts chosen by the licensee, CNSC staff or even intervenors. As the CNSC had previously pointed out in rejecting a panel review for the Proposed Refurbishment of the Bruce A Nuclear Generating Station,[48] "there had been considerable experience within the Canadian nuclear industry

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46. (1997), 135 F.T.R. 1 (T.D.).

47. *Supra*, at para. 131. Similar reasoning was applied in 1994 by the English Court of Queen's Bench in *R. v Secretary of State for the Environment*, *ex parte Greenpeace Ltd.*, [1994] 4 All E.R. 352 (Q.B.), at pp. 381-2, in rejecting a judicial challenge brought to the Secretary of State's decision not to refer to a public hearing a proposal to process spent nuclear fuel at Sellafield in the U.K. During the second round of consultations on the operation of the reprocessing plant, there were 42 500 responses. Of these, 12 300 people called for a public inquiry, 102 local authorities responded on the issue of whether a public inquiry should be held and 85 of those demanded one. The breakdown on the local authorities was interesting because it showed that opinion results depended upon the question posed, i.e. whether the plant should operate or whether there should be a public review. Also of interest was the weight to be given to particular respondents. Should host communities' responses be given more weight than surrounding or further distanced communities? Of the local authorities who responded after being solicited, 4 were in favour of operation of the plant, including the local authority areas (Cumbria and Copeland Borough Councils) in which the project was located, while 23 were opposed. A further 22 expressed no opinion whether the processing facility should operate or not. Of the solicited responses from local authorities (49 in total), a full 39 local authorities requested a public inquiry (not however, the Cumbria and Copeland Borough Councils). There were a further 53 unsolicited responses from local authorities and 46 of those called for a public inquiry.

48. CNSC, *Environmental Assessment Guidelines for Bruce Power's Proposed Refurbishment for Life Extension and Continued Operation of the Bruce A Nuclear Generating Station* (decision 19 May 2005, reasons released 14 July 2005), CEA Registry No. 04-01-8081.

and CNSC with many types of refurbishment, operating and waste management activities that would be required to complete the project".

Scoping the project and the assessment factors

The responsible authority's discretion in scoping the project defines the course of the environmental assessment. Since the mandatory and discretionary assessment factors in CEAA, s. 16 follow the project description and must apply to it, two of the most important considerations in framing the project scope are spatial and temporal boundaries. In the 2007 Pickering B Refurbishment EA Guidelines decision, the CNSC recognised the importance of including any of the impacted Great Lakes adjacent to the facility,[49] areas beyond the facility covered by the protective actions recommended to be taken in the Provincial Nuclear Emergency Response Plan,[50] and areas within the transportation route for any waste generated by the project and relocated off-site. However, spatial boundaries appear to stop at the door of other licensed facilities that have been the subject of a previous EA. In the Bruce A Refurbishment EA Guidelines decision in 2005,[51] the Commission accepted that the subsequent storage of refurbishment waste at the adjacent Western Waste Management Facility (WWMF) operated by Ontario Power Generation Inc. would be captured by a consideration of any incremental effects which might occur at this facility in the context of cumulative effects of the refurbishment project. The narrower project scope thereby eliminated any consideration of such discretionary assessment factors as alternatives to the WWMF.

Temporal boundaries have been tentatively set for the Pickering B Refurbishment project at 2060, the time frame for the last refurbished reactor unit to complete its anticipated 30 years of operation.[52] In the EA Track Report decision for the Deep Geologic Repository for Intermediate and Low Level Waste Project,[53] CNSC Regulatory Policy P-290, *Managing Radioactive Waste,*[54] figured as an important consideration in temporal scoping. This policy provides that managing radioactive waste should proceed in a manner that protects human health and the environment for current and

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49. CNSC, *Environmental Assessment Guidelines (Scope of Project and Assessment) for the Proposed Refurbishment and Continued Operation of Pickering B Reactors at the Pickering B Nuclear Generating Station* (decision 24 January 2007, reasons released 3 April 2007), CEA Registry No. 06-01-21226, at para. 55.

50. *Ibid*, at para. 51.

51. CNSC, Bruce A Refurbishment guidelines, *op.cit.*, footnote 48, at p. 6. This decision is consistent with *Friends of the West Country Assn. v Canada (Minister of Fisheries and Oceans)*, [2000] 2 F.C. 263 (C.A.), leave to appeal to S.C.C. refused 262 N.R. 395*n* ("Sunpine" decision). This case and more recently *Prairie Acid Rain Coalition v Canada (Minister of Fisheries and Oceans)* (2006), 265 D.L.R. (4th) 154 (F.C.A.), leave to appeal to S.C.C. refused 266 D.L.R. (4th) vii, have confirmed the wide discretion given to responsible authorities in project scoping.

52. CNSC, Pickering B Refurbishment guidelines, *op.cit*., footnote 49, at paras. 52-5.

53. CNSC, *Environmental Assessment Track Report regarding Ontario Power Generation Inc.'s Proposal to Construct and Operate a Deep Geologic Repository within the Bruce Nuclear Site in Kincardine, Ontario* (decision 23 October 2006, reasons released 21 December 2006), CEA Registry No. 06-05-17520, at para. 52.

54. CNSC, Regulatory Policy P-290, *Managing Radioactive Waste* (July 2004), online at www.nuclearsafety.gc.ca/eng/resource/regulatory_docs/current_docs/index.cfm.

future generations. According to the Commission, this requires that an assessment be carried out until the predicted maximum impact.[55]

Under project scoping in the EA Guidelines decision for the Pickering B Refurbishment Project,[56] the CNSC considered intervenors' request for the inclusion of alternatives to the project such as renewable resources. The CNSC, in exercising its discretion, refused to include these alternatives within the project scope, their staff having explained to the Commission that this was a matter of energy policy outside of the CNSC's mandate. The Commission was even more explicit on this point in its decision in 2001 on the EA Track Report for the Pickering A Return to Service Project.[57] The CNSC dealt with the issue as part of the scoping of the assessment factors, since the need for and alternatives to the project were and are specifically referred to under CEAA, s. 16(1)(e). The Commission recognised it had a discretion to consider these factors and conceded that information could be placed before the Commission at the scoping stage which would indicate such severe adverse environmental consequences resulting from the project that would prompt a proponent to consider alternatives. However, as no such information was brought before the Commission, the Commission, relying on the decision of the Federal Court of Appeal in *Sharp v Canada (Transportation Agency)*,[58] rejected inclusion of need and alternatives. The Sharp decision concerned an application by Canadian Pacific Railway (CPR) under the Canada Transportation Act[59] for approval to construct a 12.6 km rail line in Alberta between its own operations and those of Union Carbide. The appellant opposed the application on the basis of environmental safety and land use impacts. She argued that the line was unnecessary as CPR railcars could interchange over existing Canadian National (CN) rail lines at Red Deer and complete the journey in CN railcars to the Union Carbide facility. The Canadian Transportation Agency, as part of its discretion, decided to consider need and alternatives but decided to rely on CPR's conclusion that the project was necessary to meet market needs and business objectives and that alternatives were less desirable. The Court of Appeal upheld this conclusion, stating that CEAA, s. 16(1)(e)

> …is not a back door means of reempowering the [responsible authority] with economic regulatory control… In cases in which it is able to determine that a project is environmentally acceptable, the [responsible authority] may not find it necessary to consider need and alternatives. However… [in] the case of a proposed project having… severe adverse environmental consequences… the [responsible authority] may consider it necessary to rigorously analyse the question of need and alternatives.[60]

There is a provincial regulatory framework for evaluating the appropriate energy mix in the Province of Ontario over the next 20 years and beyond. Pursuant to s. 25.29(1) of the Electricity Act, 1998,[61] the Ontario Power Authority (OPA) is required to make an assessment of the adequacy and reliability of electricity resources with respect to anticipated electricity supply, capacity, reliability

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55. CNSC, Deep Geologic Repository track report, *op.cit*., footnote 53, at para. 52.

56. CNSC, Pickering B Refurbishment guidelines, *op.cit.*, footnote 49, at paras. 36, 40.

57. CNSC, *Environmental Assessment Track Report regarding Ontario Power Generation's Proposed Return to Service of Pickering A Nuclear Generating Station* (reasons released 16 February 2001), FEA Index No. 18822, at pp. 9-10.

58. [1999] 4 F.C. 363 (C.A.), leave to appeal to S.C.C. refused 132 O.A.C. 377*n*.

59. Canada Transportation Act, S.C. 1996, c. 10.

60. Sharp, *supra,* footnote 58, at para. 28.

61. Electricity Act, 1998, S.O. 1998, c. 15, Sch. A.

and demand for assessment periods prescribed by the regulations. As part of such an assessment, s. 25.29(2) of the act requires the OPA to consider Ontario's generation and transmission capacities and technologies and conservation measures. Further, under the Integrated Power System Plan (IPSP),[62] the OPA is to submit a plan to the Ontario Energy Board covering a 20-year period from the date of submission of the plan. On 29 August 2007 the OPA submitted the IPSP to the board. Four key elements of the 4 000-page submission are the following: (1) a doubling of the amount of renewable energy to the grid by 2025; (2) the phase out of coal-fired generation by the end of 2014; (3) the refurbishment or replacement of the province's baseload nuclear capacity; and (4) transmission upgrades to achieve the policy and operational objectives of the plan.[63]

While it is beyond the scope of this paper to analyse and comment on the arguments for and against the need for and alternatives to nuclear energy, suffice it to say that there is no shortage of such studies on both sides of the issue.[64]

In finalising the EA Guidelines for Pickering B Refurbishment, the CNSC accepted their staff recommendation that credible accidents and malfunctions which would need to be included within the scope of the assessment were those accidents having a probability of occurrence greater than one in a

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62. Integrated Power System Plan, O. Reg. 424/04.

63. The full 4 000-page submission can be found online at www.powerauthority.on.ca/IPSP.

64. On 1 August 2007 the Pembina Institute released three papers on their website, www.pembina.org, entitled *Renewable is Doable: A Smarter Energy Plan for Ontario*. The authors present four separate scenarios to demonstrate that with conservation and demand management, renewable energy, combined heat and power opportunities (microturbines) in Ontario and hydro power purchases from adjacent provinces, future power needs in Ontario can be met without any new investment in new or refurbished nuclear capacity. In May 2007, the U.K. government, Department of Trade and Industry, issued its consultation document entitled *The Future of Nuclear Power: The Role of Nuclear Power in a Low Carbon UK Economy*. The government concluded that nuclear energy needed to be part of the future energy mix. At para. 32 of the Executive Summary, there is a recommendation that the decision on whether to allow energy companies to invest in new nuclear build needs to be taken now because of the long lead times to secure relevant regulatory and development consents and the long construction periods. With the opportunity for large-scale hydro being largely exhausted in the U.K., nuclear power was the only low-carbon form of base load generation proven on a commercial scale. Replacing existing nuclear capacity with wind power alone would require a jump of 23 GW. Assuming a turbine size of 2 MW this would mean 12 000 turbines. Each of the necessary 25 GW of wind power would cover around 10 000 hectares of land (para. 8.55). The U.K.'s ambitious goal is to reduce carbon emissions by 60% by 2050, and while its modelling showed that goal might be achieved without nuclear under certain assumptions, there was a significant risk to security of energy supply, particularly since nuclear facilities would be reaching their end of life and carbon capture and storage had yet to be proven on a commercial scale. "Profound behavioural changes" in energy use would be required, since demand for electricity would need to decline by 6% compared to current demand, when the economy was expected to grow to three times its current size. The U.S. Atomic Safety and Licensing Board, in a decision dated 28 July 2005, subsequently upheld by the U.S. Nuclear Regulatory Commission (NRC) on 12 December 2005, affirmed the Environmental Report prepared and submitted by Exelon in support of an early site plan for new unspecified nuclear reactor design potentially generating 2 180 MW of power in Clinton, Illinois. The board and the NRC rejected arguments that renewable resources such as solar and wind and combinations with natural gas or even fossil fuels were feasible alternatives, finding that assumptions about improvements in the efficiency of the technology were speculative and that solar was limited to daytime and wind was too variable to be reliable. An early site permit was issued by the U.S. NRC on 15 March 2007 for additional reactors with a capacity of up to 6 800 MW thermal. See online at www.nrc.gov/reactors/new-reactor-licensing.html.

million per year of operation.[65] To give some sense of this risk probability, consider that in the U.K.'s May 2007 paper on *The Future of Nuclear Power: The Role of Nuclear Power in a Low Carbon UK Economy*,[66] they refer to a European Commission study and conclude that the probability of a major accident such as a meltdown of the reactor core coincident with a failure to the containment structure is one in 2.4 million per reactor per year.

With heightened security concerns following the events of 11 September 2001, risk probability has become a topic of some interest in Canada, the U.K. and particularly the U.S.

Petitions in the U.S. were sparked particularly following the refusal of the Supreme Court to hear Pacific Gas and Electric's appeal in January 2007 in *San Luis Obispo Mothers for Peace v Nuclear Regulatory Commission*[67] (the "Diablo Canyon" decision). The Court of Appeals for the Ninth Circuit held that the U.S. Nuclear Regulatory Commission (NRC) could not categorically reject an environmental assessment of the effects of a range of terrorist scenarios on a proposed dry storage facility at Diablo Canyon for spent nuclear fuel simply on the basis that the scenarios were speculative and not quantifiable. The NRC's position was inconsistent with the administration's heightened security efforts after 9/11 and its licensing of their Design Basis Threats before 9/11. It was possible to conduct low-probability/high-consequence analysis without quantifying the precise probability of risk. Assessment should, according to the Ninth Circuit Court, include modes of attack, weapons and vulnerabilities of the facilities and the possibility of impact on the environment including various release scenarios.

Buoyed by the Diablo Canyon decision on 16 March 2007 the Attorney General for California filed a petition[68] requesting the NRC to rescind its codified Waste Confidence Decision,[69] which reflects the U.S. nuclear regulator's determination that spent nuclear fuel generated at any reactor can be stored safely and without significant environmental impacts for at least 30 years beyond the facility's licensed operating life. The Commission determined in the Waste Confidence Decision that a fire could only occur with a relatively sudden and substantial loss of coolant – a loss great enough to uncover all or most of the fuel, damaging enough to admit enough air to keep a large fire going and sudden enough to deny operators the time to restore the spent fuel pool to a safe condition. Such a severe loss of cooling water could only arise from an earthquake well beyond the conservatively estimated earthquake for which reactors were designed. The annual probability of such a major spent fuel pool failure was calculated at two chances in a million per year of reactor operation – "extremely rare".[70] The Commission went on to find that risks due to other accident scenarios – such as structural failure of the pool due to high-energy tornado or missiles, aircraft crashes and heavy load drops, inadvertent drainage of the pool and boil-down of the pool due to loss of spent fuel cooling or make-up water – are at least "an order of magnitude smaller".[71] The California petition, like a previous one

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65. CNSC, *Environmental Assessment Guidelines (Scope of Project and Assessment) for the Proposed Refurbishment and Continued Operation of Pickering B Reactors at the Pickering B Nuclear Generating Station* (decision 24 January 2007, reasons released 3 April 2007), CEA Registry No. 06-01-21226, at para. 57.

66. U.K., Department of Trade and Industry, *The Future of Nuclear Power*, op. cit., footnote 64, at p. 105.

67. 449 F.3d 1016 (9th Cir. 2006), *cert.* denied 127 S. Ct. 1124 (2007).

68. NRC Petition for Rulemaking No. PRM-51-12, 72 FR 27068 (21 March 2007).

69. NRC Waste Confidence Decision, 55 FR 38474 (1990), codified at 10 CFR 51.23.

70. *Ibid*, at p. 38481.

71. *Ibid.*

filed in August 2006 by the Massachusetts Attorney General,[72] alleges that there is new and significant information concerning the potential for spent fuel fires in connection with high-density spent nuclear fuel pool storage.[73]

The Nuclear Regulatory Commission has basically ignored these arguments. In its supplemental environmental assessment for Diablo Canyon, issued on 31 August 2007,[74] the NRC staff determined that

> …the construction, operation, and decommissioning of the Diablo Canyon ISFSI [Independent Spent Fuel Storage Installation], even when potential terrorist attacks on the facility are considered, will not result in a significant effect on the human environment. NRC security requirements, imposed through regulations and orders, and implemented through the licensee's security plans, in combination with the design requirements for dry cask storage systems, provide adequate protection against successful terrorist attacks on ISFSIs. Therefore, a terrorist attack that would result in a significant release of radiation affecting the public is not reasonably expected to occur.

The Nuclear Regulatory Commission has further refused to follow the Ninth Circuit Court of Appeals decision in Diablo Canyon in any of its licensing hearings outside the court's jurisdiction. On 26 February 2007 the NRC, in three separate licensing cases in New Jersey,[75] Michigan[76] and Mississippi,[77] decided that it would not consider the environmental consequence of hypothetical terrorist attacks on NRC facilities because these scenarios were considered far too removed from natural or expected consequences. In the reasons given in the Amergen Energy case,[78] the NRC challenged the Ninth Circuit Court of appeals ruling on the basis that it ignored two previous decisions from the U.S. Supreme Court.[79] According to the NRC, the court in those cases regarded the National Environmental Policy Act of 1969[80] (NEPA) as setting, as a precondition to the Commission's environmental oversight, a causation requirement analogous to the tort law concept of proximate

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72. NRC Petition for Rulemaking No. PRM-51-10, 71 FR 64169 (25 August 2006).

73. The Nuclear Energy Institute has filed written submissions with the NRC opposing both petitions, on 19 March 2007 for Massachusetts and on 30 July 2007 for California.

74. NRC, Notice of Availability of Supplement to the Environmental Assessment and Final Finding of No Significant Impact for the Diablo Canyon Independent Spent Fuel Storage Installation, 72 FR 51687 (10 September 2007), at p. 51688.

75. NRC Order No. CLI-07-08 (26 February 2007), Amergen Energy Co. LLC (Licence renewal for Oyster Creek Generating Station). Commission documents are available online at www.nrc.gov/reading-rm/doc-collections/commission. On 21 September 2007, the New Jersey Department of Environmental Protection petitioned the U.S. Court of Appeals for the Third Circuit to reverse the NRC decision and require that an environmental impact study be completed of an air attack at the Oyster Creek facility: Court File No. 07-2271.

76. NRC Order No. CLI-07-09 (26 February 2007), Nuclear Management Co. LLC (Licence renewal for Palisades Generating Station).

77. NRC Order No. CLI-07-10 (26 February 2007), System Energy Resources Inc. (Early Site Permit for Grand Gulf Site).

78. NRC, Amergen Energy Co. order, *op.cit.*, footnote 75.

79. *Metropolitan Edison Co. v People Against Nuclear Energy*, 460 U.S. 766 (1983), at pp. 772-5; *Dept. of Transportation v Public Citizen*, 541 U.S. 752 (2004), at p. 767.

80. National Environmental Policy Act of 1969, 42 U.S.C. 4321 (2000).

cause. There was simply no proximate cause link between the NRC's licensing action and any altered risk of terrorist attack. Any such risk depended upon political, social and economic factors external to the licensing process.[81]

The NRC's position on proximity has implications for the implementation of the necessary mitigation measures to defend against terrorist attacks. Petitioners requested the NRC to amend its Design Basis Threat regulations to allow for a sufficient margin of safety to encompass the terrorist capabilities evidenced by the attacks of 11 September 2001. In particular, they requested a requirement for nuclear operators to construct shields known as "beamhenges" which would enable a nuclear power plant to withstand an air attack from a jumbo jet. The NRC rejected this request as well:

> [F]irst, the NRC has determined that active protection against the airborne threat rests with other organizations of the Federal government, such as NORTHCOM and NORAD, TSA, and FAA. The NRC will continue to test these relationships through exercises. Second, licensees have been directed to implement certain mitigative measures to limit the effects of an aircraft strike. To the extent that commenters have suggested the imposition of specific physical security measures such as the "beamhenges" concept, the NRC has considered on the issue, but has rejected the concept because it believes that the mitigation measures in place are sufficient to ensure adequate protection of the public health and safety.[82]

Recognising that the impact of a large commercial aircraft was a beyond design basis event, the majority of the members of the NRC recommended rejection of an expedited rulemaking proposed by the Commissioner Jaczko in February 2007 which would have amended the Code of Federal Regulations[83] to require applicants for new nuclear plant licences to demonstrate that their plant designs would withstand an aircraft impact "such that there would be no release of significant quantities of radioactive materials to the environment". Instead the majority recommended the amendment of the code to include a requirement that licence applicant include a description and evaluation of the design features, functional capabilities and strategies to avoid or mitigate the effects of the applicable beyond design basis aircraft impact. The assessment would include core cooling capability, containment integrity and spent fuel pool integrity. The application would describe how the design features, functional capabilities and strategies to the extent practicable "would avoid or mitigate the effects of the applicable aircraft impact with reduced reliance on operator actions".[84]

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81. NRC, Amergen Energy Co. order, *op.cit*., footnote 75, at p. 9.

82. NRC Paper No. SECY-06-0291 (30 October 2006), Final Rulemaking to Revise 10 CFR 73.1 Design Basis Threat (DBT) Requirements, at pp. 22-3. The DBT rule was published on 19 March 2007 at 72 FR 12705. The State of New York filed a petition for review which was subsequently transferred and consolidated in the U.S. Court of Appeals for the Ninth Circuit with a petition filed by Public Citizen and San Luis Obispo Mothers for Peace on 11 May 2007. New York's Brief challenging the Final DBT Rule was filed on 24 October 2007.

83. 10 CFR Part 52.

84. NRC, Staff Requirements Memorandum, Staff Requirements – SECY-06-0204 – *Proposed Rulemaking – Security Assessment Requirements for New Nuclear Power Reactor Designs* (24 April 2007). On 3 October 2007 the NRC published a proposed rule on "Consideration of Aircraft Impacts for New Nuclear Power Reactor Designs" in the Federal Register at 72 FR 56287. Public comments were due on 17 December 2007.

Bill C-5, the Nuclear Liability and Compensation Act

On 26 October 2007, Bill C-5[85] received first reading and on 30 October, following second reading, it was referred to a committee of the House of Commons. On 27 November 2007 the House Standing Committee on Natural Resources heard from the nuclear and insurance industries, the Canadian Association of Nuclear Host Communities (CANHC) comprised of 10 municipalities located in Ontario, Quebec, Manitoba and New Brunswick, and Greenpeace. The Bill would replace an act which is over 30 years old and will increase the insured liability of nuclear operators from CAD 75 million[86] to CAD 650 million.[87] At the parliamentary committee hearing on 27 November 2007,[88] the CANHC sought a higher insured liability, particularly where a nuclear facility is located in a densely populated area. Greenpeace sought the complete removal of the liability cap. Both CANHC and Greenpeace expressed a preference for an American style industry pooling of liability. In the United States, pursuant to the portion of the Energy Policy Act of 2005 commonly referred to as the Price-Anderson Amendments Act of 2005,[89] each operator undertakes to indemnify, in the event of a nuclear incident, up to USD 100 million per reactor unit at USD 15 million a year. As there are 104 reactors in the U.S., this contingent liability currently amounts to over USD 10 billion. In Canada, by contrast, there are currently only 22 reactor units, and either the amount of coverage by pooling would be considerably smaller, or the operators would be required to commit to pay a great deal more for each of their reactors. Germany was also mentioned by Greenpeace as a potential model for a nuclear liability regime at the November committee hearing. The liability cap in Germany is set at EUR 2.5 billion and is satisfied by a private "Solidarity Agreement" concluded between the four parent companies of the 17 German nuclear power plants. Under the agreement, the insurance industry covers the first EUR 255.6 million of the liability cap while the four parent companies guarantee the remaining EUR 2.24 billion by a pooling arrangement. As in the U.S., the companies are not obliged to pay their contribution in advance, but only after an incident has occurred. The companies who pay their contribution gain a right of recourse against the operator of the plant responsible; however, the claims of the victims for compensation have priority over those rights of recourse.[90] Germany, however, may not be an appropriate model for Canada, as in 2002, the Social Democratic/Green Party coalition amended the 1959 German Nuclear Act to phase out nuclear power. That decision has not been revisited by the new Government.[91]

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85. Bill C-5, An Act respecting civil liability and compensation for damage in case of a nuclear incident (Nuclear Liability and Compensation Act), 2nd Sess., 39th Parl. (first reading 26 October 2007; second reading 30 October 2007; committee report 12 December 2007).

86. Nuclear Liability Act, R.S.C. 1985, c. N-28, s. 15(1).

87. Bill C-5, s. 21(1).

88. Bill C-5, committee meeting 27 November 2007, minutes of proceedings, online at www.parl.gc.ca/legisinfo.

89. Energy Policy Act of 2005, Pub. L. 109-58, 119 Stat. 594 (2005); Title VI, Subtitle A known as Price-Anderson Amendments Act of 2005, Pub. L. 109-58, sec. 601, 119 Stat. 594, 779 (2005), amending Price Anderson Act, 42 U.S.C. 2210 (2000), Subchapter XIII of Atomic Energy Act of 1954, 42 U.S.C. 2011 (2000).

90. Pelzer, Norbert (2007), "International Pooling of Operators' Funds: An Option to Increase the Amount of Financial Security to Cover Nuclear Liability?" *Nuclear Law Bulletin* No. 79 at pp. 43-5.

91. Raetzke, Christian and Micklinghoff, Michael (2006), *Existing Nuclear Power Plants and New Safety Requirements — An International Survey* (Carl Heymanns Verlag), at p. 12.

Under Bill C-5, Cabinet would have the authority to increase the amount of the cap by regulation.[92] Operators may substitute for mandatory insurance a portion of the coverage by other acceptable financial security.[93] At the committee hearing on 27 November 2007, the nuclear industry sought the greater flexibility to access available markets for the entire amount of the coverage. In response to the experience of Three Mile Island, where there proved to be no release to the environment, Bill C-5 now covers damages caused by preventative measures recommended by the authorities acting under a federal or provincial nuclear emergency scheme,[94] regardless of whether there was a radioactive release into the environment. Other notable changes include coverage of transportation accidents involving radioactive material,[95] psychological harm,[96] economic loss,[97] lost wages and damages from loss of use of property,[98] other than the costs resulting from the failure of the responsible nuclear generating facility to provide electricity,[99] and the reasonable costs of remedial measures taken to repair, reduce or mitigate environmental damage caused by a nuclear incident, if the measures were ordered by an authority acting under a federal or provincial environmental protection legislation.[100] The new bill would increase the limitation period on bringing a claim for bodily injury from the current 10 years[101] to 30 years.[102] As with the current act,[103] the new act would allow the Minister to reinsure risks which an insurer is not willing to assume.[104]

At the committee hearings on Bill C-5 on 4 December 2007,[105] a spokesman for Natural Resources Canada pointed out that if the liability amount was raised above CAD 650 million, in light of the reinsurance agreement, some of the risks would be borne by the Federal Government. Consequently, a motion by the New Democratic Party (NDP) to amend the bill to increase the liability where the operator cannot establish its lack of negligence was ruled "out of order" by the Chair because it would "involve an increase in spending where a royal recommendation was involved".[106] The concern is more than speculative. At the 2 October 2007 Nuclear Inter Jura Congress of the International Nuclear Law Association in Brussels, representatives from the Swiss and British Nuclear Insurance Pools expressed reservations with the full insurability for liability arising from environmental damage. These reservations stemmed from a lack of identifiable insurable interest, no

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92. Bill C-5, s. 21(2).
93. Bill C-5, s. 24(2).
94. Bill C-5, s. 8(2).
95. Bill C-5, s. 8(1)(b).
96. Bill C-5, s. 14.
97. Bill C-5, s. 15.
98. Bill C-5, s. 16(1).
99. Bill C-5, s. 16(2).
100. Bill C-5, s. 17.
101. Nuclear Liability Act, s. 13.
102. Bill C-5, s. 30(2)(a).
103. Nuclear Liability Act, s. 16.
104. Bill C-5, s. 26(1), (2).
105. Bill C-5, committee meeting 4 December 2007, minutes of proceedings, David McCauley for Natural Resources Canada.
106. *Ibid.*

direct and quantifiable economic interest, difficulty establishing when particular damages occurred and poor industry experience with other "open-ended" exposures such as asbestosis.[107] Another NDP proposed amendment which was turned down by the committee on 4 December would have had a separate CAD 650 million liability limit apply to each reactor unit instead of the installation as a whole. Mr. McCauley, spokesman for Natural Resource Canada (NRCAN), pointed out that a single vacuum building would contain all the radionuclides from a multiple reactor facility in the event of an incident and for that reason there would be one liability cap for that facility, which would be designated as one installation for liability purposes, regardless of how many reactors it had. A second spokesman for NRCAN, Monsieur Henault, pointed out that the first tier of liability in the U.S. – USD 300 million – operated by station rather than by reactor unit, though he did concede that the pooling arrangement mentioned above operated by reactor unit.

Above the CAD 650 million coverage, payments are to be made by the government out of an account separate and apart from the Consolidated Revenue Fund, to be known as the Nuclear Liability Reinsurance Account.[108] Even assuming the bill were to receive Royal Assent early in 2008, before the act could become enforceable, regulations would be necessary for apportioning the percentage of the risk which may be guaranteed by financial security alternative to private insurance and the classes of insurable nuclear facilities.[109]

Long-term spent nuclear fuel management in Canada and disposal of low-level radioactive waste generated by uranium enrichment facilities in the United States

Following the enactment and proclamation of the 2002 Nuclear Fuel Waste Act,[110] the companies which own spent nuclear fuel resulting from the production of electricity by means of a commercial reactor were required to:

- establish a waste management organisation (Nuclear Waste Management Organisation or NWMO) as a separate legal entity to provide recommendations to the Government of Canada on the long-term management of used nuclear fuel; and to implement the approach selected by the Government;[111]

- establish trust funds to finance the long-term management of used fuel.[112]

In addition, the act directs the NWMO to establish an independent Advisory Council whose comments on waste management organisation's study and reports are made public.

The NWMO was required to submit to the Natural Resources Canada Minister, by November 2005, proposed approaches for managing used nuclear fuel and a recommended approach. This was done on schedule with the release in November 2005 of a Final Study entitled *Choosing a Way*

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107. Reitsma, Sebastiaan and Tetley, Mark, "Current Market Capabilities and Possible Future Insurance Arrangements" (unpublished).

108. Bill C-5, ss. 27(1), 58, 60, 61.

109. Bill C-5, s. 66.

110. Nuclear Fuel Waste Act, S.C. 2002, c. 23, Royal Assent 13 June 2002, proclaimed in force 15 November 2002.

111. Nuclear Fuel Waste Act, s. 6.

112. Nuclear Fuel Waste Act, s. 9.

Forward: The Future Management of Canada' s Used Nuclear Fuel.[113] The recommendation of the NWMO study was to pursue Adaptive Phased Management of the used fuel. This approach consists of the following:

- ultimate centralised containment and isolation of used nuclear fuel in an appropriate geological formation;
- phased and adaptive decision making;
- optional shallow storage at the central site prior to placement in the repository;
- continuous monitoring;
- provision for retrievability of the waste;
- citizen engagement.

On 14 June 2007, Natural Resources Canada announced that it had accepted the NWMO's recommended approach for managing spent nuclear fuel in Canada. "This is a safe, long-term approach. APM [Adaptive Phased Management] will ensure the used nuclear fuel is monitored and retrievable", said Natural Resources Minister Gary Lunn.[114] The NWMO will now begin planning and designing a site selection process collaboratively with the public.

At the end of 2007, the U.S. Court of Appeals for the District of Columbia Circuit upheld the Nuclear Regulatory Commission's decision to grant a licence for a new, privately owned facility in New Mexico to produce enriched uranium as fuel for nuclear reactors.[115] The petitioners argued, amongst other things, that the licence applicants failed to provide a reasonable cost estimate for disposing of the radioactive waste from the facility. To guard against unforeseen costs, the applicant had added a 25% contingency factor on top of the Department of Energy's cost estimate for waste disposal. The court conceded that the petitioners' argument that the costs were underestimated, because they were based on "near surface disposal" as opposed to deep disposal hundreds or thousands of feet underground, was "weighty".[116] Nevertheless, the court concluded: "We are not authorized to micromanage the NRC's licensure proceeding, or to second-guess its acceptance of reasonable cost estimates".[117] Judicial deference to a regulator in matters involving the balancing of environmental protection, costs and other benefits is not unique to American courts. In Canada, the appropriate inquiry on such a judicial review is also whether the decision maker had before it information from which it could reasonably reach its conclusion.[118]

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113. Nuclear Waste Management Organization, Choosing a Way Forward: The Future Management of Canada's Used Nuclear Fuel (November 2005), online at www.nwmo.ca.

114. Natural Resources Canada, News Release, 14 June 2007, "Canada's Nuclear Future: Clean, Safe, Responsible", online at www.nrcan-rncan.gc.ca/media/newsreleases/2007/200750_e.htm.

115. *Nuclear Information and Resource Service v Nuclear Regulatory Commission* [unreported, 11 December 2007, U.S.C.A. (D.C. Circ.)].

116. *Supra*, at p. 14.

117. *Supra*.

118. *Inverhuron & District Ratepayers' Assn. v Canada (Minister of Environment)* (2001), 39 C.E.L.R. (N.S.) 161 at paras. 38-39 (F.C.A.), leave to appeal to S.C.C. refused [2002] 1 S.C.R. vii, and more recently, *McLean Lake Residents' Assn. v Whitehorse (City)* (2007), 32 C.E.L.R. (3d) 60 (Y.T.S.C.), at para. 31.

Perspective on the Pros and Cons of a Pooling-type Approach to Nuclear Third Party Liability

*by Simon Carroll**

The system of third party liability for nuclear damage established in the 1960s has been the model for many national legal systems in countries with nuclear power programmes. However, this approach has been criticised. It is argued that, with compensation limited to certain types of damage and with limits set well below the possible consequences of an accident, not all damage arising from an accident might be compensated. Moreover, relatively low levels of operator liability mean that risks associated with nuclear power are borne by the general public and that the generation of nuclear electricity is effectively subsidised. Debate about nuclear liability and compensation arrangements increased markedly after the 1986 Chernobyl accident, which brought into stark relief numerous deficiencies in the existing regimes. The subsequent revision of the international nuclear liability and compensation conventions has sought to address this criticism by establishing higher liability amounts and broadening the range of compensable nuclear damage, whilst leaving much of the original 1960s liability and compensation structure unchanged.

Even with these proposed increases in operator liability and compensation amounts, it remains the case that not all the potential costs of a large nuclear accident will be covered by the revised conventions. The revisions of the nuclear liability and compensation conventions have also highlighted an additional problem in that the nuclear insurance industry seems unable to cover the full range and extent of the newly expanded third party liability of nuclear operators, as required by the revised instruments.

International pooling of operators' funds has been suggested as one way of addressing these problems.[1] This paper argues that there are some advantages to international pooling which, if correctly implemented, may help improve the current situation concerning liability and compensation for nuclear damage by complementing the current level of financial security provided by insurance and ultimately by ensuring greater compensation amounts would be available in the event of a nuclear

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1. Pelzer, Norbert (2007), "International Pooling of Operators' Funds: an Option to Increase the Amount of Financial Security to Cover Nuclear Liability? – Discussion Paper for the IAEA INLEX Group Meeting on 21-22 June 2007", *Nuclear Law Bulletin* No. 79, pp. 37-55.

accident. It starts from the perspective of the basic need to secure the broadened scope of liability under the revised conventions, thus guaranteeing greater compensation amounts and goes on to argue that pooling may be a mutually beneficial solution, offering advantages to operators, the electricity sector generally, insurers and governments. The question of whether such pooling might offer additional benefits, particularly in the European context, is also considered, for example, by realising greater harmonisation in liability and compensation arrangements, addressing the current and evolving structure of the electricity market and by strengthening nuclear safety.

1. The legal framework and its development

In the early days of the nuclear industry, government and industry experts identified a major barrier to the establishment of commercial nuclear power programmes, namely, the potential need for payment of considerable damages resulting from a nuclear accident and the lack of adequate available insurance. Private companies, unwilling to risk huge financial liability, viewed even the remote possibility of a serious accident as a roadblock to their participation in the development and use of nuclear power. Ensuring adequate financial protection to the public was also a cause of concern because the public had no assurance that it would receive compensation for personal injury or property damage from the liable party in the event of a serious accident. Government lawmakers, nuclear operators and insurers worked together to draft a specific liability framework for the nuclear industry.

This work ultimately lead to the creation of the two major international instruments establishing the framework for liability of nuclear operators – the OECD's 1960 Convention on Third Party Liability in the Field of Nuclear Energy (Paris Convention)[2] and the IAEA's 1963 Convention on Civil Liability for Nuclear Damage (Vienna Convention).[3] Both had two primary underlying objectives: (1) to establish a mechanism for compensating the public for personal injury or property damage in the event of a nuclear accident and (2) to encourage the development of nuclear power. To meet these objectives, the conventions impose strict, and absolute, but limited, liability on nuclear operators with a simultaneous requirement for them to financially secure their third party liability obligations for compensation following a nuclear accident at the site or during the transport of nuclear substances. In general, insurance is the most common method of meeting this financial security requirement.

While there are some differences in detail, the original Paris and Vienna Conventions have some important features in common. The 1963 Brussels Supplementary Convention[4] works together with the Paris Convention and aims to provide additional funds to compensate damage as a result of a nuclear incident where Paris Convention funds prove to be insufficient. It requires public funds be provided for this purpose, not only by the state where the liable operator's nuclear installation is located, but also by contributions from all parties to that convention.[5]

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2. The OECD Secretary General is the depositary for the Paris Convention which has been amended three times by Protocols adopted in 1964, 1982 and 2004. The 1960 Convention and the 1964 Protocol entered into force on 1 April 1968. The 1982 Protocol entered into force on 7 October 1988. www.nea.fr/html/law/nlparis_conv.html.

3. The IAEA Director General is the depositary for the Vienna Convention. The Convention entered into force on 12 November 1977. www.iaea.org/Publications/Documents/Infcircs/1996/inf500.shtml.

4. 1963 Brussels Convention Supplementary to the Paris Convention of 29 July 1960 on Third Party Liability in the Field of Nuclear Energy. No state may become or remain a party to the Brussels Supplementary Convention unless it is a party to the Paris Convention. www.nea.fr/html/law/nlbrussels.html

5. The combined Paris/Brussels regime provides for compensation to a maximum amount of SDR 300 million or about EUR 350 million.

The system of liability and compensation established by the Vienna and Paris/Brussels Conventions has weaknesses, and it was especially criticised in the aftermath of the Chernobyl accident which clearly highlighted the most serious deficiencies.[6] In comparison to the extent of damage caused by the Chernobyl accident, the liability and compensation amounts were woefully low. Many countries were also not party to either convention.[7] The scope of damage under both conventions was not sufficient to cover the most serious types of damage caused by Chernobyl. It became clear that economic losses, the cost of preventive measures, the cost of measures to reinstate an impaired environment and certain other losses resulting from such an impaired environment were likely to constitute major portions of the damage resulting from a nuclear incident. There were also problems with the time limits in which claims for compensation could be brought, the claims procedures and the limitations on the rules for determining which courts had jurisdiction to hear claims.

After the Chernobyl accident, the parties to both the Paris and Vienna Conventions adopted the 1988 Joint Protocol[8] as an interim step, intended primarily to address the limited geographical scope of the liability regimes. The Joint Protocol generally extends to states adhering to it the coverage that is provided under the convention (either Paris or Vienna) to which it is not already a Contracting Party.[9] It thus creates a "bridge" between the two conventions, effectively expanding their geographical scope. At the time, it was believed that the link established by the Joint Protocol would induce a greater number of Central and Eastern European (CEEC) countries to join the Vienna Convention, in particular those which were part of the former Soviet Union. However, this aspiration has only been partially realised.[10]

The international community soon recognised that in order to attract broad adherence to the international nuclear liability conventions and make them really effective, reform had to be more far reaching. In short, it had to ensure that, in the case of a nuclear accident, much greater financial compensation would be made available to a much larger number of victims and in respect of a much broader scope of nuclear damage, than ever before. The process of negotiating amendments to the Vienna Convention began in 1990 and was conducted under the auspices of the International Atomic

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6. For a description of the evolution of international nuclear law following the Chernobyl accident including the developments of the nuclear liability and compensation instruments, see OECD (2006), *International Nuclear Law in the Post-Chernobyl Period, A Joint Report by the OECD Nuclear Energy Agency and the International Atomic Energy Agency*, OECD, Paris.

7. The Vienna Convention was intended to be a global instrument but by the time of the 1986 Chernobyl accident, only ten states had ratified it and not one of these had a major nuclear programme. The Paris (and Brussels) Conventions provide a regional liability and compensation regime for nuclear damage for Western Europe and they had achieved wide-spread, but not universal, participation of Western European countries by the time of the Chernobyl accident.

8. The Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention (see www.nea.fr/html/law/nljoint_prot.html). The Joint Protocol entered into force on 27 April 1992.

9. For example, where a nuclear incident occurs for which an operator in a Paris Convention/Joint Protocol state is liable and damage is suffered by victims in a Vienna Convention/Joint Protocol state, those victims will be able to claim compensation for damage suffered against the liable operator as if they were victims in a Paris Convention state.

10. Some 18 countries from CEEC have ratified or acceded to the Vienna Convention. Yet, only 11 of those 18 countries have ratified or acceded to the Joint Protocol, a disappointing development for those who had hoped to link all of Europe with one single nuclear liability and compensation regime. See Schwartz, Julia A. (2006), "International Nuclear Third Party Liability Law: The Response to Chernobyl", *International Nuclear Law in the Post-Chernobyl Period*, OECD, pp. 37-72.

Energy Agency.[11] It concluded in 1997 with the adoption of a Protocol amending the Vienna Convention[12] and of the new Convention on Supplementary Compensation (CSC).[13] The Protocol amending the Vienna Convention entered into force on 4 October 2003. The CSC has yet to enter into force (see also Section 2.2 below).

The Contracting Parties to the Paris and Brussels Supplementary Conventions concluded in 1997 that while the Paris/Brussels regime was viable and sound, it, too, was in need of improvement. Amendments would be needed to increase the liability and compensation amounts, broaden the definition of damage and extend the scope of the conventions, similar to what had been done in the context of the revision of the Vienna Convention. It was considered necessary to ensure that the Paris/Brussels regime remained compatible with the revised Vienna Convention and that Paris Convention States would not be hindered from joining the new CSC. Work began officially in 1998 on revisions to the Paris Convention and in 1999 on revisions to the Brussels Supplementary Convention, and all amendments were adopted in 2004.[14] The 2004 amendments to the Paris and Brussels Supplementary Conventions have yet to enter into force (see also Section 2.2 below).

The revisions to the conventions respond to some of the criticisms made by increasing the amount of compensation available and the time frame in which claims can be made, and by expanding the range of damage that is covered by the conventions. In addition to personal injury and property damage, the revised conventions cover certain types of economic loss, the cost of measures to reinstate a significantly impaired environment, loss of income resulting from that impaired environment and the cost of preventive measures, including loss or damage caused by such measures.

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11. In light of the 1986 Chernobyl accident, the General Conference of the IAEA decided, in 1989, to establish a Standing Committee on Nuclear Liability (SCNL). Its mandate was to examine ways to strengthen the existing international legal regime governing third party liability in the event of another nuclear accident. The SCNL met formally 17 times, focussing on two objectives: (1) modernising and strengthening the Vienna Convention to provide a greater level of protection to third party victims of a nuclear accident to which that convention applied and (2) examining possibilities for mobilising additional funds internationally to supplement national funds made available by the "installation state" under its national law and its obligations under other nuclear liability conventions to which it might also be party. For a description of the SCNL process and key issues, see for example: IAEA (2007), *The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage – Explanatory Texts*, IAEA International Law Series No. 3, IAEA, Vienna.

12. The 1997 Protocol to amend the 1963 Vienna Convention on Civil Liability for Nuclear Damage (see www.iaea.org/Publications/Documents/Conventions/protamend.html).

13. The 1997 Convention on Supplementary Compensation for Nuclear Damage is a free-standing instrument whose objective is to provide additional compensation for nuclear damage beyond that established by the existing Paris and Vienna Convention or national legislation. It would do this through financial contributions from states which become parties. The CSC does not use operators' resources for its second tier of compensation but exclusively draws the supplementary layer of compensation from public funds. For a description of the negotiation of the CSC and its contents, see for example: IAEA (2007), *The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear*, *op.cit.*, at p. 62 *et seq*. www.iaea.org/Publications/Documents/Conventions/supcomp.html.

14. The 2004 Protocol to amend the 1960 Paris Convention (for the full text of the Protocol see www.nea.fr/html/law/paris_convention.pdf) and the 2004 Protocol to amend the 1963 Brussels Supplementary Convention (see www.nea.fr/html/law/brussels_supplementary_convention.pdf).

The new liability and compensation amounts would be higher than before with operator liability under the revised Paris Convention required to be at least 700 million euros (EUR) and total compensation available under the revised Brussels Supplementary Convention at EUR 1 500 million.[15] The amount provided under the revised Vienna Convention is considerably lower, at approximately EUR 180 million.[16] It is worth noting also, that in the formula to be used for calculating state contributions to the combined fund under the revised Brussels Supplementary Convention, the proportion to be raised is more closely related to the actual generation of nuclear power by participating states.[17]

2. Problems with the new conventions

Despite the improvements made by the amendments to the earlier instruments, the process has left some of the original criticisms unanswered or only partially addressed. Moreover, there remain problems in bringing the new amended instruments into force and in realising a coherent, comprehensive nuclear liability and compensation regime with broad international adherence.

2.1 Limits remain low and are arbitrary

The total cost of the 1986 Chernobyl accident is likely to remain uncertain and even speculative, but estimates place it in the order of hundreds of billions of Euros.[18] Thus even the new compensation amounts remain worryingly low when compared with the costs of the Chernobyl accident. There is

15. The amended Paris Convention also will officially recognise, for the first time, that a state with an unlimited liability regime may participate in the scheme established by the convention.

16. The minimum level of operator liability under the 1997 amended Vienna Convention is SDR 150 million.

17. Following the example of the CSC which imposes greater responsibility upon nuclear power generating states to provide compensation, the formula for calculating contributions to the international tier under the Brussels Supplementary Convention Protocol moves from one based equally on gross national product and installed nuclear capacity to one based 35% on gross domestic product and 65% on installed nuclear capacity. See Schwartz, Julia A. (2006), "International Nuclear Third Party Liability Law: The Response to Chernobyl", *op.cit*.

18. There is no single, internationally-accepted, methodology for assessing and valuing damage incurred as a result of a nuclear accident, particularly for damage arising in different countries. Different assessments include or exclude particular categories of damage to a greater or lesser extent, sometimes even entirely excluding particular types of damage from consideration. An illustration of the complexities involved can be seen by considering the Chernobyl accident. Most of the population of the Northern hemisphere was exposed, to various degrees, to radiation from the Chernobyl accident. Even now it is possible to arrive only at a reasonable, but not highly accurate, assessment of the ranges of doses received by the various groups of population affected by the accident. Some areas of agricultural land still are excluded completely from use and are expected to continue to be so for some time. In a much larger area, although agricultural and dairy production activities are carried out, the food produced is subjected to strict controls and restrictions on distribution and use. The progressive spread of contamination at large distances from the accident site caused considerable concern in many countries outside the former Soviet Union and the reactions of the national authorities to this situation were extremely varied, ranging from a simple intensification of the normal environmental monitoring programmes, without adoption of specific countermeasures, to compulsory restrictions concerning the marketing and consumption of foodstuffs. Some of these restrictions remain in place today. To date, the author is aware of no comprehensive overall assessment of the total costs of the Chernobyl accident which compiles and integrates the costs of these different damages, preventive responses and related actions in all affected countries.

therefore still a concern that a considerable amount of damage may remain uncompensated in the event of another major accident on a scale comparable to that of Chernobyl.

Additional problems arise because the liability of a nuclear operator may still be limited to a very small fraction of the potential costs of a nuclear accident.[19] This potentially shields the operator from the financial consequences of safety-related decisions. A limitation in operator liability below the likely cost of a major nuclear accident also constitutes a subsidy to the nuclear industry. The same may be said of existing compensation arrangements which allow for state funds to be provided in lieu of industry responsibility for the economic consequences of an accident. As such they fail to make any contribution to cost internalisation of the risks of nuclear power in electricity pricing, even if they do allow more compensation to be made available to potential victims.[20] A further consideration arises in that setting fixed compensation sums is not only arbitrary (in the absence of genuinely robust estimates of probable damage) but it is also unlikely to be valid over the longer term, unless they can be continually adjusted to take into account changes in the economic profile of accident consequences.[21]

2.2 Membership of the liability regimes remains limited

The goal to ensure broad participation in the new regimes has not been achieved.

The adoption of the 1997 Vienna Convention Protocol was seen as one of the most significant developments to have taken place in nuclear liability law for several decades. It was hoped that this new instrument would attract broad adherence by both nuclear power generating states and non-nuclear power generating states, whether or not they had been party to the original Vienna Convention.[22] The 1997 Vienna Convention entered into force on 4 October 2003, some six years after it had been adopted, having been ratified by the bare minimum number of states required for that purpose. No additional states have since ratified and the lack of wide adherence remains a challenge.[23] Some states, most notably perhaps the Russian Federation, instead chose to become parties to the original Vienna Convention.

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19. See for example, Faure, Michael G. and Vanden Borre, Tom (2007), "Economic Analysis of the Externalities in Nuclear Electricity Production: the US versus the International Nuclear Liability Scheme", paper presented to Nuclear Inter Jura Congress on 2 October 2007 in Brussels.

20. Some aspects of this criticism can be addressed if states charge the operators for the costs of making public money available.

21. An illustration of this can be seen in the context of natural disasters. In the United States, until recently, the number of lives lost to natural hazards each year has declined. However, the economic cost of response to, and recovery from, major disasters continues to rise. Each decade, the cost in constant dollars of property damage from natural hazards doubles or triples. See "Facing Tomorrow's Challenges – U.S. Geological Survey Science in the Decade 2007-2017", Circular 1309, U.S. Department of the Interior/U.S. Geological Survey (2007), p. 30. A similar "inflation" would also be expected for the costs of "man-made" disasters.

22. See Schwartz, Julia A. (2006), "International Nuclear Third Party Liability Law: The Response to Chernobyl", *op.cit.*

23. Five countries have ratified the 1997 Vienna Convention: Argentina, Belarus, Latvia, Morocco and Romania. Only Argentina and Romania have nuclear power generating capacity, and according to the IAEA's Power Reactor Information System of August 2007, those capacities were 935 MWe and 1 300 MWe respectively (see www.iaea.org/programmes/a2/).

There has also been a delay in the ratification of the revised Paris Convention and the revised Brussels Supplementary Convention.[24] In order for the Protocol amending the Paris Convention to enter into force it must be ratified by *two-thirds* of the Contracting Parties. For EU Member States, this was hoped to have taken place by the end of 2006, but this is not the case.[25] For the Protocol amending the Brussels Convention, ratification by *all* Contracting Parties is required.

Only four states have ratified the new Supplementary Compensation Convention (CSC).[26]

The revisions of the original liability and compensation conventions may not be supportive of broad adherence by a large number of states. In order to ensure a favourable environment for those considering investing in nuclear programmes, it is necessary for installation states, states involved in the supply of nuclear materials or services for these programmes and *all* other states that might be affected by a nuclear accident to be under the umbrella of the same liability and compensation regime. For a liability and compensation regime to be attractive to states seeking to maintain or increase their nuclear power programmes, the burdens imposed by a liability and compensation regime must not be too great. However, the expanded definition of damage, extended prescription periods and raised liability and compensation amounts are proving problematic for some countries.

Conversely, in order to be attractive for a state without nuclear power plants, the liability and compensation conventions must offer sufficient compensation, and the regime must not introduce unacceptable restrictions or burdens when seeking to obtain compensation for losses incurred. For such states, becoming party to one of the nuclear liability conventions is not necessarily an attractive proposition, even if the revisions are taken into consideration. This is not surprising as the Paris and Vienna Conventions were essentially developed to nurture emerging nuclear industries, and the recent revisions have done little to alter this fundamental characteristic of the instruments; protecting and promoting nuclear power remains a central feature. Even as revised, the levels of compensation are relatively low when compared to the likely costs of a serious accident. By becoming a party, a non-nuclear power generating state might actually restrict its possibilities of obtaining satisfactory legal remedies in the event of an accident.[27]

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24. The Protocol to the Paris Convention and the Protocol to the Brussels Supplementary Convention were opened for signature on 12 February 2004, but as of June 2008 neither of these instruments had entered into force.

25. According to the Council Decision of 8 March 2004, Member States which are party to the Paris Convention shall take necessary steps to deposit simultaneously their instruments of ratification of the Protocol with the Secretary General of the OECD "*within a reasonable time and, if possible, before 31 December 2006*". See Council Decision of 8 March 2004 authorising the Member States which are Party to the Paris Convention of 29 July 1960 on Third Party Liability in the Field of Nuclear Energy to ratify, in the interest of the European Community, the Protocol amending that Convention, or to accede to it, *Official Journal*, L 97/53, 1 April 2004.

26. The four states which have ratified the CSC are: Argentina, Morocco, Romania and recently the USA. Entry into force requires the ratification of at least five states with a combined minimum of 400 000 installed units (MW_{th}) of nuclear capacity.

27. See for example, Sands, Philippe and Galizzi, Paolo (1999), "The 1968 Brussels Convention and Liability for Nuclear Damage", *Nuclear Law Bulletin* No. 64, pp. 7-27; and Galizzi, Paolo (1998), "Questions of Jurisdiction in the Event of a Nuclear Accident in a Member State of the European Union", *Journal of Environmental Law* 8(1), pp. 71-97.

2.3 Fragmentation and the lack of a coherent regime

Less than half of the world's nuclear reactors are covered by the existing international conventions.[28] For those that are covered, the nuclear liability conventions do *not* provide a comprehensive and unified international legal regime for nuclear accidents. In fact, there is what has been called a "labyrinth" of intertwined international agreements on nuclear liability, the interrelations of which have become increasingly complicated.[29] Complications arise because earlier and revised versions of some of these instruments coexist, and states may become party to more than one instrument.[30]

Even in a relatively homogenous region like Europe – or the European Union – the picture is complex. Until recently, most EU Member States were party to the Paris/Brussels regime of nuclear liability and compensation which was deemed a sufficiently uniform situation for the European Commission not to consider specific EU measures in the same field.[31] Since the 2004 EU enlargement this is no longer the case as various new EU Member States are party to the original Vienna Convention, the revised Vienna Convention, the Paris Convention only or the Paris and Brussels Conventions; some have signalled their intention to adhere to the revised Paris Convention. Operator liability in Member States ranges from as low as EUR 50 million in Bulgaria and Lithuania to unlimited liability in Germany and Austria. Some EU Member States are not party to any of the international nuclear liability conventions. Indeed, for EU countries like Ireland, Luxembourg and

28. McRae has calculated that of the ten countries with the largest installed nuclear capacity, one half are members of an international nuclear liability regime. Overall, the nuclear power generating countries that operate outside the international compensation regimes account for more than half of worldwide installed capacity. See McRae, Ben (2000), "Overview of the Convention on Supplementary Compensation", in: *Reform of Civil Nuclear Liability*, OECD, p. 175. Similarly, Tetley calculates that the Vienna Convention covers 75 reactors, the Paris Convention 130 and that there are 235 reactors outside of these conventions. See Tetley, M. (2008), "Nuclear insurance: update on European & UK legislative & commercial positions affecting operations", Westminster Energy Forum "Risk & reward in future nuclear markets", London (UK), 7 February 2008.

29. Currently, there are at least eight such agreements, including the 1960 Paris Convention, the 1963 Vienna Convention, the 1963 Brussels Supplementary Convention, the 1988 Joint Protocol, the 1997 Protocol to Amend the Vienna Convention, the 1997 Convention on Supplementary Compensation, 2004 revised Paris Convention and the 2004 revised Brussels Supplementary Convention. For a comprehensive discussion of the interrelationship of the various conventions, see Horbach, N.L.J.T. (1999), "Contemporary Developments in Nuclear Energy Law: Harmonising Legislation in CEEC/NIS", *Kluwer Law International*, pp. 43-85. See also Brown, O.F. & Horbach, N.L.J.T. (1999), "Liability for International Nuclear Transport: An Overview"*, International Symposium on Reform of Civil Nuclear Liability*, Budapest.

30. A further complication is introduced by transitional measures introduced in some of the various new instruments, designed to facilitate adherence by new states.

31. Answer of Commissioner Matutes to Written Question E-2489/93 (S. Kostopolous), 1 September 1993 (94/C 240/45), in which it is stated, *inter alia*, that: "*All the Member States are parties to the 1960 Paris Convention save Luxembourg and Ireland, which have no nuclear installations on their territory. There is thus no need for the Commission to take the initiative suggested by the Honourable Member* [to lay down provisions in insurance law relating to the civil liability of operators of nuclear installations for any damage to persons, property and the environment]", *Official Journal*, C 240/24, 29 August 1994.

Austria[32] – who are gravely concerned about the risks of nuclear power in neighbouring countries, but with no nuclear power plants of their own – it would be difficult indeed to identify many reasons why they should accede to the current nuclear liability conventions.[33]

The impacts of this fragmented and limited membership cannot be understated. The widely divergent nuclear liability and compensation arrangements currently in place across the various EU Member States have profound implications for victims seeking compensation in the event of an accident as well as for operators needing to provide financial security. They raise concerns also in the context of establishing nuclear safety standards and for competition in the EU electricity market. The problem created by this current situation has been recognised by the European Commission, which is currently undertaking an impact assessment to explore the range of possible solutions and prepare a proposal to the Council.[34]

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32. Although not a party to any of the conventions, Austria has enacted specific legislation covering liability for nuclear accidents. Austria's nuclear liability legislation rejects many of the fundamental principles underlying the current nuclear liability regimes. Under its legislation, for example, the operator of a nuclear installation may not be exclusively liable. Victims may even assert a claim against a nuclear operator or supplier pursuant to other liability legislation in force, for example product liability legislation. Nor are victims precluded from pursuing claims against more than one defendant. The liability imposed is in all cases unlimited. There are no time limits during which claims may be brought. Prescription periods are determined by the general law of civil procedure of Austria. Austrian courts have jurisdiction to determine claims and Austrian law is applicable, regardless of where the incident causing damage took place, subject only to certain limited exceptions. See Federal Law on Civil Liability for Damages Caused by Radioactivity [Bundesgesetz über die zivilrechtliche Haftung für Schäden durch Radioaktivität (Atomhaftungsgestz 1999), BGBl I No. 170/1998]. A description is given in Hinterregger, M. (1998), "The New Austrian Act on Third Party Liability for Nuclear Damage", *Nuclear Law Bulletin* No. 62, pp. 27-34.

33. It should be noted, in this respect, that Commissioner Matute's response to the Parliamentary question described above, is deficient. Although neither Ireland nor Luxembourg have nuclear installations, they may be affected by a nuclear accident at a reactor located in one of the other EU Member States. In such circumstances, the fact that they are not party to the Paris Convention might pose problems in that provisions of the Paris Convention might not apply with respect to them. This creates the possibility of claims being pursued through other mechanisms, without the limitations on type of damage, time periods and amounts of liability of the operator, or the channelling, exclusivity and other special requirements favourable to the nuclear operator, which are established by the Paris Convention. Plaintiffs in such countries might seek compensation through the courts in their own country, i.e. where the damage occurred (or at the plaintiff's discretion, in the country where the incident occurred), relying on the general conflict of law rules relating to international jurisdiction, including, for example, the 1968 Brussels Convention on the Jurisdiction and Enforcement of Judgements in Civil and Commercial Matters. See Galizzi, "Questions of Jurisdiction in the Event of a Nuclear Accident", *op.cit*. While the outcome of such a proceeding is by no means certain, it might be considered to offer certain advantages not found in pursuing claims pursuant to the limitations of the Paris Convention. See also Sands and Galizzi, "The 1968 Brussels Convention", *op.cit*.

34. In January 2007 the Commission stated: *"The Commission is aiming at harmonising the nuclear liability rules within the Community. An impact assessment will be started to this end in 2007."* See Illustrative Nuclear Programme, Presented Under Article 40 of the Euratom Treaty for the Opinion of the European Economic and Social Committee, Communication from the Commission to the Council and the European Parliament, COM (2006) 844 final, European Commission, 12 July 2007. This aim was restated by EU Energy Commissioner Andris Piebalgs at the Nuclear Inter Jura Congress on 2 October 2007 in Brussels.

2.4 Problems of insurance

The nuclear liability conventions and national legislation which implements them have established a link between insurance coverage and liability amounts. In order to ensure that funds would be available to pay claims, it was made compulsory that some kind of financial security would be provided. Most typically, this security has been furnished in the form of third party liability insurance. The desire to protect the industry and the necessity of relying on insurance has required both monetary and temporal limits on compensation. Although the capacity for nuclear insurance has increased greatly over the years, it still remains limited. Governments have generally stipulated a level of financial security that does not exceed the capacity of the insurance industry, and for which the premiums required would not go beyond what the operators could afford. Thus the capacity of the private nuclear insurance market is also a major factor in determining the amount and extent of liability imposed on nuclear operators.

As Pelzer rightly notes, the consequence of this is that liability amounts exist worldwide which largely correspond to the insurance capacity but which do not necessarily match the nuclear risk.[35] The expanded scope of operator liability and the raised liability limits introduced by the amendments need to be seen in this context.

During the negotiations to revise the Vienna and Paris Conventions, representatives of the nuclear insurance industry stated that some of the proposed amendments would be problematic.[36] In particular, the nuclear insurance industry was concerned that there would be:

- Insufficient private insurance market capacity to insure nuclear operators against raised liability amounts (the amount of cover available).

- An unwillingness of the market to cover extended/extinction periods during which an operator would be liable (the increase from 10 to 30 years).

- A difficulty in that private insurance could not cover all the categories included in the expanded definition of damage (scope of the cover required).

The concerns of the nuclear insurance industry regarding the "full insurability" of these various risks stem from a variety of issues. In some cases, particularly for "reinstating a significantly impaired environment", insurers take the view that there is no "insurable interest" to be protected or that there is no quantifiable economic interest. They maintain that it will be difficult to establish the type and extent of damage caused by the accident and at what stage of progression that damage occurred; they point out that it is not always easy to relate decreases in land values to a particular source. They have expressed concerns over uncertainty as to how courts may define or interpret a "significant" impairment of the environment. Finally, they have indicated their opposition to extended prescription periods both on the basis of problems related to causality and the difficulty of quantifying exposure,

35. See Pelzer, N. (2007), "International Pooling of Operators' Funds", *op.cit*., p. 37.

36. *Ibid*, at p. 39. The nuclear insurance industry made its concerns known at an early stage in the discussion of the amendments to the Paris Convention, see Letter of the Comité Européen des Assurances of 8 December 2000.

the need to defend against speculative claims and the questioned value of legally authorised exposure limits.[37]

This has direct consequences for nuclear operators as they may no longer be able to obtain private insurance coverage to cover their full liabilities under the amended Vienna and Paris Conventions. Tetley summarised the concern thus:

> "The financial uncertainties introduced by the new heads of cover under the revised conventions will cause a reduction in insurance cover unless a consistent approach is found to deal with the unquantifiable risks imposed upon the nuclear operators".[38]

The gap which has opened up between what the liability risks the operators are required to assume under the revised convention and the coverage available from private insurers, is causing problems and is delaying ratification of the revised liability conventions.[39] Additional difficulties may arise, as the monopoly of the national nuclear insurance pools creates problems for the operators who are paying high premiums and for the authorities, who do not know what the exact capacity of the insurance market is and are therefore confronted with information asymmetry.

The current situation is that governments have signed up to the revised arrangements for nuclear liability and compensation which the nuclear insurance industry finds difficult to implement. As a result operators and the insurance industry are putting pressure on governments not to ratify the revised conventions until there is an initial guarantee that their additional exposure to risks will be met with government assistance. All of these considerations together serve to delay the entry into force of the amended Paris and Brussels Conventions.

3. Finding a way forward

3.1 Addressing the problem of insurance

The contention that aspects of environmental damage under the revised conventions are ambiguous and ill-defined so as to make them completely uninsurable can be challenged. However, the core question that emerges is whether the private insurance industry, simply because it is unable or unwilling to make cover available at the appropriate price to the industry, should automatically let the burden fall on society as a whole.

In accordance with the conventions, gaps in insurance coverage have to be covered by the installation state which has to step in to the extent that insurance or other financial security is not available or insufficient. Tetley argues that if insurance cover is not available to cover the increased liability under the revised conventions, then the liability for the increased scope of cover should be

37. Tetley, M. (2006), "Revised Paris and Vienna Nuclear Liability Conventions – Challenges for Nuclear Insurers", *Nuclear Law Bulletin* No. 77, pp. 27-39.

38. *Ibid*, at p. 39.

39. Schwartz, Julia A. (2007), "Alternative Financial Security for the Coverage of Nuclear Third Party Liability Risks", paper presented to Nuclear Inter Jura Congress on 2 October 2007 in Brussels.

accepted by governments. Moreover, the charges should not be passed on to operators.[40] This would make liability conditional on the availability of insurance which would not be acceptable in general. As Pelzer has commented:

> [L]egislators cannot agree to that view nor is it in the best interest of operators – not to mention the interest of possible victims – to be tied to the insurance industry without alternatives. For good reasons and after long difficult negotiations, States agreed on the revised conventions with a view to establishing a more risk adequate liability regime and to better protecting victims. There is no 'inconsistent approach' which would warrant a change or an insurance adequate streamlining of the new liability concept only for the reason that the insurance industry is unable to cover the liability.[41]

From the perspective of potential victims there is a pressing need to ensure full and effective compensation for the full liabilities from nuclear power. The appropriate question is how nuclear operators can meet these new liabilities, not how they can escape from them. The challenge is to find a way that enables operators to demonstrate that these liabilities are adequately and securely covered. Nuclear operators will need to obtain financial security for their outstanding liabilities through means other than insurance.

One alternative might be for governments to provide the additional security required, whilst requiring nuclear operators to pay a fee for the service. For example, in Sweden, it is proposed that the government be authorised to provide alternative financial security subject to charges, within the framework of a state guarantee.[42] The United Kingdom Government also recognised the concern in a recent consultation paper, in which it stated:

> When the revised Conventions are implemented in the UK there will be an increase in the liability amount and the cost of insurance for UK nuclear operators (present ones and any future ones). To the extent that commercial cover cannot be secured for all aspects of the new operator

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40. Tetley, M. (2006), "Revised Paris and Vienna Nuclear Liability Conventions", *op.cit*, at p. 38. He argues also that these costs should not be passed on to operators as pricing will be difficult, noting that these costs are currently not quantifiable by the insurance industry.

41. Pelzer, N. (2007), "International Pooling of Operators' Funds", *op.cit*, at p. 47.

42. In Sweden, at least for the moment, private nuclear insurance will not be available to fully cover the EUR 700 million of liability to be imposed upon a nuclear operator under the 2004 Protocol to Amend the Paris Convention. Not only will insurance capacity be unavailable for that amount but it will equally be unavailable (in whole or in part) for certain types of risks which nuclear operators will be required to assume once the Protocol has come into force, such as claims made more than ten years following the date of the incident or the costs of reinstating a significantly impaired environment. The Swedish Government's Inquiry into an appropriate nuclear liability regime for that country concluded that the Government (should) be authorised by the Swedish Parliament to provide alternative financial security to supplement the amount of (currently) available insurance, subject to charges that are calculated on the basis of standard commercial terms and that conform to European Union regulations regarding restrictions against competition, within the framework of a state guarantee. This self-financed commitment should preferably take the form of a reinsurance commitment so that financial coverage of the operator's liability may be available for up to EUR 1 200 million, the amount required to be paid by operators and by their governments under the first two tiers of the Brussels Supplementary Convention as amended by the 2004 Protocol. Summary of the Report of the Swedish Government Inquiry in the Swedish Government Official Report Series (SOU) 2006:43, p. 27 *et seq*.

liabilities, the Government will explore the alternative options available – including providing cover from public funds in return for a charge.[43]

State intervention to cover private liabilities would conflict with the polluter-pays principle and would interfere with principles of market economy. It is likely that, at best, the price of state guarantees will only partially reflect the real liabilities.[44] Under such an arrangement it will be society at large that ultimately bears the cost of some of the damage caused by a nuclear accident. Use of public funds would effectively serve as a continuing subsidy to nuclear electricity generation by failing to internalise the recognised liabilities of nuclear power. In addition, using new and additional public funds to implement the revised liability conventions is likely to generate new public debate about state support for nuclear power. Pelzer suggests that, rather than seeking new financial guarantees through government intervention, nuclear operators would better serve their own interests by identifying solutions to cover the insurance gaps through their own resources.[45]

3.2 Addressing the problem of alternative financial security – operators' pooling

Operators' pooling could provide additional financial security in two ways. First, it could be used to fill gaps in coverage due to specific exclusions from insurance coverage. Secondly, it could be used to increase the total amount of compensation beyond the capacity of the insurance industry. Using pooling for both purposes is desirable. The principal advantage of an operator pooling system is that large sums of private money, as opposed to public funds, can be made readily available to compensate victims of a nuclear accident. There are other potential advantages for the operator, including the fact that this option could be a cost-effective supplement and an alternative to other forms of financial security, provided pooling can be organised appropriately.[46]

There are currently two national operators' pooling arrangements which exist. One of them is in the United States and the other in Germany. The United States pooling system is based on a statutory obligation or duty of the individual operator to contribute. The German system is formed by a voluntarily concluded contract under civil law among the four leading German energy producing companies. Both systems have demonstrated a capacity to deploy considerably larger compensation amounts than those required under the nuclear liability conventions, including the raised amounts which followed the revisions to the Paris and Brussels Conventions. The sums are orders of magnitude greater than those currently being offered by the insurance industry. These arrangements show that it is possible to have a liability and compensation regime as a collective responsibility of the nuclear industry that makes much higher amounts of compensation available for victims and ensures a better internalisation of the nuclear risk.[47]

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43. HMG 2007, The Role of Nuclear Power, Consultation 2007.

44. These costs should be market reflective and should take into account risk differentiation etc. It is far from sure that any governmental institution is well equipped enough to assume this difficult task, and thus whether such an institution could do so in a more efficient manner than an insurance company or mutual insurance scheme. See for example, Faure and Vanden Borre (2007), "Economic Analysis of the Externalities in Nuclear Electricity Production", *op.cit.*, p 31.

45. Pelzer, N. (2007), "International Pooling of Operators' Funds", *op.cit.*, at pp 48-49.

46. *Ibid*, in particular pp. 46 *et seq*.

47. See for example, Schwartz, Julia A. (2007), "Alternative Financial Security for the Coverage of Nuclear Third Party Liability Risks", *op.cit.*, p. 18; and Pelzer, N. (2007), "International Pooling of Operators' Funds", *op.cit.*, at pp. 43-45.

3.2.1 The United States Model

In the United States, nuclear liability is governed by the Price-Anderson Act, adopted in 1957. The act sets out requirements governing maximum available insurance, liability limits and channelling of compensation claims. On 19 December 2007, the President of the United States signed into law the Energy Independence and Security Act of 2007, section 934 of which implements the CSC.[48]

The 1957 Act was similar to the international compensation regime in that it limited the nuclear operator's liability and made public funding available to compensate for victims of a nuclear accident. Under the 1957 act, the nuclear operator needed to buy all the insurance coverage then available, which at the time was USD 60 million. On top of that amount, the government agreed to make available an amount of USD 500 million through indemnification agreements. Thus, the major part of the compensation scheme provided for by the 1957 Price-Anderson Act consisted of public funds.

One feature of the Price-Anderson Act is that it is periodically revised.[49] One such revision was made in 1975 which was an important step in shifting the burden of liability and compensation to the nuclear operator. Although the total compensation amount was at that time kept at the same level as in 1957, it was decided that the part composed of public funds needed to disappear gradually. This was achieved by phasing out the indemnification agreements and replacing them by a system of retrospective assessments. This introduced a new tier in the compensation scheme paid for collectively by nuclear operators, to be used if the damage exceeded the amount of the nuclear operator's individual liability. The contribution from public funds was reduced by a corresponding amount. This collective tier is financed by all American nuclear operators which have received a licence from the US Nuclear Regulatory Commission (NRC). It implies an additional financial protection per power plant and per incident, payable in annual installments up to a certain maximum amount per incident per power plant. The effect of the 1975 amendments to the Price-Anderson Act was such that, by 1982, the American nuclear compensation scheme offered exactly the same amount as in 1957, but it was entirely financed by private funds: both the individual and the collective tier had to be provided for by nuclear operators. It was also decided that the individual liability insurance coverage of each nuclear operator should be consistent with the evolution of the American nuclear insurance market and that thereafter the total amount in the collective tier would increase as new nuclear reactors became operational, with the amount to be contributed per reactor being periodically adjusted for inflation.[50]

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48. The United States actively participated in the work of the IAEA SCNL and played a major part in the development of the CSC. It also contributed to the work on revising the Paris and Brussels Conventions. For a description of the process relating to the CSC in the United States, see McRae, B., "The Role of the Convention on Supplementary Compensation", *op.cit.* For more on the implementation of the CSC, see Chapter on National Legislative and Regulatory Activities of this Publication, under United States.

49. It has been revised in 1966, 1975, 1988 and 2005.

50. The amount of the premium per reactor for the second tier is adjusted by inflation every five years. In 1982, operators had to buy an individual insurance coverage of USD 160 million and USD 400 million of retrospective premiums was to be generated under the second tier, giving a total of USD 560 million. In 1988, the individual operator insurance was set at USD 200 million and the second tier would contibute USD 9.5 billion, yielding a total of USD 9.7 billion [42 USC 2209(b)]. For an overview of the development of the United States liability legislation, see OECD Nuclear Energy Agency (2008), *Nuclear Legislation: Analytical Study - Regulatory and Institutional Framework for Nuclear Activities, OECD, 2000, United States, pp. 24-26, available at* www.nea.fr/html/law/legislation/usa.pdf.

The most recent change to the Price-Anderson Act was made in 2005.[51] As a result, the liability of the individual operator is now USD 300 million (currently about EUR 190 million), the second collective tier would yield USD 10.46 billion, and the total compensation available in the United States would be USD 10.76 billion (currently equivalent to EUR 6.82 billion).[52] If the total cost of an accident is less than this full amount, the per reactor contribution to the second tier is reduced accordingly.[53]

It should be noted that the size of the second tier is proportional to the number of reactors. If the United States nuclear power industry grows, the funds available in the event of a serious accident will increase accordingly. It should also be noted that the pooling system at national level in the United States requires that premiums or shares to be paid by an individual operator are only due after a nuclear incident has occurred and where the damage exceeds that covered by the individual operator insurance.

The international regime of the conventions and the United States national nuclear compensation schemes were originally very similar, but they have since evolved along different lines and are now markedly different. Both started from the idea that nuclear energy had to be supported by limiting liability and the use of public funds. In the United States it has since been accepted that this justification cannot be upheld. As a result, by 1982, the United States had effectively abandoned the public funding of nuclear damage, with one exception. Public funds may still be used in the event of a nuclear incident involving damages in excess of the limits established in the Price-Anderson Act, whereby Congress could take further actions, including the appropriation of additional funds for compensation. Nevertheless, the result of the changes to the Price-Anderson Act has been that the costs of a nuclear accident were increasingly internalised and that considerably greater compensation amounts have been secured than would have been the case without pooling. Although there are outstanding issues to consider under the Price-Anderson Act, in particular because individual operator liability remains limited thus still entailing possible recourse to public funds, it can be argued that there are clearer advantages under the United States nuclear liability legislation than under the current international nuclear conventions.

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51. See "Legislative updates", NEA (2005), *NEA News*, 23.2, p. 32, OECD, Paris.

52. The amount to be contributed to the second (collective) tier is currently set at USD 95.8 million per reactor, plus 5% for legal costs, with a maximum of USD 15 million per reactor per year. Currently there are 104 nuclear operators in the United States. On the basis of USD 300 million of the first tier plus [(95.8 plus 5%) x 104 = 10,461] of the second tier, the total amount of compensation available is USD 10.76 billion. See Faure and Vanden Borre (2007), "Economic Analysis of the Externalities in Nuclear Electricity Production", *op.cit.*, p.15.

53. This implies the following if a nuclear accident occurs in the United States causing USD 7 billion of damage. Under the first tier, the insurer will have to pay USD 300 million. This leaves a remainder of USD 6.7 billion to be covered by the second tier of the compensation scheme. This will be financed collectively by all the 104 nuclear operators in the United States. Each nuclear operator will pay, a total of USD 64.4 million (USD 6.7 billion/104 nuclear power plants) per power plant. As this payment is currently limited to USD 15 million per reactor per year, the outcome is that the second layer (USD 6.7 billion) will be financed by the operators over a period of five years, whereby each will pay USD 15 million during the next four years and USD 4.4 million in the fifth year, *ibid*.

3.2.2 The German model

The German Atomic Energy Act includes provisions relating to compensation for damage and injuries caused by nuclear energy or ionising radiation.[54] Germany is a party to the Paris and Brussels Conventions, as well as the Joint Protocol.[55] The Paris Convention and the Joint Protocol apply as national law in the Federal Republic of Germany, unless its provisions depend on reciprocity as effected by the entry into force of the convention.[56]

The original 1959 German Atomic Energy Act was intended to promote nuclear research and the development and use of nuclear energy for peaceful purposes. The German Government elected in 1998 decided to phase out the use of nuclear energy for electricity-generating purposes. The legal instrument to implement the phasing-out decision was the Act on the Structured Phase-Out of Nuclear Power for the Commercial Production of Electricity.[57] While the 1959 Atomic Energy Act was aimed at promoting the use of nuclear energy and preventing damages caused by the use of nuclear energy, the new act changed its purpose substantially. The promotional purpose of the act was deleted and replaced by provisions intended to phase out the use of nuclear energy for the commercial generation of electricity in a structured manner and to ensure on-going operation up until the date of discontinuation. Major changes were also made to the provisions relating to compensation for damage and injuries caused by nuclear energy or ionising radiation.[58]

In Germany the concept of operators' pooling was discussed as early as the beginning of the 1970s. In order to provide a total financial security of 500 million deutsch marks (DEM),[59] insurers and operators agreed to an arrangement whereby individual nuclear operators obtained third party liability insurance cover for DEM 200 million, and an additional DEM 300 million was covered by the insurers and re-insured by the entirety of the operators of nuclear power plants.[60] This arrangement remained valid until 2002.

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54. Gesetz über die friedliche Verwendung der Kernenergie und den Schutz gegen ihre Gefahren (Atomgesetz, AtG), Act on the peaceful utilization of atomic energy and the protection against its hazards (Atomic Energy Act).

55. Germany ratified the 1960 Paris Convention and the 1963 Brussels Supplementary Convention on 1 October 1975.

56. Section 25, paragraph 1 of the AtG.

57. Gesetz zur geordneten Beendigung der Kernenergienutzung zur gewerblichen Erzeugung von Elektrizität, dated 22 April 2002 (BGBl 2002 I p. 1351).

58. For a description and analysis of the revised act, see Vorwerk, Axel (2002), "The 2002 Amendment to the German Atomic Energy Act Concerning the Phase-out of Nuclear Power", in *Nuclear Law Bulletin* No. 69, pp. 7-14 (www.nea.fr/html/law/nlb/nlb-69/nlb69-vorwerk.pdf); and OECD Nuclear Energy Agency (2003), *Nuclear Legislation: Analytical Study - Regulatory and Institutional Framework for Nuclear Activities, OECD, Germany (available at:* www.nea.fr/html/law/legislation/germany.pdf*).* For an unofficial translation, see Germany: Act on the Peaceful Utilisation of Atomic Energy and the Protection Against its Hazards (Atomic Energy Act*)* Supplement to the *Nuclear Law Bulletin* No. 70 (December 2002), available at www.nea.fr/html/law/nlb/nlb-70/supplement.pdf.

59. For purposes of rough comparison only, DEM 500 million can be considered equivalent to EUR 250 million or nearly USD 400 million.

60. OECD Nuclear Energy Agency, *Nuclear Legislation: Analytical Study, op.cit*., at Germany. For the second, collective, tier the operators formed a partnership on the basis of which they entered into a contract with six leading insurance contractors in Germany to cover the DEM 300 million. For this the operators paid an advance an annual fee and a deferred premium. Similar to the United States second tier

In 2002, as a result of the changes to the German Atomic Energy Act, the amount of financial security required for nuclear reactors was dramatically increased, up to EUR 2.5 billion (currently about USD 3.9 billion), which provided considerably improved protection of victims.[61] The revised act also explicitly allowed that the financial security be provided by some other form of financial security than by third party liability insurance, making private or mutual guarantees by nuclear power plant operators possible as financial security.[62] In this way the new version gives greater consideration to the actual wording of Section 10(a) of the Paris Convention.

Nuclear insurance provides nuclear operators with only a portion of the financial security. When this significant increase to the German legislation was made, the amount covered by the insurance sector was at EUR 256 million. While the insurers were prepared to negotiate increased coverage, they were not prepared to provide full coverage. Accordingly, alternatives to insurance had to be secured in order to provide the remainder of the EUR 2.5 billion financial security required. These had to satisfy the requirements of the German licensing authorities concerning the nature, extent and amount of cover necessary to meet the legal requirement for the financial security.[63] In order to raise the remaining amount of financial security needed, the four leading German energy producing companies voluntarily concluded a contract under civil law, to establish the *Solidarvereinbarung* ("Solidarity Agreement"). This creates an operator pooling system which provides up to EUR 2.24 billion towards the financial security required of them by the German Atomic Energy Act.[64] Under this new arrangement, each partner accepts liability to contribute a percentage of the total amount of coverage to be provided by the liable operator, with the combined total of all partners' commitments meeting the overall financial security requirement. The size of each partner's guarantee is determined on the basis of the number of shares it holds in each and every nuclear power plant, of which there are currently 17 operating in Germany.[65] The guaranteed amount must be paid to the liable operator in the event of a nuclear incident, provided that the operator and its parent company together demonstrate that they cannot provide the required compensation amount. As under the American system, no money is required to be paid to this collective tier in advance of a nuclear accident. In addition, the partners will offer claims handling support to the liable operator through deployment of their infrastructure and

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retrospective premium, the deferred premium would fall due only in the event of an accident and causing damage exceeding DEM 200 million. In effect, the operators served as their own reinsurers.

61. The maximum limit of financial security to be provided by the licensee of a nuclear power plant for damage resulting from the operation of the plant was increased tenfold from DEM 500 million to EUR 2.5 billion (Section 13, paragraph 3, sentence 3 AtG).

62. Section 14, paragraph 2 of the AtG.

63. The Financial Security Ordinance of 1977, as last revised in 2002, regulates in detail how and in which individual amounts, financial security has to be provided (BGBl 1977 I p. 220; 2002 I p. 1869, 1906).

64. For a description of the liability requirements in Germany, see OECD Nuclear Energy Agency (2003), *Nuclear Legislation: Analytical Study*, *op.cit.*, *at Germany,* pp. 24-25. *The description of* the *Solidarvereinbarung* which follows is based on that given by Pelzer, N. (2007), "International Pooling of Operators' Funds", *op.cit.*, pp. 44-45.

65. The parties to the *Solidarvereinbarung* are: E.ON Energie AG, RWE AG, Energie Baden-Württemberg AG (EnBW), Hamburgische Elektrizitäts-Werke AG (now: Vattenfall Europe AG). The approximate percentages read as follows: E.ON: 42%, RWE: 25.9%, EnBW: 23.9%, Vattenfall: 8.2%.

expertise.[66] The partners are required to submit a public accountant's certificate annually to the regulatory authorities attesting their financial capacity to meet their obligations under the scheme.[67]

An important feature of the German liability system is the unlimited liability of the operator of a nuclear installation for damage occurring within Germany.[68] In the case of damage occurring outside of Germany the maximum liability is determined in accordance with the principle of reciprocity, i.e. the extent to which the state in which the damage occurs has equivalent compensation arrangements in relation to Germany. A special arrangement is in place with Switzerland, a country which has a common border with Germany and which also has unlimited operator liability for nuclear accidents.[69] In relation to states which do not operate a nuclear installation in their territory, liability is limited to the maximum amount under the Brussels Supplementary Convention.[70]

Germany has reappraised its assessment of the risks of atomic energy on the basis of the experience and knowledge that have been gained throughout the world since atomic energy was first used for electricity production. The decision to promote nuclear power in the 1959 Atomic Energy Act has been replaced in the 2002 Atomic Energy Act by one intended to bring an end to the use of nuclear energy for the commercial generation of electricity in a structured manner.[71] The German approach to nuclear liability and compensation has evolved in line with this fundamental change to its domestic policies concerning nuclear energy. Similar to the United States and the system of the international conventions, Germany started from the idea that the development of nuclear energy had to be supported by limiting liability and the use of public funds. Collective contributions from operators through pooling came into play a decade earlier than in the United States. This operator pooling has enabled the provision of substantially greater compensation amounts than provided even under the revised Paris and Brussels Conventions, and this without any recourse to public funds.

Some additional distinctions between the German and the United States approaches are worth noting. Unlike the United States, which so far remains outside the international system of conventions

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66. See the extra 5% for legal costs added to the per reactor calculation for contributions to the second tier under the Price-Anderson Act. See Section 3.2.1 above.

67. In order to satisfy the regulatory bodies that the guarantors are reliably in a position to meet their obligations when requested, the partners have annually, and in connection with the year-end accounting of the company, to submit a certificate of a public accountant that sufficient solvent means are available (Section 3 of the Solidarity Agreement). This is the prerequisite for accepting the system as valid maintenance of financial security to be provided by the operator under Sections 13, 14 Atomic Energy Act and Article 10 Paris Convention. Pelzer, N. (2007), "International Pooling of Operators' Funds", *op.cit.*, p. 45.

68. The only exceptions to this rule are when the incident is due to war, insurrection or a grave natural disaster, in which case liability is limited to the state guarantee of EUR 2.5 billion. The operator of a nuclear installation will be indemnified against claims for damages of up to EUR 2.5 billion to the extent that they are not covered by private financial security or that claims cannot be paid out of such security. Such indemnification is borne, up to the amount of EUR 500 million, as to 75% by the federal authorities and as to 25% by the *Land* within which the installation is situated. The federal state covers the amount between EUR 500 million and EUR 2.5 billion alone (Sections 34 and 36 of the AtG).

69. On 22 October 1986, an Agreement on Third Party Liability in the Nuclear Field was concluded between Germany and Switzerland. This declares reciprocity in regard to the amount of compensation and to provide for greater uniformity in the compensation regimes in the two countries (BGBl 1988, p. 598). It entered into force on 21 September 1988.

70. Section 31 of the AtG.

71. Section 1 No. 1 of the AtG.

in force, the evolution of the German liability and compensation system took place also in the context of its memberships of the Paris and Brussels conventions.[72] Although the Paris Convention did not provide for unlimited liability, the situation was nuanced with respect to Germany's domestic law requiring unlimited liability and the amended Paris Convention now explicitly provides for this possibility. The total amount of compensation available from the second, collective, tier in the United States depends on the number of reactors in operation – if this grows, the pool funds grow; if the number of reactors falls, so does the compensation amount. The German second tier is not dependant on the number of reactors. In the event of damage exceeding the total funds available, the Price-Anderson Act provides for possible recourse to public funds through a decision of Congress. If the German EUR 2.5 billion is exhausted, recourse is made to the other assets of the operator for additional compensation amounts. Finally, in the United States, the collective tier is contributed to by reactor operators on a reactor-by-reactor basis. The German system is linked to the reactor operators' parent companies on the basis of the proportion of their reactor ownership, a feature which reflects the evolving structure of the power sector, especially in Europe, and is something that will be discussed further below.

3.3 Addressing the problem of amounts

Operator pooling as described here is a funding mechanism designed to facilitate availability of funds for compensation in amounts greater than would be realisable through insurance alone and without recourse to public funds. Yet while the current pooling arrangements in Germany and the United States offer considerably greater compensation amounts than the current system of liability conventions, including the revised Paris and Brussels Conventions, they still do not come close to matching the actual costs of an accident on the scale of Chernobyl.

Obviously the total amount of funding that could be realised by a pooling arrangement is a function of the design of the pool and the basis of contributions to it. Thus it is not difficult to envisage a pooling arrangement being able to raise more funds than the EUR 2.5 billion (approximately USD 3.9 billion) or the USD 10.76 billion (about EUR 6.96 billion) currently available under the German and United States pooling systems. However, the fact that a severe accident may exhaust even the large financial resources provided through a pooling mechanism needs to be considered. Addressing this concern requires maintaining options to further supplement the amounts made available through the pool, in order to ensure that additional compensation is available for victims and also to remedy damage in the event that the combined insurance and pool funds are insufficient.

On this basis, the creation of such operator pooling should not affect the ultimate liability of the operator, which should be unlimited. As noted earlier, this is the situation today with the German nuclear liability pool arrangement. Thus, an operator pool should provide a high minimum level of financial security, with a guaranteed amount of compensation that approaches realistic estimates of the costs of a severe nuclear accident. The ultimate liability of the operator is not affected in that the liability remains unlimited, and in the event that the damage caused exceeds the financing of the pool, the other assets of the liable operator are available to add to compensation, including possible recourse against the assets of the reactor owners.

72. In addition to its active participation in the revision process of the Paris and Brussels Conventions, Germany, along with other Paris Convention states, also actively participated in the work of the IAEA SCNL.

4. An international pooling system – but first in Europe…

Given the benefits of the current national operators' pooling systems, the possibility of international operators' pooling deserves consideration. How might international pooling be achievable?

Effective and reliable coverage of nuclear liability by a system of international operators' pooling will probably only be possible if there is a certain degree of political, legal and economic convergence amongst states whose operators could participate in such a system.[73] Instead of seeking to realise a truly global operator pooling system, it would be preferable, initially, to aim to realise international operator pooling at a regional level. The region arguably with most to gain from international operator pooling is Europe. Operator pooling might be easier to agree upon if it takes place between operators of like-minded states that preferably co-operate already in other fields, such as the EU Member States. Limitation of the system to a certain geographical region makes pooling more reasonable because only in a geographically limited area a natural transboundary risk community may exist. Here there are a large number of reactors, in a sizeable number of countries, with common borders or otherwise in close proximity to one another.

Faure and Vanden Borre have considered the creation of an international nuclear liability system modelled on that currently in place in the United States and concluded that this would best be applied, at least initially, on a limited international (e.g. European) basis.[74] Their analysis would add to the necessary conditions identified above, a comparable standard of operational safety of the participating nuclear power plants. In their model, the amount of funds to be raised through operator pooling would be introduced gradually, similar to the changes in the United States system which were launched by the 1975 amendments to the Price-Anderson Act (see section 3.2.1). Finally, they consider that their model will only work if major regulatory issues have been resolved.[75]

The United States system is based on a statutory obligation on every individual operator to contribute to the pool. Pelzer suggests that this is not the model to follow at the international level, arguing instead that it should be left to the industry to decide if, to what extent and under which conditions they are prepared to embark on international pooling to cover their mandatory nuclear liability.[76] It could be of benefit to leave participation in any pooling arrangement to the discretion of reactor operators and owners. However, state engagement would be necessary for creating the conditions to ensure that such pooling is both adequate, from the perspective of society as a whole, and possible for the operators and owners concerned. States would need to determine the minimum criteria by which pooling arrangements would be deemed adequate in order to meet the mandatory financial security requirements, for example.

An EU-wide pool should operate within a liability and compensation framework which takes into consideration the characteristics of the EU nuclear electricity generating sector. Previously nuclear reactors in Europe tended to be operated by state agencies or national companies. This is no

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73. Pelzer, N. (2007), International Pooling of Operators' Funds, *op.cit.*, pp. 50-52.

74. Faure and Vanden Borre (2007), Economic Analysis of the Externalities, *op.cit.*, p. 32.

75. *Ibid*, at p. 33. In their view, by far the most important regulatory issue is the creation of a European independent regulatory body (a kind of *European Nuclear Regulatory Agency*); this body would issue permits for nuclear installations falling under the international nuclear liability regime and would determine the way in which the operators would insure their liability.

76. Pelzer, N. (2007), "International Pooling of Operators' Funds", *op.cit.*, p. 50. Note that this conclusion does not, however, exclude State measures designed to support respective efforts of operators to implement international pooling arrangements if states deem them useful.

longer the case, and the system of reactor ownership in Europe is currently undergoing a process of considerable change. Reactor ownership is also shared among private companies in an increasingly privatised electricity sector often operating at EU (and wider) rather than national levels of organisation. Individual reactors may have multiple owners, in some cases there are multiple "part" owners of reactors, with large multinationals who have interests in nuclear reactors located in several EU Member States. While the specific details of the organisation of an EU nuclear operators' pooling system could be left to the discretion of operators and their respective parent companies, it is essential that the overall liability and compensation context in which such a pool would operate should reflect this evolving pattern of reactor ownership and control.

5. Pros and cons of a European operator's pool

The operators' pooling approach is attractive because of the potentially much higher amounts of compensation it can guarantee and the improved internalisation of the risks of nuclear power in the costs of generation of nuclear electricity. However, the extent to which these potential benefits can be realised will depend largely on the details and implementation of any planned new scheme. Operator pooling *per se* is no panacea – a flawed and inadequate pooling system will not improve the current situation. There are two principal issues of concern: the extent to which the full costs of a Chernobyl-scale accident would be covered and the potential for "unscrupulous" operators to spread their risk through the pool.

What compensation amounts could be feasible through a European pooling system? In nine Western European countries alone there are currently 135 nuclear reactors in operation – considerably more than the current 104 reactors contributing to the second tier of the United States compensation system. Applying a similar level of contributions as currently in place in the United States could raise funds in excess of EUR 10 billion.[77] Even higher amounts are feasible. Yet even these considerable funds might not come close to matching the actual costs of an accident on the scale of Chernobyl. However, operator pooling should be seen as simply one means of guaranteeing the necessary funds to provide a high minimum level of financial security. It is not in itself a sufficient basis for nuclear liability and compensation.[78] The ultimate liability of the operator should remain unlimited. In the event that the damage caused by a nuclear accident exceeds the financing provided through insurance and the operators' pooling system, the other assets of the liable operator would then be available to add to the other compensation amounts. This arrangement would also include possible recourse against the parent companies of the liable reactor operator.[79]

Any pooling arrangement spreads the risk amongst its members, with the result that (1) for any individual operator, the internalisation of the nuclear risk is less than complete and (2) the risk per reactor is averaged, so that a "risky" operator transfers a part of its risk to the pool, whereas a "safer" operator accepts a portion of the extra risk. One virtue of the pooling system is that there will be an element of self-policing by the pool members in their self-interest. Pool members themselves will have

77. See for example, the calculations in Faure and Vanden Borre (2007), "Economic Analysis of the Externalities", *op.cit.*, p. 32.

78. Assuming that a pooling arrangement would not guarantee full coverage of all conceivable costs and damage arising from nuclear accidents.

79. Operators choosing not to engage in the pooling arrangement would still be subject to the requirements of providing the mandatory financial security and subject to unlimited liability and any associated conditions for these established by the concerned regulatory agencies.

at least minimum requirements concerning the level of nuclear safety and security of the nuclear installations with which the risk will be shared. Operators will only be prepared to pool if the safety and security standards of other installations are up to the standards of their own installations.[80] Thus, while there would need to be an adequate nuclear regulatory legal framework in all states whose operators wish to co-operate in the pool, there would also likely be an increasing convergence in reactor safety standards even in the absence of a single European-wide nuclear safety regulatory body. If, however, participation in the operator pooling system was mandatory, as in the case of the United States, there may well be a need for a common EU-wide approach to safety regulation and standards, including a single regulatory body.

Operators and their parent companies might have a direct interest in a pooling system and in addition to any political considerations, there may also be financial advantages.[81] In France, for example, evidence suggests that the monopolistic nuclear operator, Electricité de France (EDF), pays an excessively high price for its insurance cover.[82] This situation is not restricted to France, and it may be explained partly by the structure of the nuclear insurance markets. In this context it becomes all the more worthwhile for nuclear operators to develop alternatives to insurance to provide cover for their nuclear third party liabilities. Operator pooling may offer a cost-effective way to cover the full range and extent of the newly expanded third party liability of nuclear operators under the revised conventions and guarantee considerably higher compensation amounts. It is not simply a question of cost as there is no sign of change yet in insurers' reluctance to cover the full range of risks required by the revised conventions. There is also a growing impatience to see these long-sought arrangements brought into full effect.

Insurers too, might see benefits to international operator pooling. Both the United States and Germany rely on nuclear insurance for the first tier of their coverage. The insurance industry is the proper and experienced partner in providing this nuclear liability coverage. However, noting that its capacity is finite, both in terms of scope and quantity, there may be gains to the insurers themselves in relieving the insurance industry of the unsought burden of aspects of the revised liability conventions that they do not feel able to cover.[83]

Finally, introducing such an operator pooling system may lead to more general indirect gains in nuclear safety. Limiting liability and allowing the use of public funds to pay for the costs of a nuclear accident, potentially allows the industry to pay only part of the damage it causes. Ultimately it will be society at large that bears the cost of damage caused by nuclear power. From the perspective of the functioning of the energy markets, this is inefficient as it acts as a subsidy to nuclear power by failing to internalise the full costs of nuclear generation. To the extent that operators' pooling allows compensation amounts to be more closely related to the potential costs of nuclear accidents, without having to draw on public funds, the risks of nuclear power production are then internalised more

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80. Pelzer, N. (2007), "International Pooling of Operators' Funds", *op.cit.*, p. 51. It is conceivable that operators develop formal mechanisms in order to enable the partners to decide on the eligibility of an installation – these might include direct monitoring, inspection and assessments by or on behalf of the pool.

81. *Ibid*, p. 48.

82. Fiore, Karine and Faure, Michael (2008), "The Civil Liability of European Nuclear Operators: Which Coverage for the New 2004 Protocols? Evidence from France", Maastricht University, Faculty of Law, available at http://ssrn.com/abstract=1086287.

83. For additional considerations related to the insurance industry, see Pelzer, N. (2007), "International Pooling of Operators' Funds", *op.cit.*, pp. 38-39 and pp. 54-55.

efficiently. This creates economic incentives for further preventive measures improving nuclear safety, thereby complementing safety regulation.

6. Conclusions

Even with the increases in operator liability and compensation amounts envisaged by the amendments to the international nuclear liability and compensation conventions, not all potential costs of a major nuclear accident will be covered. In any case, the full benefits of the revisions of the nuclear liability and compensation conventions are not yet being realised, as states can still adhere to the old, out-dated instruments and because the nuclear insurance industry seems unable to cover the full range and extent of the newly expanded third party liability risks. These factors are potentially delaying the entry-into-force of the amended instruments and widespread adherence to them, and they have negative implications for reactor safety generally.

To address these problems, it is essential to find a way to ensure that liability and compensation arrangements are put in place that better reflect the actual risks of nuclear accidents. The experience of existing national operator pooling arrangements shows that, properly designed and implemented, international arrangements for pooling operators' resources could offer a way forward from the current impasse. International operators' pooling could both complement the current level of financial security provided by insurance and guarantee that considerably higher compensation amounts would be made available in the event of a nuclear accident than would be otherwise possible. International operators' pooling may be a mutually beneficial solution, offering advantages to operators, the electricity sector generally, insurers and governments. Additional benefits, particularly in the European context, could include greater harmonisation in liability and compensation arrangements at a high-level rather than at a low common denominator, a reduction in distortions to the EU electricity market by elimination of some subsidies to nuclear power generation through better internalisation of the risks of nuclear power generation and a strengthening of nuclear safety generally. In this context, there is currently a real opportunity to develop and implement a fairer, more efficient and effective nuclear liability and compensation scheme to the benefit of all.

Case Law

European Union

Judgement of the European Court of Justice on failure of a Member State to fulfil obligations under Directive 96/29/Euratom (2007)

On 18 July 2007, the European Court of Justice (ECJ) handed down its ruling in the case *Commission of the European Communities v United Kingdom of Great Britain and Northern Ireland*[1] in which the Court declares that the United Kingdom failed to fulfil its obligations under Article 53 of Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation[2] (see *Nuclear Law Bulletin* Nos. 58 and 61).

The ruling originates in the European Commission's commencement of the procedure for failure to fulfil obligations under Article 141 of the Euratom Treaty in 2002 and the Commission's request to declare that the United Kingdom failed to adopt the necessary measures to fulfil its obligations in 2006.

Article 53 of the Directive, entitled "Intervention in cases of lasting exposure", obliges Member States to bring into force laws, regulations and administrative decisions to ensure that "where Member States have identified a situation leading to lasting exposure resulting from the after-effects of a radiological emergency or a post practice" specific measures are to be taken. The United Kingdom however, imposed an obligation to intervene only if a situation of radioactive contamination results from a present or past activity for the exercise of which a licence was granted. The national legislation does not oblige the authorities to take measures referred to in Article 53 of the Directive in circumstances in which radioactive contamination results from a past practice which was not the subject of such a licence. The United Kingdom Government admitted the validity of the Commission's claims adding that further legislation to transpose that article into national laws is in the process of being drawn up.

Germany

Judgement of the Federal Administration Court on the standing of third parties regarding attacks at interim storage facilities (2008)

In its judgment handed down on 10 April 2008, the German Federal Administrative Court overrules a decision of a Higher Regional Administrative Court and declares that residents in the vicinity of an interim storage facility may challenge the licence for that facility on the grounds that the necessary protection has not been provided against disruptive action or other interference by third parties.[3] The licensing authority has discretion to determine if and to what extent such protection is necessary. The decision of the

1. The text of the ruling is available at www.curia.europa.eu/.

2. *Official Journal of the European Union* 1996 L 159, p. 1.

3. BVerwG 7 C 39.07; information taken from BVerwG Press Release No. 23/2008.

authority can be scrutinised by courts as to whether or not the administrative risk analysis and risk assessment is based on sufficient data and is in accordance with state of the art in science and technology.

The Higher Regional Administrative Court had denied the possibility of an infringement of the plaintiff's individual rights ("standing"), ruling that the provision on the protection against disruptive action or other interference by third parties [Article 7 paragraph (2) No. 5 of the German Atomic Energy Act] serves the general public, not individuals.

By contrast, the Federal Administrative Court states that the protection against acts of terrorism at an interim storage facility is covered by the Atomic Energy Act (reproduced in Supplement to *Nuclear Law Bulletin* No. 70) and that the protection against such risks serves the individual rights of those who live in the vicinity of the facility. The fight against terrorism by the state does not release the operator from its duty to take measures to protect the facility and its operation for which it is responsible. However, such protection of third parties does not apply to areas which the licensing authority has classified as residual risk (*Restrisiko*). The ruling of the Higher Regional Administrative Court does not include any such finding which is why the Federal Administrative Court has remanded the case.

United States

Judgement of the US Court of Appeals on licensing of the LES Uranium Enrichment Facility (2007)

On appeal to the Federal Court of Appeals for the District of Columbia, the joint petitioners objected to the Nuclear Regulatory Commission (NRC) issuing a license to the Louisiana Energy Services, L.P. (LES) Uranium Enrichment Facility in New Mexico on several grounds:

(1) the NRC violated the Atomic Energy Act (AEA) by "supplementing" the environmental impact statement (EIS) after the hearing closed;
(2) the NRC violated the National Environmental Policy Act (NEPA) by insufficiently analysing the environmental impacts of depleted uranium waste from the LES facility;
(3) the NRC violated the Atomic Energy Act by determining that LES had presented a reasonable cost estimate for disposal of depleted uranium waste from the LES facility;
(4) based on remarks made regarding one of the petitioner's expert witness, NRC Commissioner McGaffigan should have disqualified himself from the licensing proceeding.[4]

As to the first objection, Section 193 of the AEA provides that an EIS shall be prepared before the hearing on the issuance of a licence for the construction and operation of a uranium enrichment facility is completed.[5] Petitioners claimed that the EIS was not "prepared" before the hearing was completed because the written opinions of the Licensing Board and the Commission "supplemented" the EIS. Because the NRC prepared a draft EIS and issued a final EIS after incorporating public comments, the Court of Appeals found that the petitioners' claims were irrelevant because the agency "prepared" an EIS before the hearing was completed, which is all that the AEA requires.

4. *Nuclear Information & Resource Service v NRC*, 509 F.3d. 562 (D.C. Cir. 2007).

5. 42 U.S.C. 2243(a)(2) (2008).

As to the second objection, the court found the petitioners' claim that the NRC had failed to sufficiently analyse the impacts of depleted uranium waste disposal to be unpersuasive. Both the EIS and the extensive administrative record demonstrated that the agency met the requisite NEPA "hard look" standard for assessing environmental impacts of waste disposal. As to the third objection, the court endorsed the following standard:

> "A license applicant need not present a 'concrete plan' to dispose of waste generated by a proposed uranium enrichment facility. Rather, an applicant must present 'a plausible strategy for the disposition of depleted uranium' waste. An applicant also must present a reasonable estimate of the costs of disposal and give adequate assurance that it can pay those costs."[6]

The petitioners contended that the cost estimate was unreasonable because it used too low a contingency factor for unseen costs related to the Department of Energy's waste disposal activities, in light of the Department's "alleged history of underestimating costs on other projects". The NRC dismissed petitioners' claims because there was no direct connection between the Department's prior cost overruns and the licensing action in dispute. The Court of Appeals found that the petitioners had not presented any viable basis to upset NRC's reasoning and conclusion that the contingency factor used in the cost estimate was reasonable.

Finally, as to the fourth objection, petitioners claimed that Commissioner McGaffigan should have disqualified himself from the NRC's decision based on comments he made in an unrelated proceeding regarding one of the petitioner's expert witness. The court stated that it is presumed that administrative officers are objective and capable of judging a particular controversy fairly. Absent circumstances where a disinterested observer could conclude that an official has judged the facts as well as the law of a case in advance of hearing it, the agency official should not be disqualified. The court found that, since the Commissioner's remarks were made in the course of a separate matter, there was no evidence to support the claim that he had prejudged the issues in this particular proceeding.

6. 509 F.3d at 569.

National Legislative and Regulatory Activities

Belarus

General legislation

Act on the development of atomic energy in the Republic of Belarus (2008)

Act No. 1 of 31 January 2008,[1] of the Security Council of the Republic of Belarus on the development of atomic energy in the Republic of Belarus aims at the construction of a nuclear power plant with a total capacity of 2 000 MW, the first unit of which is to be in operation by the end of 2016 and the second by 2018.

This act obliges both the Government and the National Bank of the Republic of Belarus to define the scheme and the financial sources for the design and construction of the nuclear power plant. They will have until 1 January 2009 to report to the President on same. A pre-project plan is also to be drafted prior to construction activities and the government will have to report on this plan to the President in 2008.

Decree on the construction of a nuclear power plant (2007)

The aim of Decree No. 565 of the President of the Republic of Belarus of 12 November 2007 is the carrying out of preparatory activities for the construction of the nuclear power plant. It creates a public institution, the "Board of Directors for the Construction of a Nuclear Power Plant", under the supervision of the Ministry of Energy, which is to carry out these functions. The Board shall, *inter alia*, organise and carry out research activities prior to site selection for a nuclear power plant, co-ordinate the bidding process, prepare and document the purchase of special equipment, works and services and will control quality assurance of activities, including compliance with the safety of nuclear technology, geodesy, geology, prospecting, seismic-tectonic and ecological activities as well as appropriate design.

The decree specifies that "Belnipienergoprom", a national engineering institute, will co-ordinate and conclude contracts to provide for investments, conclude specifically a contract with "Energoproject", a joint stock company, to provide design and engineering services for the site selection of the nuclear power plant, to prepare comprehensive reports and documents on investment developments, bids and the nuclear power plant design. The decree further determines that the state scientific institute "Joint Institute for Power and Nuclear Research" at the National Academy of Science in Belarus shall perform research assistance for the nuclear power plant construction activities.

The Ministry of Emergency Situations is responsible for nuclear safety and radiation safety and it will establish a special Department (Gosatomnadzor) to supervise these responsibilities. Within six month, the Government of Belarus is required to submit a proposal on social guarantees for invited non-residential

1. Published in the *Official Journal* on 31 January 2008.

citizens when carrying out the nuclear power plant project (design, construction, commissioning and operating activities) by providing dwelling and salaries. The Government will prepare the necessary legislation in this field.

Organisation and structure

Statute of the Department of Nuclear Safety and Radiation Protection in the Ministry of Emergency Situations – Gosatomnadzor (2007)

The Statute of the Department of Nuclear Safety and Radiation Safety of the Ministry of Emergency Situations (Gosatomnadzor) was confirmed by Decree of the President of Belarus of 12 November 2007. The Department is responsible for achieving certain functions to ensure nuclear safety and radiation safety.

The Head of Gosatomnadzor, to be appointed by the Belarusian President on the recommendation of the Minister of Emergency Situations, will direct the activities and bear personal responsibility for achieving the entrusted functions. A council ("collegium") consisting of seven senior staff members will be created to discuss important issues.

The decree empowers Gosatomnadzor to supervise nuclear safety and radiation safety and to ensure compliance with national legislation and regulations through, *inter alia,* the following means:

- create norms and rules on the utilisation of atomic energy, nuclear safety and radiation safety;
- set licence requirements and conditions, including the requirements for appropriate safety reports, ensure physical protection including requirements in respect of protection against terrorist attacks, plan radiation safety activities in case of nuclear and radiological accidents;
- organise research activities on nuclear and radiation safety principles together with scientific institutions, scientists and specialists;
- collect information on licence condition violations in connection with nuclear installations, radioactive sources and storage facilities, and investigate same;
- organise professional training, retraining and upgrading of its staff;
- ensure compliance with the international obligations of Belarus;
- inform the public, according to legislative requirements, about the levels of safety of nuclear installations, radioactive sources and storage facilities;
- participate in the commissions on the site selection for radioactive waste disposal;
- perform the auditing of state authorities and authorised persons.

Gosatomnadzor is scheduled to start its activities in May 2008. The establishment of a comprehensive regulatory authority is in process with legislation to be adopted in the course of this year.

France

Organisation and structure

Decree establishing a Political Nuclear Council (2008)

Decree No. 2008-378 of 21 April 2008 establishes a Political Nuclear Council chaired by the President of the Republic of France. The Council provides guidance on nuclear policy and ensures its implementation, particularly in export and international co-operation fields, industrial policy, energy policy, research, safety, security and environmental protection.[2] This decree repeals Decree No. 76-845 of 1 September 1976 establishing a Council on Nuclear Foreign Policy. It provides that the Political Nuclear Council will be composed of the Prime Minister, eight ministers from the government (energy, foreign affairs, defence, industry, foreign exchange market, economy, budget, and research), the High Commander of the Army, the Secretary of Defence and the General Administrator of the Atomic Energy Commission (*Commissariat à l'énergie atomique*).

Decree authorising the establishment of the "Agence France Nucléaire International" within the Atomic Energy Commission (2008)

Decree No. 2008-441 of 9 May 2008 authorises the Atomic Energy Commission (*Commissariat à l'énergie atomique*) to establish a body within the Commission, the *Agence France Nucléaire International* which is vested with administrative and budgetary independence.[3] This authorisation is given within the framework of the Political Nuclear Council, with a view to assisting foreign states in implementing the institutional, human and technical framework necessary for establishing a civil nuclear energy programme that complies with all requirements relevant to safety, security and non-proliferation. The Director of the *Agence France Nucléaire International* will be designated by a decree adopted jointly by the Minister of Energy and the Minister for Foreign Affairs, following a proposal by the General Administrator of the Atomic Energy Commission.

Germany

Regime of nuclear materials (including physical protection)

Ratification of the International Convention for the Suppression of Acts of Nuclear Terrorism (2007)

By Act of 23 October 2007 Parliament ratified the International Convention of 13 April 2005 for the Suppression of Acts of Nuclear Terrorism (*Bundesgesetzblatt* 2007 II p. 1586). In implementing that convention, Parliament passed an Act of 26 October 2007 (*Bundesgesetzblatt* 2007 I p. 2523) which, as far as not already covered by existing provisions, introduces relevant new provisions into the Penal Code and amends Sections 309 and 310 of the code correspondingly.

2. The text is available (in French) on the website of *Légifrance* at www.legifrance.gouv.fr.

3. The text of this decree is available (in French) on the website of *Légifrance* at the following URL: http://legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000018776874.

Regulation on nuclear trade (including non-proliferation)

Amendments to the 1993 Foreign Trade Ordinance (2008)

New ordinances[4] containing regulations on a weapons embargo regarding Iran and on trade of dual use goods implement a number of EC Regulations and include provisions to implement the Single Euro Payments Area as of 1 January 2008.

A new version of the Import List – Annex AL to the Foreign Trade Act – as last amended by Ordinance of 18 December 2006 (see *Nuclear Law Bulletin* No. 79) was published by the 155th Ordinance to Amend the Import List – Annex to the Foreign Trade Act – of 18 December 2007.[5]

An amendment to the Export List – Annex AL to the Foreign Trade Ordinance – as last amended by Ordinance of 10 July 2006 (see *Nuclear Law Bulletin* No. 79) was published by the 106th Ordinance to Amend the Export List – Annex AL to the Foreign Trade Ordinance – of 10 September 2007.[6]

List of Foreign Trade Regulations (2008)

By Circular Decree Foreign Trade No.1/2008 the Federal Minister of Economics and Technology published a complete list of all foreign trade laws and ordinances including relevant circular decrees. The list covers the status as at 31 December 2007.[7]

Italy

Radiological protection

Decree designating a working group to identify the procedures and methodology for establishing a centre for technological services and research (2008)

The decree[8] designates the working group in charge of identifying the type, the procedures and the methodology for establishing a centre for technological services and research, comprising a centralised national surface facility for the final storage and allocation of all category II radioactive waste, and the temporary storage of medium term radioactive waste, of category III spent nuclear fuel and nuclear material still existent in Italy. The working group is composed of representatives of the Government, the Regions, the Italian Environment Protection and Technical Services Agency (APAT) and the Italian National Agency for New Technologies, Energy and the Environment (ENEA).

The working group may make use of experts and may collaborate with Sogin SpA (the public-sector company in charge of managing the decommissioning of Italy's nuclear power plants). In particular, Sogin S.p.A. is to provide:

- specific technical information on plants, nuclear facilities and radioactive waste;

4. 79th, 80th, 81st and 82nd, published in the *Bundesanzeiger* 2007, pp. 4307, 7279, 8353 and No.242b.

5. *Bundesanzeiger* 2007 p. 8410 and No. 242a/2007.

6. *Bundesanzeiger* 2007 p. 7503.

7. *Bundesanzeiger* 2008 p. 146.

8. Decree of 25 February 2008 of the Ministry of the Economic Development, published in the Italian *Official Gazette* No. 57 on 7 March 2008.

- technical and logistical support for the operational activities of the working group.

The working group is co-ordinated by a representative of the Ministry of Economic Development and it is responsible for drawing up a document that, on the basis of international principles of environmental and radiological protection, defines:

- the characteristics of the surface deposit and related technological infrastructure and services;
- including those relating to research in the field of radioactive waste;
- the characteristics of the site and the technical procedure for administrative decision-making through a transparent and participatory involvement of administrations and local communities;
- responsibility for the management of the national deposit in the medium and long term and estimating the costs of establishing the centre; and
- suggestions regarding amendments to the legislation on nuclear waste.

Japan

Radiological Protection

Criminal Radiation Emission Act (2007)

In April 2007, the Diet adopted the "Criminal Radiation Emission Act" in order to implement the International Convention for the Suppression of Acts of Nuclear Terrorism. The law was proclaimed on 11 May 2007 and came into force on 2 September 2007.

The law specifies the following criminal offences:

(a) causing nuclear fission or emitting radiation unlawfully with intent to cause bodily injury to a person, damage to property endanger a person's life or create risk to the health or safety of the public;

(b) committing preliminary conduct for the purpose of crime described in (a);

(c) producing a nuclear explosive device, radiation dispersal device or other radiation emitting device which enables to cause radiation hazard;

(d) possession of any "device" described in (c) or radioactive material;

(e) attempting to commit crimes described in (a), (c) or (d);

(f) committing threat or extortion in relation to radiation emission.

As a countermeasure against terrorism, the new legislation introduces changes to Japan's penal law as follows:

- The term of imprisonment is extended, i.e., the offence mentioned above in (a) is extended from "imprisonment of up to ten years" to "life imprisonment or more than two-years prison" and the

penalty of the offence mentioned in (f) is also extended from "up to three years" to "up to five years imprisonment".

- New criminal offences described in (b), (c), (d) or (e) are introduced into pre-existing provisions of punishment concerning radioactive material.

Lithuania

General legislation

Amendment to the Law on the Nuclear Power Plant (2008)

Law No. X-1231 of 28 June 2007 (text of the law is reproduced in *Nuclear Law Bulletin* No. 80) was amended by Law No. X-1446 on 1 February 2008.

The amendment concerns the national investor defined in Article 10(1) of the act which now reads that the "national investor shall be the national power company managing through its subsidiaries the main part of the Lithuanian power system – the electricity transmission and distribution networks. Seeking to attain the goal of its activity, the national investor shall participate, on the basis of private initiative, in implementing in Lithuania the project of construction of a new nuclear power plant, as well as constructing, according to the procedure established by the Law on Electricity and other legal acts, the interconnections of the power system of the Republic of Lithuania with the power systems of the Republic of Poland and the Kingdom of Sweden".

The implementation of strategic energy projects will require huge investments, including internal financial resources as well as attracting loan funds. The creation of an independent legal entity according to the model defined in Article 10(1) of the revised law is expected to lead to the accumulation of the required financial resources by consolidation of the three largest Lithuanian energy companies – joint stock companies Lietuvos Energija, privately owned grid company VST and state-owned grid company Rytu skirstomieji tinklai.

An agreement on the creation of a national investor company, named LEO LT, was reached recently. On 29 April 2008, the Government of Lithuania and the privately-owned NDX Energia, which is the main shareholder of grid company VST, signed a memorandum of association in relation to the joint stock company LEO LT. The national investor LEO LT faces a number of challenging tasks, namely immediate implementation of Lithuania's strategic energy goals, interconnection with Lithuanian and Swedish power systems and construction of a new nuclear power plant. The creation of the national investor is an important factor to start negotiations with potential foreign partners, i.e. Latvia, Estonia and Poland, who have expressed their intention to participate in the construction of a new nuclear power plant.

Poland[9]

Radiological protection (including nuclear emergency planning)

Regulation on the emergency plans for radiation emergency (2007)

Regulation of the Council of Ministers of 20 February 2007[10] aims at amending the Regulation of 18 January 2005[11] and establishes a national emergency plan, including procedures for co-operating with local emergency assistance entities. It also provides samples of on-site and regional emergency plans and introduces two main amendments:

- It extends the authority of the President of the National Atomic Energy Agency with respect to co-ordination, in a radiological emergency, with stations for early detection of radioactive contamination and entities conducting measurements of radioactive contamination.

- It determines that in the case of a radiological emergency in a region (*voivodship*) a state regional sanitary inspector will participate in emergency actions led by the regional governor (*voivod*).

This regulation implements the provisions of:

- Council Directive 89/618/Euratom of 27 November 1989 on informing the general public about health protection measures to be applied and steps to be taken in the event of a radiological emergency (*Official Journal of the European Communities* L 357 of 7 December 1989, text of the Directive is reproduced in *Nuclear Law Bulletin* No. 45) and

- Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation (published in the *Official Journal of the European Union* L 159 of 20 June 1996, see *Nuclear Law Bulletin* No. 58).

Regulation on the requirements for controlled and supervised areas (2007)

This Regulation of the Council of Ministers of 20 February 2007[12] establishes the basic requirements for controlled and supervised areas, particularly:

- the means for marking such areas, including the standard warning signs for marking the boundaries of controlled and supervised areas;

- the conditions for access to and departure from these areas for workers and others;

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9. The unofficial translations of all regulations and the new consolidated version of Act of Parliament of 29 November 2000 – Atomic Law are available on the website of the Polish National Atomic Energy Agency at www.paa.gov.pl/en/?frame=1.2.

10. Published in the *Polish Official Journal* of 2007, No. 131 Item 912 pursuant to act of Parliament of 24 February 2006 on amendments to the Atomic Law (*Polish Official Journal* No. 52 Item 378).

11. Published in the *Polish Official Journal* of 2005, No. 20 Item 169.

12. Published in the *Polish Official Journal* of 2007, No. 131 Item 910 replaces and repeals Regulation of 6 August 2002 (*Polish Official Journal* of 2002 No. 138 Item 1161).

- the conditions for dosimetry measurements in the work environment within these areas, in particular the scope of the measurement programme and requirements for individuals who conduct such measurements.

The regulation implements the provisions of Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation (published in the *Official Journal of the European Union* L 159 of 20 June 1996, see *Nuclear Law Bulletin* No. 58).

Regulation on the requirements for individual dose registration (2007)

This Regulation of the Council of Ministers of 23 March 2007[13] establishes the requirements for individual dose registration, including in particular:

- the content and manner of keeping the individual dose register by the head of the organisation concerned and the central register of individual doses, the duration of the registration period, the period of data preservation in these registers, the period of preservation of documents which constitute a formal basis for making register entries, the procedures for making copies of register data and the period for preserving such copies, the standard application form for the central register of individual doses and a standard registration file form for the central register of individual doses;

- entities entitled to receive data from the register of individual doses kept by the head of the organisation concerned, and from the central register of individual doses, the dates for forwarding the data and also the content of a request for access to the data in the central register of individual doses;

- exposures referred to in Article 16(1), Article 19(1) and Article 20(2)(1) of Atomic Law, including the results of dosimetry measurements.

The regulation implements provisions of Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation (published in the *Official Journal of the European Union* L 159 of 20 June 1996, see *Nuclear Law Bulletin* No. 58).

Radioactive waste management

Regulation on the state owned public utility "Radioactive Waste Management Plant" (2007)

Regulation of the Council of Ministers of 4 October 2007 on the allocated and special purpose subsidy, fees and financial management of the state-owned public utility "Radioactive Waste Management Plant"[14] establishes:

- procedures for determining the value of the allocated and special purpose subsidy awarded to the state-owned public utility "Radioactive Waste Management Plant" (the plant);

13. Published in the *Polish Official Journal* of 2007, No. 131 Item 913 replaces and repeals Regulation of 5 November 2002 (*Polish Official Journal* of 2002 No. 207 Item 1753).

14. Published in the *Polish Official Journal* of 2007, No. 185 Item 1311 replaces and repeals Regulation of 24 September 2002 (*Polish Official Journal* of 2002 No. 163 Item 1344).

- factors and procedures for determining the fees to be set for services performed by the plant;

- financial management procedures for the plant, including audits of financial statements, procedures for disposal of property, procedures for financing salaries and investments as well as decision-making procedures for financial matters.

Transport of radioactive materials

Regulation on import, export and transit of spent nuclear fuel intended for reprocessing or storage (2007)

Regulation of the Council of Ministers of 30 January 2007 on granting a permit for import into, export from and transit through the territory of Poland of spent nuclear fuel intended for reprocessing or storage[15] was adopted pursuant to the 2000 Atomic Energy Act (see *Nuclear Law Bulletin* Nos. 67 and 69; text of the law is reproduced in the Supplement to *Nuclear Law Bulletin* No. 68). This instrument defines the requirements and the application procedure for grants to import, export and transit spent nuclear fuel intended for reprocessing or storage which is only allowed after authorisation has been granted by the President of the National Atomic Energy Agency.

Regulation on import, export and transit of nuclear materials, radioactive sources and equipment containing such sources (2007)

Regulation of the Council of Ministers of 20 February 2007 on the import, export and transit of nuclear materials, radioactive sources and equipment containing such sources[16] determines the conditions for conducting these activities as well as the timing, procedures and content of notifications to the President of the National Atomic Energy Agency. It further defines the standard form for the declaration of shipments of sealed radioactive sources from or to a country which is not a Member State of the European Union.

It constitutes yet another regulation to implement the provisions of Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation (published in the *Official Journal of the European Union* L 159 of 20 June 1996, see *Nuclear Law Bulletin* No. 58).

Romania

General legislation

Government Decision on Romania's Energy Policy for 2007 to 2010 (2007)

By Government Decision No. 1069 of 5 September 2007[17] Romania's Energy Policy from 2007 to 2010 has been approved. Its objective is to achieve energy security at the lowest possible price at present and for the medium and long terms in order to meet the needs of a modern market economy and high standards of living. Strategic objectives also include sustainable development and competitiveness.

15. Published in the *Polish Official Journal* of 2007, No. 24 Item 145; it replaces and repeals Regulation of 27 April 2004 (*Polish Official Journal* of 2004, No. 98, Item 986).

16. Published in the *Polish Official Journal* of 2007, No. 131 Item 911; it replaces and repeals Regulation of 27 April 2004 (*Polish Official Journal* of 2004, No. 98, Item 984).

17. Published in the *Official Gazette* of Romania Part I, No. 781 of 19 November 2007.

The main goals of the Energy Policy are, *inter alia*, to ensure the security of supply, a more balanced energy mix by giving priority to the use of coal processed by clean technologies, nuclear power and renewable energy sources, to exploit the hydroelectric potential which is still unused, to cover the required coal and uranium stock from mainly domestic production and to diversify uranium supply by a judicious use of domestic resources and imports, to achieve environmental protection targets and to reduce CO_2 emissions.

As to measures regarding the generation, transmission and distribution of electric and thermal power, the Energy Policy promotes, *inter alia*, the completion of Units 3 and 4 of the Cernavoda NPP (each of which has a commercially available capacity of 600 MW) by 2015 through the attraction of private investment, and studying the best possible solution for Unit 5. The Energy Policy also provides for upgrading of energy capability by revamping existing plants that are still viable and replacing non-viable ones with new power plants.

The Energy Policy contains important provisions regarding S.N. "Nuclearelectrica" S.A., the only electric power generator that uses nuclear technologies, addressing its ability to attract private investment and its listing on the stock-exchange as of 2008. The Romanian Government will retain control of the company, however, as it is seen as strategically important.

Transport of radioactive material

Guidelines regarding the road haulage of hazardous goods on the Romanian territory (2007)

The Guidelines regarding the road haulage of hazardous goods on the Romanian territory have been approved by Government Decision No. 1175 of 26 September 2007.[18] They set the framework for the enforcement of the provisions of the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), concluded on 30 September 1957 in Geneva, on Romanian territory. Romania became a party of this agreement by Law No. 31/1994.

The guidelines are applicable to the road haulage of hazardous goods carried out on Romanian territory. They are not applicable to haulage vehicles owned or under the charge of the national defence system. The National Commission for Nuclear Activities Control is charged with supervising road haulage of radioactive materials to ensure safety, security and the protection of the environment.

Order adopting the INF Code (2008)

By Order No. 235 of the Ministry of Transport of 20 February 2008[19] the International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on Board Ships (INF Code), adopted by the International Maritime Organization by Resolution MSC.88(71) of the Maritime Safety Committee of 27 May 1999 has been endorsed together with the amending document thereof adopted by the International Maritime Organization by Resolutions MSC.118(74), MSC.135(76) and MSC.178(79) of the Maritime Safety Committee of 2001, 2002 and 2004 respectively.

18. Published in the *Official Gazette* of Romania Part I, No. 696 of 15 September 2007.

19. Published in the *Official Gazette* of Romania, Part I, No. 165 of 4 March 2008.

Russian Federation

Organisation and structure

Reform of the Russian nuclear power industry (2007)

On 20 March 2008, the President of the Russian Federation signed the Decree "on measures to create the Rosatom state corporation for atomic energy" which abolishes the Federal Atomic Energy Agency.

The decree also approves the list of open joint stock companies and state-owned enterprises which will be transferred into Rosatom, which in turn will hold that property on behalf of the Russian Federation. Rosatom will represent the Russian Federation as a shareholder in open joint stock companies in the nuclear energy sector which will be created through the reorganisation of state-owned enterprises. The Russian Government has until 1 March 2009 to bring its laws into line with the decree and to submit proposals in this respect.

In pursuance of the decree, a government ordinance was issued on 10 April 2008 which establishes a special Commission for the breakup of the Federal Atomic Energy Agency and the organisational issues to be solved during this process.

The federal law establishing the Rosatom State Corporation took effect on 5 December 2007. It envisages the formation of a corporation to unite companies in the nuclear energy and industrial sectors. Sergey Kirienko, who formerly headed the Federal Agency for Atomic Energy, was appointed General Director of Rosatom (see related Decree on Restructuring the Atomic Energy Industry Complex of the Russian Federation and the establishment of Atomenergoprom *Nuclear Law Bulletin* Nos. 79 and 80).

Slovenia

General legislation

Decree on the designation of affected areas and the compensation due to the limited use of land surrounding the Žirovki Vrh Uranium Mine (2008)

This decree was adopted by the Slovenian Government on 21 February 2008 and published in the Official Gazette No. 22/08. It determines the area in which the use of land is limited, due to the radiological and chemical long-term impacts of the mine waste and mill tailings on the environment, and it sets out criteria for determining the amount of monthly compensation to be paid to the local community on whose territory the Žirovski Vrh Uranium Mine was located.

The person liable for this compensation is the performer of the programme for the permanent closeout of uranium ore exploitation and the prevention of mining incidents in the Žirovski Vrh Uranium Mine. Although this decree is not based on the Ionizing Radiation Protection and Nuclear Safety Act it is governed by the same principles as the Decree on Compensation Due to the Limited Use of Land Surrounding a Nuclear Facility of 2003 (see *Nuclear Law Bulletin* No. 73).

The mine was in operation from 1984 to 1990. In 1992, the Slovenia established a company to perform its permanent closure.

Decree on safeguarding of nuclear materials (2008)

The Decree on safeguarding nuclear materials was adopted on 27 March 2008 by the Slovenian Government and published in the Official Gazette No. 34/08.

The main objective of the decree is to provide a legal basis for the transfer of accounting data on nuclear materials to the central state inventory of nuclear materials. The decree sets out the rules for transferring all safeguard relevant information to the Slovenian Nuclear Safety Administration (SNSA) which, in accordance with Commission Regulation (Euratom) No. 302/2005 of 8 February 2005 on the Application of Euratom Safeguards, designates a site representative for all sites in Slovenia (Article 3/para.2 of 302/2005/Euratom).

Matters such as the definition of nuclear materials subject to safeguards, the criteria for exemption of nuclear materials from safeguards, and the definition of material balance areas are not covered by the decree which refers only to international treaties and agreements which are legally binding for every "holder" of source material or special fissile material in Slovenia, i.e. the Safeguards Agreement 78/164/Euratom, Additional Protocol 1999/188/Euratom and Euratom Treaty.

Spain

Organisation and structure

Law creating the Nuclear Safety Council (2007)

On 7 November 2007, Law 33/2007[20] on the creation of the Nuclear Safety Council (CSN) was passed.

This new law substantially amends Act 15/1980, by which the CSN was created 27 years ago as the only public entity in charge of nuclear safety and radiological protection in Spain, being independent from the government and with legal personality and its own financial means. Although the 1980 Act has been amended several times (mainly by Act 14/1999 of 4 May 1999, of Taxes and Public Prices for the services rendered by the CSN), this new law takes into account experience acquired since that time and aims to adapt the CSN to growing social demands on environmental matters, to ensure that it maintains its effective independence, and to reinforce the transparency and efficiency of this public body.

The new law has neither changed the legal status nor the competence and basic organisation of the CSN; rather it responds to a need to update the legal and regulatory framework in order to:

- enhance the CSN's capabilities (expanding its functions and reinforcing its regulatory power);
- reinforce transparency, access to information and public participation in matters within the CSN's jurisdiction;
- adapt the Nuclear Energy Act to the latest scientific knowledge and update its enforcement regime.

20. Amending Law 15/1980 of 22 April, creating the Nuclear Safety Council, published in *Official Gazette* of 8 November 2007. The consolidated text of the law will be published in the next issue of the *Nuclear Law Bulletin*.

The major amendments which have been introduced are as follows:

- The legal nature of the CSN's regulations (*CSN's Instructions*) is more clearly defined, as well as the procedure for their preparation and communication to the Parliament before they are approved. For example, in the preparation of its Instructions, the CSN shall encourage public participation according to Act 27/2006 which implements the Aarhus Convention in Spain. Also the legal nature of informative documents (*Circulars*) and recommendations (*Guidelines*) is reflected in this act, as well as Supplementary Technical Instructions that the CSN is entitled to submit directly to licensees at any moment to ensure the safety and security of installations and activities.

- New authority is given to the CSN to require physical protection reports as a requirement for issuing licences for installations and activities, as well as a sanctioning initiative. Further, new functions include co-operation with competent authorities in the areas of radiation protection, of medical treatments and nuclear safeguards.

- Contracting external services shall be subject to the condition that there is no relationship between the supplier of the service and the licensees involved in the subject matter of the service being provided. Furthermore, only CSN officers may participate in decision making in relation to administrative procedures.

- Under the new law, the CSN will now report to regional legislative assemblies and governments on any event that may affect the safety or radiological protection of nuclear and other installations posing radiation risks. A number of mechanisms to reinforce transparency, access to information and public participation have been introduced in the amended act:

  – First, the public's rights in respect of information handled by the CSN are the same as those in respect of its access to information, participation in decision making and access to justice in environmental matters under Act 27/2006.

  – Every person who works for or provides a service to a nuclear installation is to report to the licensee, as well as to the CSN, if no corrective action is taken in due time concerning any known fact that might affect the safe functioning of the installation or the observance of safety regulations. This provision is contemplated as both a worker's right and an obligation simultaneously. A "whistleblower" protection clause is included to protect a "reporting" worker and sanctions are provided against the employer who initiates any reprisal against him or her.

  – There is an obligation to provide information to the public about relevant facts (safe functioning, radiological impact, events and incidents, remedial measures) and about all decisions taken by the Plenary of the CSN. Draft instructions and guidelines will be subject to public consultation, and the CSN shall encourage and participate in information fora in the areas near nuclear installations.

  – An Advisory Committee, chaired by the President of the CSN will issue non-binding recommendations for improving transparency, public access to information and public participation in matters within the CSN's jurisdiction.

- Some provisions of the act are subject to further legislative development, and it is expected that these developments will be approved within approximately nine months from enactment of the new law.

Regime of nuclear installations

Royal Decree amending the Regulation on Nuclear and Radioactive Installations (2008)

Royal Decree 35/2008 of 18 January 2008[21] amends the Regulation on Nuclear and Radioactive Installations which was approved in 1972 and amended in 1999. The aim of the decree is to adapt the regulation's content to that of Act 33/2007 of November 2007 under which the CSN's capabilities are significantly enhanced. Its main objective is to reinforce the mechanisms for controlling the safety and radiological protection of nuclear installations, as well as to achieve better co-ordination between the Government (Ministry of Industry, Tourism and Commerce, the CSN, regional authorities) and licensees.

With this amendment, the regulation provides for reinforced CSN review and assessment capacities while promoting the safety culture of licensees who are to be committed to continuously improve the safety of their installations by incorporating the best existing techniques and practices. The regulation also distinguishes between installation modifications that require regulatory review and approval, and those which can be implemented under the licensee's sole responsibility.

With regard to the co-ordination, the regulation provides for submitting licence application documentation to regional governments where a nuclear installation is located (including those governments whose territory is affected by emergency response zones) before granting a licence. In addition, the membership of Local Information Committees is enlarged to include both the municipality hosting the plant and others surrounding municipalities located within the emergency response zones. Additionally, authorities responsible for granting licences for facilities that are not regulated under nuclear legislation but may cause undue impact on the operation of a nuclear installation, are to provide the CSN with sufficient information to assess whether the impact is acceptable prior to granting the licence.

Turkey

General legislation

Regulations on criteria to be met by investors who will construct and operate nuclear power plants (2008)

Following the law concerning the construction and operation of nuclear power plants and the sale of energy of 21 November 2007 (unofficial translation reproduced in *Nuclear Law Bulletin* No. 80), the Turkish Atomic Energy Authority (TAEK) published criteria with which construction and operating enterprises must comply. These criteria concern nuclear safety, licensing, reactor type, plant life-span, proven technology, fuel technology, localisation, operational record and electrical power.

The provision regarding nuclear safety stipulates that a nuclear power plant should have state-of-the-art technological features complying with international norms, especially the IAEA Safety Fundamentals and Safety Requirements. The criterion on localisation aims at reducing dependency from foreign vendors. The domestic share of construction, manufacture, fabrication and/or procurement of goods, equipment, components and/or services should in the long-term reach a share of 60%, for which the bidder is to submit a plan.

21. Published in *Official Gazette* of 18 February 2008.

The text of the regulations is available in English on the website of TAEK at www.taek.gov.tr/olcutler/taekcriteria_final_211207.pdf.

Regulation on requirements according to Article 3(3) of the new law on the construction of nuclear power plants and the sale of energy (2008)

Also based on the law concerning the construction and operation of nuclear power plants and the sale of energy of 21 November 2007 (unofficial translation reproduced in *Nuclear Law Bulletin* No. 80), the Ministry of Energy and Natural Resources has published a regulation on the requirements to be met by the bidding companies, the selection process, land allocation, licence fee, infrastructure incentives, fuel supply, production capacity, volume of electricity to be purchased by the Turkish Electricity Trading and Contracting Company (TETAŞ) and the energy unit price.[22] Following the adoption of this regulation, TETAŞ launched the tender process on 24 March 2008, inviting local and foreign companies to bid until 24 September 2008.

United States

General legislation

Amendment of Regulations applicable to limited work authorisations for new nuclear power plants (2007)

On 9 October 2007, the NRC amended its regulations applicable to limited work authorisations (LWAs), which permit certain construction activities on production or utilisation facilities to commence before a construction permit or combined licence (to construct and operate) is issued.[23] The rule primarily (1) redefines the scope of activities that are considered "construction" for which NRC permission (i.e. an LWA, a construction permit or a combined license) is necessary; (2) specifies the construction activities which may be performed pursuant to an LWA (as opposed to those construction activities that require a construction permit or combined licence); and finally (3) changes the review and authorisation process for LWA requests. The NRC adopted these changes to enhance the efficiency of its licensing and approval process for production and utilisation facilities, including new nuclear power reactors.

Third party liability

Implementation of the Convention on Supplementary Compensation for Nuclear Damage (2007)

On 19 December 2007, the President of the United States signed into law the Energy Independence and Security Act of 2007.[24] Section 934 of the Act implements the Convention on Supplementary Compensation for Nuclear Damage (CSC) adopted in Vienna on 12 September 1997.[25] With regard to the convention, Congress finds that

> "the combined operation of the Convention, the Price-Anderson Act, and this section will augment the quantity of assured funds available for victims in a wider variety of nuclear incidents while

22. Published in the *Turkish Official Gazette* No. 26821 on 19 March 2008.

23. Final Rule, Limited Work Authorizations for Nuclear Power Plants, 72 Fed. Reg. 57, 416 (9 October 2007).

24. Pub. L. 110-140, 121 Stat. 1492 (2007).

25. *Ibid* at 1741-47 [codified at 42 U.S.C. § 17373 (2008)].

reducing the potential liability of the United States suppliers without increasing potential costs to the United States".

Congress declares in Section 934 that the contributions made by the United States for the sake of the above benefits provided by the convention should not disturb settled expectations regarding the Price Anderson Act and, further, should not shift to federal taxpayers the liability risks for nuclear incidents at foreign facilities.

Funds made available pursuant to the Price-Anderson Act are to be used to cover the "contingent costs"[26] resulting from any "Price-Anderson incident".[27] The amount of public liability for a Price-Anderson incident is to be increased by the difference between the amount made available under Article VII of the CSC and the amount of funds used by the United States to cover the contingent costs of the incident.

With regard to covered incidents outside the United States that are not Price-Anderson incidents, each "nuclear supplier"[28] is required to participate in a retrospective risk pooling programme to cover the contingent costs resulting from such incidents. Participation in the programme shall be deferred until the United States has been asked to provide funds pursuant to Article VII of the CSC. The allocation among nuclear suppliers of the United States' contingent costs shall be determined by a risk-informed formula determined by the United States Secretary of Energy. In determining this formula, the Secretary shall take into consideration the following risk factors:

- the nature and intended purpose of the goods and services supplied by each nuclear supplier to each covered installation outside the United States;
- the quantity of the goods and services supplied by each nuclear supplier to each covered installation outside the United States;
- the hazards associated with the supplied goods and services if the goods and services fail to achieve the intended purposes;
- the hazards associated with the covered installation outside the United States to which the goods and services are supplied;
- the legal, regulatory, and financial infrastructure associated with the covered installation outside the United States to which the goods and services are supplied; and

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26. Under the act, "contingent cost" is the cost to the United States in the event of a covered incident the amount of which is equal to the amount of funds the United States is obligated to make available under paragraph 1(b) of Article III of the convention.

27. A "Price-Anderson incident" means a covered incident for which the Price-Anderson Act would make funds available to compensate for public liability. "Covered incident" means a nuclear incident the occurrence of which results in a request for funds under Article VII of the convention.

28. A "nuclear supplier" is a covered person that supplies facilities, equipment, fuel, services or technology pertaining to the design, construction, operation or decommissioning of a covered installation; or who transports nuclear materials that could result in a covered incident. A "covered person" is (1) any individual who is a resident, national or citizen of the United States or business entity which is organised under the laws of the United States, and (2) that is located in the United States; or carries out an activity in the United States. A "covered installation" means a nuclear installation at which the occurrence of a nuclear incident could result in a result for funds under Article VII of the convention.

- the hazards associated with particular forms of transportation.

The Secretary, in applying the formula, may not take into consideration any covered installation or transportation for which the Price-Anderson Act would make funds available.

Pursuant to Section 934, the US Nuclear Regulatory Commission (NRC) may promulgate regulations to carry out the terms of Section 934 and the Price-Anderson Act. Such regulations shall ensure, to the maximum extent practicable, that the implementation of the Price-Anderson Act and Section 934 are consistent and equitable and that the financial and operation burden on a licensee of compliance with the provisions of the Price-Anderson Act are not made greater as a result of compliance with the terms of Section 934.

The United States deposited its instrument of ratification of the CSC on 21 May 2008. Pursuant to Article XX.1 of that convention, it will enter into force 90 days following the date on which at least five states with a minimum of 400 000 units of installed nuclear capacity have deposited their instruments of ratification, acceptance or approval.

International Regulatory Activities

European Union

Commission Decision concerning the accession of the European Atomic Energy Community to the Convention on the Physical Protection of Nuclear Material and Nuclear Facilities (2007)

On 19 December 2007, the European Commission adopted Decision 2008/99/EC, Euratom[1] that establishes procedural rules concerning the deposit of the instrument of accession to the Physical Protection of Nuclear Material (CPPNM) with the Director General of the IAEA as the depositary of that convention. Furthermore, the simultaneous deposit of the instruments of accession of Euratom and its Member States to the amended CPPNM, in accordance with the procedure established in Article 102 of the Euratom Treaty, will be co-ordinated by the European Council.

The CPPNM was adopted in 1979 and entered into force in 1987. Euratom and all EU Member States are Contracting Parties. In accordance with Article 20 of the CPPNM, an Amendment Conference was convened on 4 July 2005 under the auspices of the IAEA. The Final Act regarding the amendments to the CPPNM was signed by the Commission on behalf of the Community on 8 July 2005. Euratom's accession to the CPPNM, as amended by the Final Act was approved through the Council Decision 2007/513/Euratom[2] (see *Nuclear Law Bulletin* No. 80).

Council Decision establishing Statutes for the Euratom Supply Agency (2008)

The new Statutes of the Euratom Supply Agency (ESA), adopted through Council Decision 2008/114/EC, Euratom of 12 February 2008,[3] repeal and replace the statutes of the agency of 6 November 1958.

The new statutes contain updated financial provisions, in line with the applicable EU *acquis*. Further, due to the enlargement to the EU, the ESA's Advisory Committee has increased in size in order to improve its operation and efficiency.

Commission Decision establishing the standard document for the supervision and control of shipments of radioactive waste and spent fuel (2008)

On 5 March 2008, the European Commission adopted the Decision establishing the standard document for the supervision and control of shipments of radioactive waste and spent fuel referred to in Council Directive 2006/117/Euratom [4] (see *Nuclear Law Bulletin* No. 79). In accordance with Article 17(2) of the Council Directive, the Commission is required to establish a new standard document to be used for the shipments of radioactive waste and spent fuel.

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1. *Official Journal of the European Union* L 34 of 8 February 2008, p. 3-4.
2. *Official Journal of the European Union* L 190 of 21 July 2007, p. 12-14.
3. *Official Journal of the European Union* L 41 of 15 February 2008, p. 15-20.
4. *Official Journal of the European Union* L 337 of 5 December 2006, p. 21-32.

The standard document set out in the Annex to the Commission Decision will be used in respect of any shipments of radioactive waste or spent fuel between Member States or into, out of and through the Community, within the scope of Directive 2006/117/Euratom.

The Decision is addressed to the Member States which have to take the necessary measures to comply with its provisions not later than 25 December 2008. Furthermore, the previous Decision 93/552/Euratom of 1 October 1993 establishing the standard document for the supervision and control of shipments of radioactive waste referred to in Council Directive 92/3/Euratom shall be repealed.

News Briefs

European Atomic Energy Community

Meeting of the European High Level Group on Nuclear Safety and Waste Management (2008)

The second meeting of the European High Level Group on Nuclear Safety and Waste Management (HLG) took place on 11 January 2008 in Brussels.

The meeting resulted in the confirmation of Mr. Andrej Stritar, the Head of the Slovenian Regulatory Authority, as the chairperson of the HLG and the designation of vice-chairpersons. The group agreed upon its rules of procedure and held an initial exchange on the preparation of the HLG work programme. The members of the group have decided to create working groups dealing with nuclear safety, decommissioning, radioactive waste management and spent fuel and improvements in transparency arrangements.

Deposit of the Instrument of Conclusion by the European Atomic Energy Community of the MNEPR Agreement (2008)

The Instrument of Conclusion by the European Atomic Energy Community of the Framework Agreement on a Multilateral Nuclear Environmental Programme in the Russian Federation (MNEPR) and of the Protocol on Claims, Legal Proceedings and Indemnification to the MNEPR, was deposited on 22 February 2008 with the Head of Legal Affairs of the OECD Nuclear Energy Agency on behalf of the Secretary General of the OECD.

The European Commission, on behalf of Euratom, had adopted a decision concerning the conclusion of the MNEPR Agreement and its Protocol on 4 December 2006 (see *Nuclear Law Bulletin* No. 79). The MNEPR Framework Agreement and its Protocol entered into force for the European Atomic Energy Community on 23 March 2008.

The MNEPR and the Protocol were signed in Stockholm on 21 May 2003 (see *Nuclear Law Bulletin* Nos. 71, 73 and 76). It is an international programme designed to facilitate co-operation and assistance to the Russian Federation in the field of spent nuclear fuel safety and radioactive waste management. Projects covered by MNEPR include securing and cleaning up spent nuclear fuel storage sites and dismantling old decommissioned nuclear submarines. More information on the MNEPR and its latest status are available at www.nea.fr/html/law/mnepr.html.

European Nuclear Energy Forum in Prague (2008)

The second meeting of the European Nuclear Energy Forum (ENEF) took place in Prague, Czech Republic on 22/23 May 2008. EU Commission President José Manuel Barroso opened the forum together with the Prime Minister of the Czech Republic Mirek Topolánek, the Prime Minister of Slovakia Robert Fico and the Prime Minister of Lithuania Gediminas Kirkilas.

The latest session of the forum was attended by high-level speakers and invitees, such as EU Energy Commissioner Andris Piebalgs, Members of the European Parliament, representatives from Member State's governments as well as representatives from the nuclear industry and civil society. The focus of the meeting was on the activities of the three ENEF working groups that were established at the first ENEF meeting, namely on opportunities, risks and transparency. The working groups have already met twice since the Bratislava meeting and are in the process of drafting proposals which shall enable ENEF to provide a roadmap for the continued development of nuclear energy in the European Union.

The Commission's proposal to create such a forum was endorsed by the European Council in March 2007. It serves as a platform to promote a broad discussion among all relevant stakeholders. ENEF is organised by the European Commission in co-operation with the Czech and Slovak Governments. Meetings are alternately hosted by the cities of Prague and Bratislava. On 26 – 27 November 2007, the first ENEF was held in Bratislava (see *Nuclear Law Bulletin* No. 80).

Joint Statement of the IAEA and the European Commission (2008)

A Joint Statement on Reinforcing Cooperation on Nuclear Energy for Peace and Development was released by the IAEA and the European Commission (EC) on 7 May 2008 in which the IAEA and the EC pledge to work together in several fields related to the peaceful applications of nuclear energy.

The main purpose of the Joint Statement is to highlight the mutual determination of the two institutions to "significantly reinforce the quality and intensity of their cooperation, including through identifying specific priority areas and synergies". The following areas of co-operation, *inter alia*, are listed:

- nuclear safety, including safety standards, installation safety, regulatory issues, safe management of spent fuel and radioactive waste, safe transport of radioactive material and safe decommissioning;
- radiological protection;
- verifications, safeguards and non-proliferation;
- nuclear security;
- supply of nuclear material, equipment and services;
- technology and scientific research;
- legal affairs and legislative assistance.

Both the IAEA and Euratom were established in 1957 and have a history of collaboration. A co-operation agreement between the two institutions of 1 January 1976 sets the legal framework of the relationship. The Joint Statement and more background information are available at www.iaea.org/NewsCenter/News/2008/iaea_ecpledge.html.

European Nuclear Assembly

2008 Conference in Brussels (2008)

On 15 and 16 April 2008, the European Nuclear Assembly (ENA) brought together approximately 180 participants at a conference themed "Nuclear Energy: Developing Europe's low-carbon-economy" to discuss the latest political, economic and environmental developments in the nuclear field.

EU Commissioner Andris Piebalgs highlighted in his keynote speech the latest developments in EU energy policy and nuclear energy's contribution to the forging of Europe's low-carbon economy goals. He announced that the European Commission is examining ways to address the difficulties related to licensing, financing and different nuclear liability regimes in order to make the necessary investments possible. Some of the speakers were Luis Echávarri, Director-General of the OECD Nuclear Energy Agency, Pierre Sellal, Ambassador of France to the EU, Romana Jordan-Cizelj, Member of the European Parliament, Christian Waterloos, Director DG TREN, European Commission

ENA is organised every two years by FORATOM, the nuclear industry trade association in Europe.

G8 Energy Ministerial Meeting

Joint Statement by G8 Energy Ministers, Aomori, Japan (2008)

Energy Ministers of the G8, the People's Republic of China, India and the Republic of Korea met in Aomori, Japan on 7 and 8 June 2008 in order to discuss issues related to energy security and climate change. Together, these countries account for about 65% of the global energy consumption, leading them to stress the importance of achieving global energy security, climate change mitigation and sustainable development. In a Joint Statement, the ministers extend messages to contribute to the discussions at the G8 Hokkaido Toyako Summit in July 2008.

The ministers address nuclear energy and emphasise "that the safe and peaceful use of nuclear energy must be carried out in a manner that ensures nuclear non-proliferation, safety and security and take note of the importance of various schemes for nuclear liability, such as the Convention on Supplementary Compensation for Nuclear Damage". They also emphasise the necessity of responsible policies for decommissioning and fuel and radioactive waste management.

The full statement is available at www.enecho.meti.go.jp/topics/g8/g8_3sta_eng.pdf.

International Atomic Energy Agency

Fourth Review Meeting of the Convention on Nuclear Safety (2008)

The Fourth Review Meeting of Contracting Parties to the Convention on Nuclear Safety (CNS) was held at the IAEA headquarters, Vienna, Austria, from 14 to 25 April 2008. The meeting was attended by 55 Contracting Parties to the convention and presided by Mr. Maurice Magugumela, Chief Executive Officer of the National Nuclear Regulator of South Africa. The OECD Nuclear Energy Agency was invited to attend as an observer.

The CNS entered into force on 24 October 1996. As of 15 November 2007, there were 65 Signatories and 61 Contracting Parties to the convention, including all countries with operating nuclear power plants. The main 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 including, where appropriate, safety-related technical co-operation" [Article 1 (i) CNS]. Obligations under the convention cover, *inter alia*, siting, design, construction, operation, the availability of adequate financial and human resources, quality assurance and emergency preparedness.

Pursuant to Articles 20 and 21 of the CNS, Contracting Parties shall hold meetings at least every three years for the purpose of reviewing the national reports presented by each party on measures taken to implement each of the obligations under the convention. In accordance with the above, parties submitted national reports six months before the review meeting. In the following months, they reviewed each other's reports and exchanged written questions, answers and comments in preparation for the meeting.

Review Meeting – Observations

As a general observation, a high degree of compliance with obligations under the CNS was reported during the meeting.

The Contracting Parties recognised the importance of openness and transparency: During the review meeting, many examples were reported of activities that regulatory bodies and operators of nuclear power plants had undertaken to enhance openness and transparency, including *inter alia* public meetings, revised legislation and the increased availability of information on websites.

Many Contracting Parties reported on their positive experiences with the IAEA peer review missions, especially the Integrated Regulatory Review Service (IRRS) and Operational Safety Review Team (OSART) missions, and recognised their importance.

In their respective national reports, countries addressed mainly the subjects: independence of their respective regulatory bodies, safety management and safety culture, staffing and competence, probabilistic safety assessment techniques, periodic safety reviews, ageing management, life extension and emergency management. Many parties reported also on activities or plans for the construction of new nuclear power plants. In this respect, it was emphasised that the necessary safety infrastructure, such as technical expertise, legislative and regulatory framework, must be established well in advance, before the construction of a nuclear power plant is authorised.

With respect to the independence of the regulatory body, the review meeting noted that, in some states, the separation between the functions of the regulatory body and those of bodies and organisations concerned with the promotion or utilisation of nuclear energy may not be fully effective. Following recent developments in Canada, parties spent considerable time engaging in in-depth discussions regarding potential conflicts between nuclear safety and the need for the production of goods and services which are essential for public safety or well-being. The Contracting Parties noted that these issues needed further attention.

Finally, the review meeting invited other countries intending to launch nuclear power programmes to join the CNS.

More information on the CNS and the review meeting is available on the IAEA website at www-ns.iaea.org/conventions/nuclear-safety.htm.

International Nuclear Regulators Association

Statement of the International Nuclear Regulators Association (2008)

In a statement following the latest meeting of the International Nuclear Regulators Association (INRA) from 13 to 15 March 2008 in Washington, D.C., United States, INRA members strongly encouraged both existing and future nuclear nations to adopt programmes of continuous improvement in nuclear safety.

The association identifies in its statement the following commitments which countries should consider to achieve and maintain high levels of nuclear safety:

- To have a legislative and regulatory framework to govern the safety of nuclear materials and installations which meets the requirements of the Convention on Nuclear Safety.

- To establish an independent nuclear safety regulatory body with authority, competence, and financial and human resources to fulfil its responsibilities to secure a high level of safety.

- To ensure that such an independent regulatory body is able to come to its regulatory judgments or decisions on nuclear safety issues based on expert nuclear safety technical understanding unfettered by outside interest or pressure, and that this is underpinned by an appropriate legal framework, custom and practice and through other measures established by governments and parliaments.

- To anchor an effective system of nuclear safety regulation and control on a strong national commitment to develop cultures in all relevant organisations, bodies, that emphasise nuclear safety as the priority.

INRA also offers its assistance to countries in developing legislation and independent regulatory entities with a sound safety culture.

The association was formed in 1997 as a forum of discussion and includes the senior national regulatory officers from Canada, France, Germany, Japan, Spain, South Korea, Sweden, the United Kingdom and the United States. In 2008, INRA is chaired by US Nuclear Regulatory Commission Chairman Dale Klein.

The statement is available at www.nrc.gov (Agencywide Document Access and Management System – Electronic Reading Room).[1]

1. Information taken from US NRC Press Release N. 08-085 available at www.nrc.gov/reading-rm/doc-collections/news/2008/08-085.html.

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