

Will Climate Change Alter the NPT Political Balance? New Challenges for the Non-proliferation Regime

Milagros Álvarez-Verdugo*

Abstract

This article focuses on the possibilities of implementing a valid multilateral system for uranium enrichment and nuclear fuel-recycling activities. The contribution to the literature is twofold. First, I identify the economic, political, and legal tensions which should be overcome in order to establish such a multilateral system: enterprises' interests in keeping their economic advantages; mistrust among states as well as mistrust in the current non-proliferation verification system; the necessity of redefining the content of the states' right to use nuclear energy for peaceful purposes. And, last but not least, the willingness to cooperate of the states currently developing those activities of enrichment and recycling. Based on that analysis, the second contribution is the definition of those formulae for cooperation which would be the most appropriate for tackling the problems detected, as they could pave the way to the transition towards a multilateral system of worldwide reach.

1 Introduction

The risk that the peaceful exploitation of nuclear energy contributes to the spread of nuclear weapons has been recognized from the very beginning of the nuclear era. The dual use problem focuses, nonetheless, on two specific stages of the nuclear fuel cycle: uranium enrichment (neces-

sary for manufacturing nuclear fuel) and the nuclear fuel reprocessing activities, as they call for capabilities and technologies which could be turned to non-peaceful uses simply following a political decision.¹

¹ This is a technical statement which shows up in all specialized articles and documents on the issue, among others, IAEA's director, M. El Baradei's declarations. See 'Addressing verification challenges', Proceedings of the International Safeguards Symposium on addressing verification challenges: IAEA and Institute of Nuclear Materials Management and European Safeguards Research and Development Association; Vienna, 16–20 Oct. 2006, available at: www-pub.iaea.org/mtcd/publications/pdf/p1298/p1298_book.pdf.

* Associate Professor of International Law and EU Law, University of Barcelona. This work was conducted in the framework of research projects SEJ2006-14418 and ECO2009-06946 (Spanish Ministry of Science and Innovation) and 2009 SGR1114 (Regional Government of Catalonia). Email: malvarez@ub.edu

Expected growing demand for nuclear energy in the foreseeable future (and so, concerns over proliferation risks) are nowadays based on these three factors:² first, the rising price of fossil fuels and the growing demand for energy in the world, including from developing countries; secondly, energy security factors, since many countries are seriously considering diversifying their energy mix in order to reduce their dependency on imported fossil fuels; and, thirdly, environmental factors, with the fight against climate change driving the search for energy sources which will not contribute to global warming. Regardless of any other considerations, nuclear energy meets this requirement.

The development of the civil nuclear energy option requires, among other conditions, a high degree of confidence concerning the future supply of nuclear fuel, and one way in which countries can hope to decrease uncertainty concerning that fuel supply is, precisely, by acquiring enrichment or reprocessing facilities. This concern has brought about the reappearance of proposals aimed at the multilateralization of the nuclear fuel cycle and, more specifically, the establishment of mechanisms to prevent – or at least limit – the increase in the number of countries with the capability to enrich uranium and/or reprocess nuclear fuel.

With this background in mind, this article will focus on the possibilities of implementing a valid multilateral system for uranium enrichment and nuclear fuel-recycling activities. The analysis

is divided into four main sections. First, I identify the technical, economic, and political aspects of the nuclear fuel cycle relevant to its regulation by law. Secondly, I examine the current legal framework of the uranium enrichment and nuclear fuel reprocessing activities under the non-proliferation regime, distinguishing the effects which that regime has on the carrying-out of these activities. Thirdly, I examine the proposals for the multilateralization of nuclear fuel production and supply, with the aim of identifying their characteristics and the economic, political, and legal tensions underlying each of them. Fourthly, the analysis thus carried out allows for the defining of those formulae for cooperation which would be the most appropriate for tackling the problems detected.

2 Technical, Economic, and Political Aspects of the Nuclear Fuel Cycle

The nuclear fuel cycle, or the whole set of actions and processes which enable uranium ore to be obtained and converted into fuel suitable for use in a nuclear power station, and its eventual re-use, can be ordered into five basic stages: (1) mining of uranium and its separation from the rock, thereby obtaining what is known as yellowcake; (2) conversion of the yellowcake into the chemical form necessary for it to be treated in the following stage; (3) uranium enrichment, a process which enables the proportion of the U-235 isotope present in uranium in its natural state to be increased from 0.7 to at least 3.5 per cent; (4) nuclear fuel manufacturing, and (5) nuclear fuel

² The International Energy Agency forecasts that world use of nuclear energy will grow from 368 GW in 2005 to some 416 GW in 2030: see World Energy Outlook 2006, 2007, and 2008.

reprocessing, in order to separate the plutonium from the uranium and re-enrich the uranium.³

The products obtained in each of those stages are the object of commercial transactions on the international market, although they are subject to the conditions and requirements which we will analyse in the following section. In that market, the participating companies are located in a limited number of countries, of which – with the exception of Russia – none has the facilities for carrying out all five stages described above. China and the United States lack the commercial facilities for reprocessing uranium (although in the case of China there is a pilot plant under construction). However, they do have uranium mines and the facilities necessary for converting and enriching uranium and manufacturing nuclear fuel. There is also a great difference between the number and type of states with functioning uranium mines⁴ and those which have the facilities for converting and enriching uranium or manufacturing nuclear fuel. It is particularly noticeable that only nine states have commercial facilities for

enriching⁵ (i.e. where most of the basic material necessary for the 439 nuclear power stations currently in existence in 30 countries to function is produced)⁶ and that in only three states are commercial reprocessing activities carried out.⁷ In other words, there is a definite bottleneck at the uranium enrichment stage of the nuclear cycle, and this bottleneck is even narrower where uranium obtained by reprocessing spent nuclear fuel is concerned.

The current situation needs clarification on two points. These clarifications reflect some of the economic and political tensions which need to be taken into account in any proposal for the multilateralization of this type of activity.

From a business perspective, uranium enrichment is an activity carried out for commercial purposes by only five

³ See IAEA, 'Nuclear Fuel Cycle Information System', available at: www-nfcis.iaea.org.

⁴ 90% of world uranium extraction capacity is concentrated in 7 countries: Australia, Canada, Russia, Kazakhstan, Namibia, Niger, and Uzbekistan. In addition to this, 40% of uranium requirements are satisfied by secondary supplies – stored uranium or material previously earmarked for military use – and recycled materials. It has been estimated that uranium resources identified in the ground are sufficient to cover current demand for about 100 years: see IAEA, 'International Status and Prospects of Nuclear Power', Report by the Director General, 12 Aug. 2008, GOV/INF/2008/10-GC(52)/INF/6, at 10–11.

⁵ We are not including facilities for enriching uranium for military purposes, which has been carried out in countries with nuclear weapons and is currently subject to a moratorium while negotiations continue for an international treaty which would ban the production of these fissionable materials. Nowadays, China, France, Germany, Japan, the Netherlands, Pakistan, Russia, the UK, and the USA have operational enrichment facilities for commercial purposes. Besides them, Brazil has two operational laboratories and one pilot plant. Another case of developing uranium enrichment capacities is that of Iran.

⁶ 42 new facilities are currently under construction, including in two new states: Finland and Iran. See 'IAEA – Power Reactor Information System', available at: www.iaea.org/programmes/a2/. As well, 51 states have shown their interest in developing this kind of energy. See IAEA, *supra* note 4, at 15.

⁷ France, Russia, and the UK (all these also have enrichment facilities). We do not include the case of the Democratic People's Republic of Korea, with a laboratory in standby as well as a controversial and risky nuclear programme.

companies.⁸ Three of these are under state ownership or the equivalent: the United States Enrichment Corporation (USEC) in the USA, Rosatom in Russia, and Japan Nuclear Fuel Limited (JNFL). The other two (URENCO⁹ and EURODIF¹⁰) are international consortia with a different legal status, although in both cases they are manifestations of the interest European countries have in maintaining an autonomous enrichment capability.¹¹ An important distinction between these two consortia is that in the case of EURODIF the participating states are guaranteed a production quota equal to their percentage holding in the company, but, unlike in URENCO, they do not share technology, this remaining exclusively in the hands of the state where the facility

is located, in this case France. As far as reprocessing is concerned, all currently functioning commercial facilities are owned either by the government or by companies under government control,¹² and the only multinational venture into this field so far – Eurochemic – closed down in 1975.¹³

With regard to the possible development of new enrichment or reprocessing facilities, interest here lies in the possible increase in the number of countries and/or companies involved in this type of activity, and therefore in the number and type of those in possession of a technology which could be used for non-peaceful purposes. However, according to data held by the International Atomic Energy Agency (IAEA),¹⁴ and excluding the specific case of Iran, only two new countries seem to have any real possibility in this sense *vis-à-vis* uranium enrichment:

⁸ See 'Multilateral Approaches to the Nuclear Fuel Cycle: Expert Group Report submitted to the Director General of the International Atomic Energy Agency', INFCIRC/640, 22 Feb. 2005, at 47–50.

⁹ URENCO is an organization created in 1971 following the Treaty of Almelo between the UK, Germany, and the Netherlands, 795 UNTS 308. URENCO facilities supply enriched uranium to the nuclear power stations of its member states and fulfil contracts for the sale of services (enriched uranium and enriching equipment) to other states as long as there is unanimous agreement between the three participants. For more details about the Organization see www.urenco.com.

¹⁰ Created in 1973, EURODIF includes companies from 5 countries (France, Italy, Spain, Belgium, and Iran) and is currently a subsidiary of the AREVA group. The presence of Iran comes about indirectly, through its share in the Franco-Iranian company SOFIDIS (which owns 25% of the shares in EURODIF). Following an agreement between AREVA and URENCO, the current EURODIF facility will be replaced in 2016 by a new one which will operate using URENCO uranium enrichment technology. SOFIDIS is not a shareholder in the company which owns this new facility (and consequently Iran will have no relation at all with it). See www.aveva.com.

¹¹ Regarding the origin of these two consortia see A.S. Krass *et al.*, *Uranium Enrichment and Nuclear Weapon Proliferation* (1983), at 31–32, 64–66, and 199–223, also available at: <http://books.sipri.org/files/books/SIPRI83Krass/files/books/SIPRI83Krass/SIPRI83Krass.pdf>.

¹² France and the UK each have two commercial installations for reprocessing (managed by the state-owned firms COGEMA and BNFL), and Russia has one (owned by Rosatom): see 'Multilateral Approaches to the Nuclear Fuel Cycle: Expert Group Report submitted to the Director General of the International Atomic Energy Agency', INFCIRC/640, 22 Feb. 2005, at 60, and 'Nuclear Fuel Cycle Information System', *supra* note 3.

¹³ Created in 1959 by an agreement between 13 European states, Eurochemic's aim was to share resources in order to gain enough experience in a market which, then, was very promising: see OECD Historical Series, EUROCHEMIC – European Company for the Chemical Processing of Irradiated Fuels 1956/1990 (1996).

¹⁴ See the Nuclear Fuel Cycle Information System, *supra* note 3.

Argentina¹⁵ and Brazil.¹⁶ The situation as far as nuclear fuel reprocessing is concerned also appears to be fairly stable: apart from a new pilot plant in operation in India and another under construction in China,¹⁷ there is only one new commercial facility under construction, in Japan, belonging to the state-owned JNFL.¹⁸

The IAEA data therefore show a relatively stable situation which, in principle, does not appear to support the hypothesis of a substantial increase in the number and/or type of subjects involved in uranium enrichment or nuclear fuel reprocessing, always supposing enrichment capacity to be sufficient to cope with demand. In this respect not all forecasts are identical. The IAEA states that current capacity is sufficient to cope with demand for the next decade, partly because of the introduction of new technologies and partly because new plants currently under construction will become operational.¹⁹ The EURATOM forecasts are nonetheless less optimistic, predicting that nuclear power stations in the European Union may have problems in

receiving supplies of enriched uranium from 2013 onwards.²⁰

3 Current Legal Framework of the Uranium Enrichment and Nuclear Fuel Reprocessing Activities under the Non-proliferation Regime

The nuclear non-proliferation regime is built upon three main sources of regulation: the Nuclear Non-Proliferation Treaty (NPT), including the safeguards managed by the IAEA; the nuclear exports control system, designed basically through non-binding agreements between the main countries exporting these types of materials and technologies; and the decisions adopted by the United Nations Security Council in Resolution 1540 of 28 April 2004.

An analysis of this regime shows that enriched uranium production and nuclear fuel reprocessing are at present activities subject to international control when they are undertaken by states not possessing nuclear weapons, and this is due to the obligations imposed on those states by the NPT. Indeed, when those activities are carried out using uranium extracted and technologies devised in the same state, international control is warranted by the safeguards agreement which these countries have with the

¹⁵ In the case of Argentina, there is a pilot plant in Pilcaniyeu, owned and operated by the Comisión Nacional de Energía Atómica de Argentina.

¹⁶ In the case of Brazil, the Navy has two laboratories and a pilot plant for uranium enrichment, all of which are primarily connected with that country's interest in developing nuclear submarines.

¹⁷ In Italy there is a pilot plant in standby, and in Argentina the planned construction of a pilot plant has been postponed.

¹⁸ In this last case, the IAEA monitors and supervises the whole process. So the Agency is acquiring the needed capabilities for the effective safeguarding of any new future reprocessing plant.

¹⁹ See IAEA, *supra* note 4, at 11.

²⁰ See Euratom Supply Agency Communiqué, 'Survey of Enrichment Requirements and Capacity and their Contractual Coverage', Luxembourg, 8 Apr. 2008. See also Euratom Supply Agency, Annual Report (2007), at 14–17, both available at: http://ec.europa.eu/euratom/index_en.html.

IAEA,²¹ although these safeguards would certainly be improved if all states signed the Additional Protocol designed by the IAEA in 1997.²²

In addition to this, when reprocessing and/or enrichment is carried out using imported products or technologies supplied by a member state of the Nuclear

Suppliers Group (or the London Group),²³ this group's directives have the effect of strengthening the IAEA's international control because the supplying countries will authorize export only if the destination country accepts that any facility built from knowledge of the technology supplied or in which the materials supplied are to be used will be subject to IAEA safeguards.

However, this way of strengthening control does not cover all the countries which participate in the nuclear energy cycle. In fact, not all of them belong to the London Group; such is the case of Israel, India, and Pakistan. The same happens with several uranium ore producing states (Kyrgyzstan, Namibia, Niger, and Uzbekistan). Therefore, these states are not obliged to submit their exports to conditions of this type.²⁴

Nonetheless, as a result of Resolution 1540 of the UN Security Council, these seven states must at least introduce measures to enable state control of any materials connected to nuclear weapons, and this includes uranium, whether in its

²¹ The scope of the safeguards agreements includes basic materials and special fissionable materials – whether produced, treated, or used in any main nuclear plant, or found outside any facility of this type – in all nuclear activities for peaceful purposes carried out within the territory of those states, under their jurisdiction, or carried out under their control anywhere (Art. III(1) of the NPT). In accordance with Art. XX of the IAEA Statute, uranium – both in its natural state and enriched – and nuclear fuel are two of these materials.

Twenty-six non-nuclear weapons states party to the NPT lack a current safeguards agreement with the IAEA. However, these are states with no nuclear activity of any type and with little economic development. India, Israel, and Pakistan have signed safeguards agreements with the IAEA, enabling the organization to monitor some of their nuclear power stations for peaceful uses. See IAEA, 'Safeguards Current Status' (as of 9 July 2009), available at: www.iaea.org/OurWork/SV/Safeguards/sir_table.pdf.

²² Under the Additional Protocol framework, states are obliged to supply the IAEA with an expanded declaration including information on all aspects of their nuclear activities and the nuclear fuel cycle, and must allow that organization unlimited access to nuclear facilities and anywhere else there are or may be nuclear materials which are used for or could be used for activities related to the nuclear fuel cycle. Of the states which currently have commercial facilities for uranium enrichment or nuclear fuel reprocessing (see *supra* notes 5 and 7) only Pakistan has not signed an Additional Protocol. On the other hand, Brazil, with two laboratories and a pilot plant in operation but no commercial facilities, has also not signed an Additional Protocol. At 9 July 2009, 91 states and one international organization (EURATOM) have an Additional Protocol in force. See IAEA Safeguards Current Status, *supra* note 21.

²³ See Courteix, 'Les Accords de Londres entre pays exportateurs d'équipements et de matières nucléaires', 22 *Annuaire Français du Droit International* (1976) 27; Strulak, 'The Nuclear Suppliers Group', *The Nonproliferation Review* (Fall 1993) 2; Anthony, 'Reforming Nuclear Export Controls: the Future of the Nuclear Suppliers Group', SIPRI research report 22 (2007); and Pomper, 'Nuclear Suppliers Make Progress on New Rules', *Arms Control Today* (Dec. 2008). Nowadays 45 states belong to the London Group: see www.nsg-online.org/default.htm.

²⁴ Nevertheless, Kyrgyzstan, Namibia, Niger, and Uzbekistan – as NPT parties – must not export uranium ore (basic material) to any non-nuclear weapons state unless that ore is subject to the IAEA safeguards regime in the receiving country: Art. III(2) of the NPT.

natural state or enriched.²⁵ The obligation to do this places a double responsibility on the state: it has to set up measures aimed at preventing any 'loss' of this type of material and it has to be in a position to supply relevant information as to the identity of the recipients of any such exports. This state control does not include a requirement for the export of materials connected to nuclear weapons to be submitted to any type of conditions. Nevertheless, other sections of the Resolution itself enable the 1540 Committee to use the lists and directives compiled within the London Group to indicate to what extent obligations decided on by the Security Council are being met, and this encourages countries to make their exports conditional on their being subject to IAEA safeguards in their destination country.

Finally, Resolution 1540 does not make it compulsory for countries to maintain control over the technologies associated with nuclear energy, including those necessary for enrichment or reprocessing activities, and therefore the export of these technologies remains subject to whatever controls each state may decide on, either unilaterally and through agreements.²⁶

4 Proposals for the Multilateralization of Nuclear Fuel Production and Supply

The possibility of establishing a multinational system to monitor the nuclear

fuel cycle has been suggested at various times since the start of the nuclear era.²⁷ This idea reappeared on the international agenda at the beginning of this century, specifically on the initiative of the Director General of the IAEA, Mohamed ElBaradei, who decided to commission a group of experts to study possible options for the multilateralization of the nuclear fuel cycle. This group presented its report in February 2005.²⁸ We will next look at the characteristics of these options and, then, we will identify the economic, political, and legal tensions underlying each of them.

A Characteristics

The report presented to the IAEA Director General in 2005 considers five multilateralization options for each stage of the nuclear fuel cycle, arranging within them the various proposals and initiatives formulated up to now. These options in fact focus on three main issues: (a) the establishment of a guarantee of services; (b) the transformation of existing national facilities into international facilities; and (c) the construction of new joint facilities. Applying these three focal points to enrichment and reprocessing activities has the following characteristics:

- (a) The establishment of a guarantee of services (in this case, access to enriched uranium or spent nuclear fuel reprocessing) is based on two premises. The first of these is the

²⁵ See SC Res 1540(2004), at para. 3.

²⁶ On the weaknesses of the current control system for nuclear exports see Rauf, 'Exports Controls and Multilateral Nuclear Arrangements', in M. Bremer Maerli and S. Lodgaard (eds), *Nuclear Proliferation and International Security* (2007), at 267.

²⁷ See J.A. Yager, *International Cooperation in Nuclear Energy* (1981), chaps 5 and 6.

²⁸ See 'Multilateral Approaches', *supra* note 8. An early analysis of this report can be found in S.A La Montagne, *Multinational Approaches to Limiting the Spread of Sensitive Nuclear Fuel Cycle Capabilities* (2005).

maintenance of the current market in uranium enrichment and nuclear fuel reprocessing, on which countries will still depend in order for their nuclear power stations to function. The second premise is that the guarantee of services will be granted only to those countries which renounced any development of an independent enrichment or reprocessing capability, for as long as they abide by this commitment.

On those bases, the report considers three types of guarantee. The first consists of supply guarantees given by the current supplying companies (individually or jointly), which would apply if there were an unjustified interruption of valid contracts (i.e., for non-commercial reasons). Although the nature of the nuclear market implies that any business decision has the agreement of the state in question, this would involve guarantees subject to domestic law and claimable under the jurisdiction of the supplier.²⁹ The other two types of supply guarantee partially coincide as both cases involve the setting-up of a nuclear fuel ‘bank’, access to which would be granted to those states which had their supply of these products and services interrupted for non-commercial reasons.³⁰ The creation

and functioning of this fuel bank could come into being only through international agreement or, in addition, with the involvement of the IAEA, which would act as an institutional support for managing the bank and a guarantee that it would function impartially.

- (b) The transformation of existing national facilities into international facilities would mean that new international organizations would have to be set up, to which both the ownership and management of these facilities would be transferred.³¹ To this end, the report advocates the use of the EURODIF model, as this would avoid the dispersal of capabilities and technologies associated with enrichment and reprocessing while guaranteeing participating states access to the resulting products. This option faces two main difficulties. First of all – and the report does not make any specific reference to this – the basic idea behind this proposal is to freeze the number of operational facilities, which would then indeed become multinational facilities. This would mean limiting the location of these new multinational facilities to the territory of those states which already have them, thereby reinforcing the distance separating many states

²⁹ Along these lines can be included the proposal to create a World Nuclear Energy Association: see Lyman and von Hippel, ‘Reprocessing Revisited: The International Dimensions of the Global Nuclear Energy Partnership’, *Arms Control Today*, Apr. 2008, at 6.

³⁰ Japan has drawn up a proposal which follows the lines of supply guarantee philosophy. See Communication received on 12 Sept. 2006 from the Permanent Mission of Japan to the Agency

concerning arrangements for the assurance of nuclear fuel supply (IAEA – INFCIRC/683, 15 Sept. 2006).

³¹ Judging by its ultimate aim, an Austrian proposal could be included in this category. See Communication received from the Austrian Federal Minister for European and International Relations concerning the Austrian proposal for the multilateralization of the nuclear fuel cycle (IAEA – INFCIRC/706, 5 June 2007 and INFCIRC/755, 2 June 2009).

from this type of centre. This distance is relevant not only in physical terms but also political ones, as it seems clear – especially if the EURODIF model is chosen – that only like-minded states will be willing to participate in an international agreement which reserves for one of them the location of the facilities and access to the enrichment and reprocessing technologies. Secondly, there is also the matter of existing property rights over the facilities in operation, which could be affected by the change in status of the facilities and would if necessary need to be compensated for.

- (c) The construction of new joint facilities was the option chosen at the time for the appearance of two of the main companies in the nuclear market today: URENCO and EURODIF. The choice of one model or the other is relevant from a non-proliferation point of view. Even so, the report doubts the effective competitiveness of future new companies in the sector and recalls the existence of particular difficulties associated with this type of organization: specifically, URENCO's difficulties in management and EURODIF's difficulties in sharing costs. Nevertheless, should a situation come about in which the joint-facility model were widely applied, the report points out two relevant advantages: economies of scale and fewer facilities that would have to be subject to IAEA safeguards.³²

Similar considerations are given in the case of joint reprocessing facilities, based on the experience of Eurochemic.

B Underlying Tensions

The options analysed show the existence of economic, political, and also legal tensions which, in our view, justify a rethink of the premises whereby these problems should be tackled.

In economic terms, the limited number of countries and companies currently involved in enrichment and/or reprocessing proves that barriers exist preventing access to these markets, due to the technologies and investment needed to set up facilities of this type. As a result, any measure aimed at preventing or limiting new suppliers joining the group would lead to, at least, the strengthening of the situation of oligopoly, which would basically benefit pre-existing companies, in a market where there are also doubts whether these companies really have the capacity to satisfy future demand. At the same time, some countries are openly opposed to proposals aimed at controlling or limiting uranium enrichment capabilities because, they argue, they would prepare the way for the confiscation of

and located on special territory controlled and administered by the IAEA in a state which at present lacks this type of facility, among other criteria. See Communication received from the Resident Representative of Germany to the IAEA with regard to the German proposal on the Multilateralization of the Nuclear Fuel Cycle (IAEA – INFCIRC/704, 4 May 2007) and the Working Paper presented by Germany to the Preparatory Committee for the 2010 NPT Review Conference (NPT/CONF.2010/PC.II/WP.32, of 6 May 2008).

³² Germany has put forward a proposal of this type: the construction of a uranium enrichment plant managed by a private company (in charge of its construction, operation, and management)

sensitive technologies and limit the development of programmes of scientific or commercial interest.³³

In political terms, the main area of tension lies in the connection between enrichment and reprocessing capability and the capacity to manufacture nuclear weapons insofar as they both depend on similar technologies and knowledge. While acknowledging that in technical terms this nuclear proliferation risk may exist, it is also true that this hypothesis has no confirmation in historical terms, since those states which have at some time tried to produce nuclear weapons have not done so through the cover of a civil nuclear programme.³⁴ Indeed the aim of the IAEA safeguards system is to verify that no such deviation of capabilities comes about, and it is therefore a security problem to be dealt with on an international basis, the appropriate instrument for which is the Additional Protocol to the IAEA safeguards agreements.

As opposed to this interpretation, it is our view that the political tension underlying the multilateralization proposals lies elsewhere – specifically, in the possible alteration of the political balance maintained by the NPT which would come about with the appearance of a tertium genus of states not possessing nuclear weapons, but having the capability to manufacture them, and, therefore, having

a political status ‘close’ to that of the nuclear weapon states. The problem lies in that concern is not expressed in general terms but, on the contrary, reactions vary depending on what political assessment is made of the state which wants to develop an independent enrichment and reprocessing capability – including its history as regards nuclear proliferation – and on what sort of strategic relations it has with other states. It only has to be seen how Germany, the Netherlands, and Japan have had uranium enrichment facilities for years, yet a completely different reaction is generated when Iran or Brazil wants access to this type of capability. This way of differentiating between countries makes it possible to think that the real aim is to limit the type, not the number, of countries possessing those capabilities, following politically-motivated criteria which would be difficult to regulate for.

In legal terms, the multilateralization proposals do not question, *per se*, the right to nuclear energy for peaceful uses recognized in Article IV of the NPT, because they are based on voluntary cooperation on the part of the countries, and therefore countries would be able to opt freely for one or another way of exercising that right (multilaterally or independently).³⁵

³³ See Statement by the representative of Brazil in the III Session of the Preparatory Committee for the 2005 NPT Review Conference, available at: www.reachingcriticalwill.org/legal/npt/prepcom04/BrazilCL3.pdf.

³⁴ See Neff, ‘The Nuclear Fuel Cycle and The Bush Nonproliferation Initiative’, address at the World Nuclear Fuel Cycle 2004 meeting, Madrid, 1 Apr. 2004, available at: www.iaea.org/NewsCenter/Focus/FuelCycle/neff.pdf.

³⁵ Even if the proposal to turn existing national facilities into multilateral facilities were put into practice, nothing would prevent non-participating states from undertaking enrichment and reprocessing activities independently. In fact, in order to prevent this from happening, it would be necessary to amend the NPT (and have this ratified as necessary by all party states) or establish another way of introducing a general ban, for example through an SC Res making a decision on the question. Clearly we will not enter into an assessment of the SC’s powers to adopt a resolution of this type.

However, the ultimate goal of the multilateralization proposals may in fact limit the extent of that right, or at least the freedom of countries to opt for one or another way of exercising that right, because it indirectly throws apparent suspicion upon those countries which opt to satisfy their enrichment or reprocessing requirements independently. The risks of proliferation inherent in this independent capability do not, however, prevent it being stated that, in legal terms and in its current configuration, the right to nuclear energy for peaceful uses includes uranium enrichment and nuclear fuel reprocessing activities as long as they are indeed subject to IAEA control and used exclusively for peaceful purposes.

5 Formulae for the Transition towards a Multilateral System of Worldwide Reach

The tensions mentioned above show how difficult it is to implement the multilateralization proposals formulated so far. Those tensions point as well to the need to put together a multinational system of worldwide reach to cover the entire nuclear energy cycle, establishing clear multilateral control and management of any enrichment and reprocessing facilities. This would call for a general international consensus to amend Article IV of the NPT, which is not likely to emerge unless there is, as well, clear implementation of the nuclear disarmament obligations included in the same treaty.

In the meantime, it would be a good idea to move towards setting up certain cooperation formulae which could pave the way for the transition to that

worldwide system and, at the same time, give an unbiased response to the legitimate aspirations of countries regarding nuclear energy. These transition formulae include the generation of an independent, viable, and effective nuclear fuel reserve and the creation of enrichment and/or reprocessing centres of a regional and supranational nature.

Generating a nuclear fuel reserve would, for the moment, appear to be the only multilateralization proposal with any real possibility of being put into action.³⁶ With its start-up finances in place since the beginning of March 2009,³⁷ there are nonetheless many important aspects regarding the constitution and functioning of this fuel bank still to be defined. These aspects include its legal basis, location, and internal organization, as well as conditions which will need to be met by countries wanting to access it.

Concerning the fuel bank legal basis two main options can be considered: (1) an IAEA subsidiary body or (2) an ad hoc international treaty (annexed or not to other non-proliferation treaties, i.e. the

³⁶ The idea for its creation stems from two specific proposals, one put forward by the US government in Sept. 2005 and the other drawn up a year later by an American non-governmental organization, the Nuclear Threat Initiative (NTI). See IAEA, Communication Dated 28 September 2005 from the Permanent Mission of the United States of America to the Agency (INFCIRC/659, Sept. 2005) and NTI Press Release, 19 Sept. 2006, available at www.nti.org/c_press/release_IAEA_fuelbank_091906.pdf.

³⁷ Funds come from the Nuclear Threat Initiative (NTI) (US\$ 50 million), USA (US\$ 50 million), Norway (US\$ 5 million), the United Arab Emirates (US\$ 10 million), the European Union (US\$ 32 million), and Kuwait (US\$ 10 million); see www.iaea.org/NewsCenter/Focus/FuelCycle/index.shtml.

NPT). The first option would emphasize the IAEA's authority over the bank, but would mean no basic relationship between this fuel reserve and the non-proliferation regime entrusted to the NPT.³⁸ That is the reason some states could prefer an ad hoc international agreement attached to the NPT, thus reinforcing the advantages of being an NPT member, and avoiding the participation in the bank of non-NPT parties.

As regards location, Russia has already come up with a proposal which could assist in this decision: the possibility of setting up an International Uranium Enrichment Centre in Angarsk, in Eastern Siberia, where there is already a complex for manufacturing enriched uranium. According to this proposal, the Centre would be controlled by the IAEA and access to it would be granted to those countries which, in line with the obligations deriving from the non-proliferation regime, had their nuclear fuel supply interrupted.³⁹ However, and even with this international status, some states consider that the bank should not be located in a state which already has enrichment or reprocessing facilities, so as to provide as much diversity of supply as possible.⁴⁰

As far as conditions for access are concerned, although it is envisaged that the IAEA will be given the responsibility of

deciding whether a country can access the services and products provided by this reserve, it still needs to be determined whether this decision will be made in accordance with a list of pre-established objective conditions or whether it will depend upon a case-by-case decision. The IAEA Director General has said on various occasions that the release of nuclear material to a consumer state should be determined by non-political criteria established in advance and applied in an objective and consistent manner.⁴¹ This would mean that the decision could be assigned to the IAEA Director General, who would simply have to check the appropriateness of the applicant country against the list of pre-established conditions. If that list does not exist or it does not include clear and objective requirements, it would most likely be necessary to refer the decision to the Board of Governors, which involves not only the risk of delays in the decision-making process, but also the risk that politically-motivated considerations may enter the process.

Among the conditions which the applying countries would have to fulfil, the contents of the requirement to 'be in agreement with IAEA safeguards obligations' still need to be specified. In other words, whether being in agreement simply means that there exists a current safeguards agreement between the IAEA and the relevant country, or whether it also includes the existence of an Additional Protocol, along with a minimum period

³⁸ The IAEA Statute provides the legal basis for creating such a subsidiary body. Among others, see Arts III(A)(7) (IAEA functions) and IX (Supplying of materials).

³⁹ See IAEA, Communication received from the Resident Representative of the Russian Federation to the IAEA on the Establishment, Structure and Operation of the International Uranium Enrichment Centre (INFCIRC/708, 8 June 2007).

⁴⁰ The diversification goal appears in some multilateralization proposals: see *supra* note 32.

⁴¹ See ElBaradei, 'Nuclear Energy: The Need for a New Framework', Statement at the International Conference on Nuclear Fuel Supply: Challenges and Opportunities, Berlin, Apr. 2008, available at: www.iaea.org/NewsCenter/Statements/2008/ebsp2008n004.html.

during which the country applying for access to the reserve must have complied with the requirements of the safeguards agreement and/or the Additional Protocol.⁴² And all this is without forgetting that, whereas the Russian initiative and the IAEA Director General himself, among others, maintain that access to the nuclear reserve must not be conditional upon any of the rights contained in the NPT being given up, the US government and the NTI proposals include the need to renounce the development of an independent enrichment and reprocessing capability as a prerequisite for countries to be able to make use of this fuel reserve.

Our view is that the viability of this mechanism and its effectiveness in limiting the number of countries with enrichment and reprocessing capability lies, precisely, in not making access to this reserve conditional on countries renouncing their rights regarding nuclear energy for peaceful purposes: first, because this would increase the number of countries willing to join, and it would therefore be possible to check whether the reserve does in fact offer sufficient supply guarantees; secondly, because assigning to the IAEA the management of a nuclear reserve which made participating countries renounce the rights they have under the NPT would weaken the organization's credibility and its position as guarantor of the obligations taken on by countries

under the terms of that treaty. A different question is whether the nuclear fuel bank should provide services to states with enrichment and reprocessing facilities. In this regard, some kind of differentiation could be established, depending on the facility type (laboratory, pilot plant, etc.) and the safeguards agreement in force (with or without Additional Protocol).

Even with these characteristics, however, the nuclear fuel bank does not provide a solution to the political tension underlying the multilateralization proposals. In fact, until the nuclear disarmament called for under the NPT comes about, there will still be enough incentive for countries to try to change their political status by developing capabilities which do not per se violate the obligations contained in the NPT. The problem is therefore more than simply a question of the potential proliferation risks associated with enrichment and/or reprocessing capabilities because, regardless of other considerations, it is still true that these capabilities give the countries that possess them a privileged international position.

The challenge therefore lies in finding a solution which will allow countries to possess this type of capability but which at the same time will be resistant to the risks of proliferation that possession of those capacities carries with it. We believe that the solution is to be found in formulae involving the joint exercise of sovereignty, i.e., regional supranational organizations which would be given the sole responsibility for developing and controlling this type of nuclear capability and which would, in addition, put themselves under IAEA supervision by signing a stronger safeguards agreement (i.e., including the provisions of the Additional Protocol model). Setting up this type of

⁴² It should be remembered that agreeing to an Additional Protocol is a voluntary decision on the part of the states, whose only obligation *vis-à-vis* the NPT is to sign a safeguards agreement with the IAEA. However, it is also true that some nuclear supplier states have decided to make their exports conditional upon a current Additional Protocol existing in the destination state.

supranational organization should be encouraged by the IAEA itself, as well as by nuclear exporting countries, which have the perfect tool for the purpose: to agree that the export of technologies and equipment relating to enrichment and/or reprocessing should take place only if the recipients are organizations of this type.

6 Final Remarks

Climate change has brought about a momentum for the debate about increasing the use of nuclear energy for peaceful purposes. However, it is not likely to be the origin of any alteration in the political balance of the NPT. Certainly, more and more states seek to add nuclear power to their energy mix, but it does not necessarily mean that they will consider developing their own uranium enrichment and/or reprocessing facilities. Most likely, they will do it only if they do not have enough assurances of nuclear fuel supply, if they have enough resources to make such expensive investments in that type of facility, and/or if other kinds of political circumstances are present. Definitely, cases such as those of North Korea and Iran have no relationship at all with climate change reasons.

Besides the political and non-proliferation dimension of the assurances of nuclear fuel supply, these assurances are primarily to do with international economic cooperation. From this point of view, the issue belongs to the scope of Article IV(2) of the NPT, and it shows up a classical North–South divide. No matter the ambiguities of this article, it calls for a specific effort on NPT parties in a position to do it to cooperate in the further development of the application of nuclear energy for peaceful purposes,

with due consideration for the needs of the developing areas of the world. Therefore, industrialized countries and nuclear weapon states have a great opportunity to demonstrate how their concerns over proliferation risks encourage them to design feasible and effective cooperative measures, which guarantee developing countries their access to nuclear fuel and to the nuclear energy option.

Finally, it is worth recalling that most multilateral proposals on nuclear fuel assurances try to maintain the existing discrimination between non-nuclear weapons states: some of them already have access to uranium enrichment and reprocessing capacities, and the current proposals do not foresee any change for them. To make this discrimination acceptable to those states disadvantaged by it, positive incentives would be required, besides the guarantee of nuclear fuel supply that those proposals could offer. Otherwise, potential uranium enrichment countries will not have enough reason to give up the chance of obtaining capacity which would provide them with economic and energy autonomy, and an upgrading of their political status as well.

Postscript: The ‘Nuclear Energy Issue’ at the Copenhagen Conference

The Kyoto Protocol makes neither mandatory application nor explicit prohibition of any specific energy source or technology in order to comply with the parties’ obligations to limit or reduce greenhouse gas (GHG) emissions. However, nuclear energy was excluded in practice from the flexibility mechanisms

designed in the same Protocol ('joint implementation' and 'clean development mechanism') because the seventh Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) ruled in 2001 that 'Parties included in Annex I are to refrain from using certified emission reductions generated from nuclear facilities to meet their commitments'.

In the preparatory meetings of the Copenhagen Conference there was discussion on whether the virtual exclusion of nuclear energy from the flexibility mechanisms should be maintained or abandoned. Specifically, the Report of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol included a draft decision on 'Emissions trading and the project based mechanisms' with two new possible options to be adopted, besides the option of maintaining the current situation: first, explicitly to declare that nuclear facilities shall not be eligible under the flexibility mechanisms; secondly, to state that activities related to nuclear facilities which commenced operation on or after 1 January 2008 shall be eligible under the clean development mechanism and under the joint implementation in the second and subsequent commitment periods. In this latter case, the conference should request the Subsidiary Body for Scientific and Technological Advice to recommend modalities and procedures for inclusion under both mechanisms of the activities referred to above. Clearly, the draft displays the very different points of view on the nuclear energy option – as well as the concerns emerging from the dual use risk – with the necessity to adopt specific measures for nuclear projects to be eligible under the flexibility mechanisms.

Anyway, the limited consensus reached at the Copenhagen Conference has made it impossible to adopt a decision on that issue. The Conference merely '[r]equests the Ad Hoc Working Group . . . to continue its work' and '[m]andates the host country of the next session of the Conference . . . to make the necessary arrangements in order to facilitate the work towards the success of that session'. While we must wait for the results of this work, it is worthwhile making some remarks:

1. Current nuclear power countries (NPC) will use nuclear energy to reduce their GHG emissions, giving at the same time an answer to their energy demands and requirements for economic development.
2. The climate change regime does not provide incentives to the NPC to transfer their nuclear technology to other countries, because their participation in those nuclear projects does not count in terms of compliance with their emissions reduction obligations. Hence, there is no interaction between the climate change regime and the commitments included in Article IV(2) of the NPT.
3. Claims have been made that the exclusion of the nuclear energy projects from the flexibility mechanisms is detrimental, especially for developing countries which have claimed access to this energy source, 'much cheaper than other alternatives', in order to meet their needs (Statement of the President of Uganda at the last Security Council Summit on September 2009). Although no prediction can be made about its effects, this is a claim which is likely to increase in the near future.