AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

Calendar No. 349

110TH CONGRESS, *1st Session* | SENATE | REPORT 110–151

NUCLEAR SAFEGUARDS AND SUPPLY ACT OF 2007

SEPTEMBER 11, 2007.—Ordered to be printed

Mr. BIDEN, from the Committee on Foreign Relations, submitted the following

REPORT

[To accompany S. 1138]

The Committee on Foreign Relations, having had under consideration a bill (S. 1138) to enhance nuclear safeguards and to provide assurances of nuclear fuel supply to countries that forgo certain fuel cycle activities, reports favorably thereon and recommends that the bill do pass.

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I. PURPOSE AND SUMMARY

The Nuclear Safeguards and Supply Act of 2007 provides increased support to the International Atomic Energy Agency's (IAEA) safeguards system by addressing a funding shortfall in the present safeguards system. The bill also makes it the policy of the United States to discourage the development of enrichment and reprocessing capabilities in additional countries, encourage the creation of bilateral and multilateral assurances of nuclear fuel supply, and ensure that all supply mechanisms operate in strict accordance with the IAEA safeguards system and do not result in any additional unmet verification burdens for the system. The bill would also authorize the President to negotiate, on both a bilateral and multilateral level, mechanisms to assure nations that forgo national nuclear fuel-cycle capabilities a supply of nuclear fuel for peaceful purposes. S. 1138 also ties the supply of nuclear fuel and an expansion of nuclear power to the ability of the IAEA to assure, through safeguards implementation, the absence of undeclared nuclear materials and activities involving them in states receiving nuclear fuel under such mechanisms.

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Significant international attention has focused in recent years on the problem of the increasing number of states seeking access to technical capabilities in the enrichment of uranium and the reprocessing of spent nuclear fuel. At the same time, increasing interest in nuclear power has led many countries to make new policy determinations that favor the use of nuclear power. A decision by any country to enter into the nuclear power field requires a clear understanding of the nuclear fuel cycle facilities for the storage or production of fuel to run reactors, the numbers and types of reactors that will be built, and the disposition of spent nuclear fuel and waste that will result from the operation of reactors. New nuclear facilities, be they production or utilization facilities, carry with them safeguards burdens. A substantial increase in the use of nuclear power throughout the world could result in many new facilities with nuclear material in new states over the coming decades. Such a situation poses inherent risks for U.S. national security and global peace and stability if the international community does not plan for an expansion of nuclear power in a manner that ensures that the nuclear nonproliferation system—which depends heavily on the IAEA's safeguards system—has the resources and technology available to it to cope with an expansion of civilian nuclear power. The committee believes that support for IAEA safeguards is thus an urgent priority.

Most projections regarding the expansion of nuclear power show some increase in the number of facilities and the amount of power generated, but are uncertain regarding the rate and scope of the rise in the use of nuclear power for electricity generation and the pace in construction of new utilization facilities or reactors. There are currently 435 commercial nuclear power plants operating in 30 countries around the globe, with a combined capacity of 370 GW(e). These plants supply 16 percent of the world's electricity.[1] A number of states, including China, India, Pakistan, Japan, Russia, the Republic of Korea, and the United States, have stated their intention to expand their nuclear power sectors. In the past year, there have been more than 25 announcements of license applications by the U.S. Nuclear Regulatory Commission (NRC) and various U.S. nuclear power entities for planned activities in the United States. Canada has recently undertaken preparatory activities for additional nuclear power plants. The United Kingdom has concluded in a major government review that nuclear power would form a key part of that country's energy strategy over the next century. The governments of Egypt, Nigeria, Indonesia, Turkey, and Belarus have all announced their intention to build their first nuclear reactors. The February 2005 Report of the IAEA Experts Group on Multilateral Approaches to the Nuclear Fuel Cycle found that "In light of existing, new and reawakened interest in many regions of the world, the prospect of new nuclear power stations on a large scale is therefore real. A greater number of States will consider developing their own fuel cycle facilities and nuclear know-how, and will seek assurances of supply in materials, services and technologies."

There has also been an expansion of the capacity to make nuclear fuel within the last several years. In 2006–2007, Brazil com-

[1] See http://www.world-nuclear.org/info/inf01.htm.

pleted work on its uranium enrichment facility at Resende. In the United States construction is underway on the National Enrichment Facility, and France also began building a new enrichment facility, to be called Georges Besse II.

The United States has for many years maintained a policy that it will not transfer enrichment and reprocessing technology to any state. President Bush has stated that his administration's policy is to prevent the further spread of such technology to new states. At the same time, the rising interest in nuclear power has challenged the international community to find ways to assure states contemplating nuclear power that they do not need to create national fuel cycles, which necessitate enrichment and reprocessing, to enjoy the benefits of nuclear power.

In 2005, Senator Lugar, then chairman of the committee, formed a Policy Advisory Group (PAG) on nuclear nonproliferation, which made and forwarded certain recommendations to President George W. Bush regarding the future of the nuclear fuel cycle and the dangers of proliferation. Co-chaired by Ronald F. Lehman II, formerly Administrator of the U.S. Arms Control and Disarmament Agency, and Ashton B. Carter, formerly Assistant Secretary of Defense for International Security Policy, the group included notable experts in the fields of nuclear nonproliferation, verification and arms control.[2] The PAG focused on the future of the Nuclear Non-Proliferation Treaty (NPT) and the larger nonproliferation system it supports.

The PAG found that the existing safeguards regime has failed to keep pace with the increase in the global availability of nuclear weapons technology, especially the technology and equipment for uranium enrichment and spent nuclear reactor fuel reprocessing. While the number of recognized nuclear-weapon states has not dramatically increased over the years, the dangers of proliferation have become more apparent, as demonstrated by the A.Q. Khan network and the Iranian, North Korean and Libyan examples.

The PAG found that the construction of new facilities for the enrichment of uranium and reprocessing of spent nuclear fuel, even for ostensibly peaceful purposes, poses an unacceptable long-term risk to the national security of the United States. The enrichment technology intended to produce fuel for nuclear power reactors can also be used to create material for a nuclear weapon, and the plutonium that is produced from reprocessing spent nuclear fuel is weapons-usable. Safeguards, even if applied as envisioned by the IAEA's Model Additional Protocol to country safeguards agreements (hereinafter, "additional protocol"), cannot solve the fundamental problems inherent in detecting enrichment facilities, which can be easily hidden. The spread of enrichment and reprocessing capabilities dangerously increases the possibility that more nations could develop their own nuclear weapons or that terrorists might obtain fissile or radiological materials for a dirty bomb. Given such threats, the PAG called on the United States to lead an international effort to halt the expansion of enrichment and reprocessing to new countries.

The PAG found that the use of nuclear power is likely to increase, both in developed countries and, in particular, in developing

[2] See Appendix to this Report.

countries. Importantly, however, the PAG concluded that expansion of nuclear power does not require—either technically or economically—the construction of new enrichment and reprocessing facilities in countries that do not currently have them. "Under most scenarios," the PAG found, "excess capacity already exists and will continue to exist for many years."[3]

The increasing international focus on nuclear power and consequent concerns about nonproliferation have resulted in the world's leading nuclear states offering a variety of proposals that not only favor the expansion of nuclear power, but also draw attention to the dangers of proliferation. In 2006, the United States announced a major initiative called the "Global Nuclear Energy Partnership" (GNEP). According to the administration, GNEP would seek to increase energy security and promote nonproliferation through the expanded use of proliferation-resistant nuclear energy facilities to meet growing electricity demand. The key elements of GNEP would include expanding domestic use of nuclear power; demonstration of proliferation-resistant actinide recycling of irradiated nuclear fuel; the minimization of nuclear waste; the development of advanced burner reactors; the establishment of reliable global fuel services; the demonstration of small- and medium-scale, proliferation-resistant reactors; and the revitalization of programs for advanced nuclear safeguards.

With regard to safeguards, GNEP may include such enhanced activities (which remain largely undefined) as:

- Incorporation of nuclear safeguards technology into designs for recycle facilities, advanced fast reactors, and associated nuclear materials storage and transportation, making them proliferation resistant.
- Development of high-reliability, remote, and unattended monitoring technologies; advanced containment and surveillance; smart safeguards information collection, management, and analysis systems; nuclear facility use-control systems; and next generation nondestructive analysis and process monitoring sensors.
- Research and development of advanced material tracking methodologies, process control technologies, and plant engineering.
- Remote sensing, environmental sampling and forensic verification methods.
- International facilities for conducting testing and demonstration.
- Continued support for global best practices for security and accounting of nuclear materials.[4]

In January 2006, President Vladimir Putin of Russia also proposed creation of "a system of international centres, providing nuclear fuel-cycle services, including enrichment, on a non-discriminatory basis and under the control of the IAEA."[5] In addition to the U.S. and Russian proposals, a number of other ideas have been

[3] See Appendix.
[4] See http://www.gnep.energy.gov/gnepNuclearSafeguards.html.
[5] "Paper Profiles Russian-Kazakh-Uzbek Uranium Enrichment Deal," Text of a Report from the Kommersant Newspaper, January 29, 2006, BBC Monitoring Former Soviet Union, available on Nexis.com.

placed before the IAEA by major nuclear states, which were considered at a Special Event on a New Framework for the Utilization of Nuclear Energy in the 21st century during the 50th IAEA General Conference.[6]

Despite the wide expectation of increased nuclear facility construction, there has been little increase in financial support to the IAEA's Department of Safeguards to ensure that it can meet both existing and future safeguards demands. The committee notes that all of the work conducted by the IAEA to implement existing safeguards is carried out under a budget that is not sufficient to meet the growing demands for safeguards. With activities likely to resume in North Korea, as well as verification of North Korean compliance with agreements reached in the Six Party Talks, ongoing activities in Iran, increasing activities in many European states, a likely new and costly set of safeguards requirements that will result from renewed international nuclear cooperation with India, expanded reprocessing activities in Japan, and the welcome implementation of additional protocols by more states, along with stresses the IAEA is already experiencing in its verification program, particularly as more environmental samples come to it for analysis under additional protocols, funding for safeguards now demands immediate attention. The IAEA must maintain an ability to implement unprogrammed safeguards and verification activities when issues arise, but maintaining routine safeguards grows difficult in times when many of its resources are already engaged. The United States and all IAEA member states must prevent a scenario in which the IAEA is forced to reduce—or cease altogether—safeguards efforts in key states because of budget shortfalls.

Historically, certain policies have adversely affected the ability of the IAEA to meet growing safeguards challenges. In 1985, the Geneva Group (the 14 largest contributors to the United Nations) imposed a policy of "zero real growth" on the IAEA's budget, save for staff salaries. This policy was reversed by the IAEA's Board of Governors in July 2003. The committee strongly supported the decision to end the zero real growth policy, a decision consistent with previously-enacted legislation.[7] Nevertheless, overall budgetary support remains insufficient to meet existing safeguards needs, much less the dramatically expanded requirements that may present themselves in the future. Moreover, additional constraints on the IAEA's verification effort, such as those on the amount of time staff may work at the IAEA's Safeguards Analytical Laboratory, pose other challenges. In this regard, certain provisions of S. 1138 again call to attention the need for reform.

S. 1138 deals with the realities of expanding nuclear power given the existing demands on IAEA safeguards. Much of the work that will create a more proliferation-resistant, nuclear-powered future can be done today, but this requires more than technical progress in the design of new nuclear facilities. Such technologies are many years away from being commercially available. What are needed now are sustained U.S. leadership and increased financial support for IAEA safeguards. The committee finds that S. 1138 will positively contribute to and enhance existing safeguards and will en-

[6] See http://www-pub.iaea.org/MTCD/Meetings/Announcements.asp?ConfID=147.
[7] See section 1305 of P.L. 107–228, The Foreign Relations Authorization Act, Fiscal Year 2003.

hance nuclear fuel supply mechanisms that take into account important nonproliferation criteria, and to these ends has reported favorably this legislation.

II. COMMITTEE ACTION

S. 1138 was introduced by Senators Lugar and Bayh on April 18, 2007, and referred to the committee on the same day.

At a business meeting on June 27, 2007, by a voice vote, the committee ordered the bill reported favorably to the Senate.

III. SUMMARY OF LEGISLATION

The Nuclear Safeguards and Supply Act of 2007 consists of two titles that augment existing U.S. activities in support of IAEA safeguards and provide authority to the President to negotiate agreements or create mechanisms for the supply of nuclear fuel to countries forgoing enrichment and reprocessing and meeting certain criteria. Importantly, the committee notes that neither title provides authorities additional to those available to the executive branch for nuclear cooperation, which remains governed by existing statutes and regulations.

Sections 1 and 2 set forth the short title and provide a table of contents. Section 3 defines "appropriate congressional committees" as the Committee on Foreign Relations in the Senate and the Committee on Foreign Affairs in the House of Representatives.

Title I provides a set of findings, stipulates both existing and new policies of the United States with respect to assurances of nuclear fuel supply, increases budgetary support for the IAEA's Safeguards Analytical Laboratory, and calls for an enhanced safeguards technology development program. Title II provides Presidential authority, consistent with existing law, for negotiation of bilateral and multilateral assurances of nuclear fuel supply to states meeting certain criteria, requires a report on the establishment of an International Nuclear Fuel Authority, and contains a sense of the Senate provision on IAEA activities for nuclear fuel supply.

TITLE I—NUCLEAR SAFEGUARDS AND NUCLEAR FUEL SUPPLY

Sections 101 (1)–(19) provide important findings. In the past two years, major studies, both in the United States and under the auspices of the IAEA, have highlighted critical questions confronting the world as it contemplates the nuclear future and begins to examine proposals for nuclear supply that would use nonproliferation criteria as conditions of supply. Particularly significant was the 2005 Report of the IAEA Experts Group on Multilateral Approaches to the Nuclear Fuel Cycle, which was chaired by the former Deputy Director General of the IAEA for Safeguards, Dr. Bruno Pellaud. The Experts Group noted:

> Two primary deciding factors dominate all assessments of multilateral nuclear approaches, namely "Assurance of non-proliferation" and "Assurance of supply and services". Both are recognised overall objectives for governments and for the NPT community. In practice, each of these two objectives can seldom be achieved fully on its own. History has shown that it is even more difficult to find an opti-

> mum arrangement that will satisfy both objectives at the same time.[8]

This statement highlights the difficulty that will confront the international community as it works to create international fuel supply mechanisms. The committee notes that many supply-side assurance efforts have been initiated in the past. Importantly, Congress proposed in the Nuclear Nonproliferation Act (NNPA) of 1978 (22 U.S.C. 3201 et seq.) that the President create and submit to Congress such mechanisms as "initial fuel assurances, including creation of an interim stockpile" of low enriched uranium fuel "to be available for transfer pursuant to a sales arrangement to nations which adhere to strict policies designed to prevent proliferation when and if necessary to ensure continuity of nuclear fuel supply to such nations."[9] Congress also mandated that the provision of this fuel be equivalent to generation of up to "100,000 MW(e) years of power from light water reactors."[10] Yet serious negotiations were never pursued for such a proposal by the executive branch. Over the next 20 years, the IAEA and other expert groups also initiated studies on fuel assurances and nonproliferation. These included the IAEA study on Regional Nuclear Fuel Cycle Centers, the International Nuclear Fuel Cycle Evaluation, the Expert Group on International Plutonium Storage, and the IAEA Committee on Assurances of Supply. No countries substantially changed their nuclear policies as a result of these efforts. Consensus was difficult to achieve because of the declining interest in (and in some cases opposition to) nuclear power and a failure to agree on what criteria would govern supply assurances.

With regard to nonproliferation factors that should influence the evaluation of any proposals for assurance of supply, the Pellaud report noted:

> The non-proliferation value of a multilateral arrangement is measured by the various proliferation risks associated with a nuclear facility, whether national or multilateral. These risks include the diversion of materials from [a multilateral nuclear approach or MNA] (reduced through the presence of a multinational team), the theft of fissile materials, the diffusion of proscribed or sensitive technologies from MNAs to unauthorised entities, the development of clandestine parallel programmes and the breakout scenario. The latter refers to the case of the host country "breaking out," for example, by expelling multinational staff, withdrawing from the NPT (and thereby terminating its safeguards agreement), and operating the multilateral facility without international control.[11]

The committee strongly concurs with this assessment, and notes that proposals for the creation of supply mechanisms must directly address these issues at the point of their creation, rather than offer only vague understandings that may result in later difficulties. Thus, section 101(16) concludes:

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[8] See http://www.iaea.org/Publications/Documents/Infcircs/2005/infcirc640.pdf, hereinafter, "Pellaud Report."

[9] 22 U.S.C. 3223(b).

[10] Ibid.

[11] Pellaud Report.

> Any proposals for the creation of bilateral or multilateral assurances of supply mechanisms must take into account, and be achieved in a manner that minimizes, the risk of nuclear proliferation or regional arms races and maximizes adherence to international nonproliferation regimes, including, in particular, the Guidelines of the Nuclear Suppliers Group (NSG), and the IAEA Additional Protocol.

There appears to be wide international support for limiting enrichment and reprocessing, based on supply incentives. For instance, the 2004 Report of the United Nations Secretary-General's High-Level Panel on Threats, Challenges and Change found (and section 101(6) notes) that "creating incentives for countries to forego the development of domestic uranium enrichment and reprocessing facilities is essential, and that such suggestions, if implemented swiftly and firmly, offer a real chance to reduce the risk of a nuclear attack, whether by states or non-state actors, and that such proposals should be put into effect without delay." [12]

The committee strongly believes that any mechanism developed for the provision of nuclear fuel should be country-neutral, should be based on solid nonproliferation criteria, and should, to the maximum degree possible, reinforce the existing safeguards system and prevent additional proliferation by limiting the spread of enrichment and reprocessing. Even if a recipient state were to forgo enrichment and reprocessing, the supply of nuclear fuel to that state would require effective safeguards measures to be in place. Should an international fuel storage facility be located in a nuclear-weapon state, it would be preferable from a nonproliferation standpoint for comprehensive safeguards to be applied to that facility, so as to maintain strict accounting for all fuel set aside for non-nuclear weapons states.

Section 102(a) continues U.S. policies already enacted in the NNPA, namely that it is the policy of the United States:

> (1) to create mechanisms to provide adequate supplies of nuclear fuel consistent with the provisions of the Nuclear Non-Proliferation Act of 1978, in particular title I of such Act (22 U.S.C. 3221 et seq.);
>
> (2) to strengthen the IAEA safeguards system consistent with the provisions of the Nuclear Non-Proliferation Act of 1978, in particular title II of such Act (22 U.S.C. 3241 et seq.); and
>
> (3) to cooperate with other nations, international institutions, and private organizations to assist in the development of non-nuclear energy resources under title V of the Nuclear Non-Proliferation Act of 1978 (22 U.S.C. 3261 et seq.).

The committee notes that it has long been U.S. policy, as embodied in the NNPA, to create assurances of nuclear supply, to strengthen the IAEA safeguards system, and to work to provide nations seeking new sources of electricity with non-nuclear options. Much work is already done under the U.S. Program of Technical Assistance to IAEA Safeguards (POTAS).

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[12] See http://www.un.org/secureworld/.

Section 102(b) would enact into law the policy announced in President Bush's speech at the National Defense University on February 11, 2004:

> The world's leading nuclear exporters should ensure that states have reliable access at reasonable cost to fuel for civilian reactors, so long as those states renounce enrichment and reprocessing. Enrichment and reprocessing are not necessary for nations seeking to harness nuclear energy for peaceful purposes.[13]

Thus, section 102(b) makes it the policy of the United States

> [T]o discourage the development of enrichment and reprocessing capabilities in additional countries, encourage the creation of bilateral and multilateral assurances of nuclear fuel supply, and ensure that all supply mechanisms operate in strict accordance with the IAEA safeguards system and do not result in any additional unmet verification burdens for the system.

Section 103(a) would authorize, in addition to the amount requested by the President for U.S. voluntary contributions to the IAEA for fiscal year 2008, $10 million for the refurbishment or possible replacement of the IAEA Safeguards Analytical Laboratory (SAL).

Committee staff and, on one occasion, Senator Lugar, have visited SAL. Each time, staff was impressed with the level of professionalism and dedication of the laboratory staff but was troubled by the apparent state of the facility. Located in Seibersdorf, Austria, outside Vienna, the SAL provides analytical support to the IAEA Department of Safeguards by receiving samples of materials taken during inspections at key measurement points of the nuclear fuel cycle for destructive chemical and isotopic analysis. This complements physical inspections and measurements performed by IAEA inspectors in nuclear facilities. Such technical analysis capabilities help the IAEA to assure that nuclear material under IAEA safeguards is not diverted to military purposes and, at times, to locate undeclared nuclear material. When SAL is unable to perform certain types of analysis, or when increased verification of results is needed, SAL will often involve its Network of Analytical Laboratories (in other IAEA member states) to assist it in its work.

During staff site visits, which occurred in February 2004 and in October and November 2006, staff found that considerable investment is needed for the laboratory to meet future IAEA requirements. The SAL's workload is growing, laboratory infrastructure is aging, and IAEA requirements have become more demanding. While initial plans have been made for laboratory enhancement, there is no escaping the fact that, as more countries implement IAEA safeguards and additional protocols, many more nuclear samples are coming to the SAL for analysis.

Because of the way the laboratory's responsibilities have grown over the years, the facilities are not optimal: facilities are dispersed throughout the Seibersdorf site, which presents a security problem; almost all of the laboratory space is rented; the nuclear chemistry

[13] See http://www.whitehouse.gov/news/releases/2004/02/20040211-4.html.

lab is 31 years old and has outdated infrastructure; and overall, the facility lacks space to deal with demands of the future.

The laboratory also has significant personnel issues that stem from rules governing U.N. agencies. The rules create problems for the SAL in finding and keeping experienced professional staff. As experienced technicians retire, the SAL has been unable to replace them with experienced staff, largely because the IAEA has been unwilling to provide long-term contracts to laboratory personnel.

The committee finds that, while certain personnel policies may be required for most U.N. agencies, the tremendously complicated and technical work of IAEA safeguards verification represents an especially critical function since that work directly enhances international nuclear accountability and transparency through safeguards, which in turn allow nations to make decisions relating to their future peace and security. The IAEA and its Board of Governors should reevaluate staffing policies at the SAL, with an eye toward improving staff retention through more long-term contracts, increasing budgetary support, and ensuring the effective operation of the SAL well into the future. Current funding and equipment planning is not sufficient to meet these goals, and attention to these problems is an urgent matter.

Significantly, previous years' State Department budget requests have noted that a goal of U.S. contributions to the IAEA was "[s]trengthening quality control and sensitivity of analyses by the Safeguards Analytical Laboratory (SAL) and the Network of Analytical Laboratories, and reviewing needs for possible refurbishment or replacement of SAL."[14] Section 103(b), therefore, requires the Secretary of State to submit a report to Congress not later than 180 days after the date of the enactment of this Act on the refurbishment or possible replacement of the SAL. In such a report, the committee expects the Secretary to examine equipment, personnel, and budgetary issues associated with the SAL, including estimates of the total costs of completely refurbishing the SAL or replacing it.

Section 104 requires the Secretary of State, in cooperation with the Secretary of Energy and the Directors of the National Laboratories and in consultation with the Secretary of Defense and the Director of National Intelligence, to pursue a program to strengthen technical safeguards research and development; to increase resources, identify near-term technology goals, formulate a technology roadmap, and improve interagency coordination on safeguards technology; and to examine proliferation resistance in the design and development of all future nuclear energy systems.

The committee notes that much of this work is already done under POTAS, but that significant research done by various nongovernmental organizations has called for greater emphasis in this area. In particular, the May 2005 Report of the Nuclear Energy Study Group of the American Physical Society Panel on Public Affairs, titled "Nuclear Power and Proliferation Resistance: Securing Benefits, Limiting Risks," contained important recommendations for future safeguards work.[15] The report noted:

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[14] See http://www.state.gov/documents/organization/60647.pdf.

[15] See http://www.aps.org/policy/reports/popa-reports/proliferation-resistance/upload/proliferation.pdf.

> The current Safeguards program largely implements or transfers technologies that are the result of [research and development] carried out 10–20 years ago. Revitalizing Safeguards [research and development] is the most significant technical investment that can enhance the proliferation resistance of nuclear power within the next five years.[16]

TITLE II—NUCLEAR FUEL SUPPLY

Section 201(a) authorizes the President to create, consistent with title I of the NNPA and other applicable provisions of law, bilateral and multilateral mechanisms to provide a reliable supply of nuclear fuel to those countries and groups of countries that adhere to policies designed to prevent the proliferation of nuclear weapons and that decide to forgo a national uranium enrichment program and spent nuclear fuel reprocessing facilities. The committee recognizes that forgoing enrichment and reprocessing strikes many countries as restricting rights they understand themselves to have acquired by ratifying or acceding to the NPT. Section 201(a) does not require countries to foreswear any rights. Rather, they must refrain from investing in sensitive fuel cycle facilities. The committee believes that there would be little value added to the existing nonproliferation regime by any assurance of nuclear fuel supply that did not rest on at least this basic assurance of nonproliferation. Notwithstanding such assurances, moreover, as a general matter, the committee believes that enrichment and reprocessing transfers should be denied to states that do not already operate full-scale enrichment and reprocessing facilities.

Section 201(a) would, again, provide a statutory embodiment of the President's policy regarding the supply of nuclear fuel and the proliferation of enrichment and reprocessing technology announced on February 11, 2004. It is also written so as to require consistency with the NNPA. Many proposals for the expansion of nuclear power have included substantial programs for international cooperation on reprocessing. While the nuclear fuel cycle envisioned by some more than 50 years ago included substantial re-use of plutonium in fast neutron reactors, many became concerned regarding the inherent proliferation risks posed by the use of such reactors and reprocessing. Today, some proposals contemplate expanded use of long-lived, separated actinides, including plutonium, in new, more sophisticated fast neutron reactors. Such reactors appear to be many years from being commercially viable. Several important studies, including a recent study commissioned by the Keystone Center, have also noted:

> No commercial reprocessing of nuclear fuel is currently undertaken in the U.S. . . . while reprocessing of commercial spent fuel has been pursued for several decades in Europe, overall fuel cycle economics have not supported a change in the U.S. from a "once-through" fuel cycle. Furthermore, the long-term availability of uranium at reason-

[16] Ibid.

able cost suggests that reprocessing of spent fuel will not be cost-effective in the foreseeable future.[17]

Given this assessment of the domestic nuclear picture, and recalling the conclusions of the 2005 PAG on nonproliferation, it is unclear when reprocessing technologies would be prudent to advocate as a part of assured fuel supply to certain states. Given the current supply of natural uranium, the undemonstrated nature of certain new technologies, and uncertainties regarding the proliferation resistance of new fast neutron reactor designs, the committee believes it prudent at this time to offer instead light water thermal reactors, and a supply of low-enriched uranium for them.

The committee notes that the administration has already taken steps toward just such a mechanism, with an announcement by the National Nuclear Security Administration (NNSA) that it has awarded a contract to Wesdyne International and Nuclear Fuel Services, Inc., to down-blend 17.4 metric tons of U.S. highly enriched uranium and store the resulting low-enriched uranium for a reliable fuel supply program.[18] The material would be converted, by 2010, to a stockpile of some 290 metric tons of low-enriched uranium fuel. According to the NNSA, "[t]he fuel will be available for use in civilian reactors by nations in good standing with the International Atomic Energy Agency (IAEA) that have good nonproliferation credentials and are not pursuing uranium enrichment and reprocessing technologies."[19] This proposal was first announced by Secretary of Energy Samuel Bodman at the 49th General Conference of the IAEA in 2005, when he stated that "the U.S. Department of Energy will reserve up to 17 metric tons of highly enriched uranium for an IAEA verifiable assured supply arrangement."[20]

The committee notes the importance of such progress. S. 1138 envisions such initiatives as a part of assurance of supply mechanisms, instead of simply authorizing additional money to the IAEA to achieve such purposes. While money for an IAEA-administered nuclear fuel bank may well be needed, the provision of materials, particularly down-blended former weapons materials, also supports a fuel assurance policy and demonstrates U.S. nonproliferation leadership by permanently removing such materials from our weapons program.

Section 201(b) provides a set of factors that the President shall take into account when creating mechanisms for fuel supply under this title. Section 201(b) is intended to be a partial, not exhaustive, list of relevant criteria that should inform decisions regarding to which nations nuclear supply should be extended. Importantly, this provision states that these factors shall be taken into account "to the maximum extent practicable." To the extent that one or more factors included in this section prove impracticable, or that other factors should be taken into account given a particular country's circumstances, the provision is intended to permit flexibility.

The committee notes that no aspect of the creation of multilateral or bilateral mechanisms assuring nuclear fuel supply will be more difficult than the criteria for access to that supply. Section

[17] See http://www.keystone.org/spp/documents/FinalReport—NJFF6—12—2007(1).pdf.
[18] See http://www.nnsa.doe.gov/docs/newsreleases/2007/PR—2007-06-29—NA-07-26.htm.
[19] Ibid.
[20] See http://www.energy.gov/news/1948.htm.

201(b) sets forth factors the President shall examine in addition to the basic criteria related to nonproliferation of nuclear weapons or fuel cycle facilities:

(1) The economic rationale for a country or countries pursuing nuclear power, including existing sources of power for such country or countries.

(2) Whether such country or countries are in compliance with their obligations under applicable safeguards agreements and additional protocols with the IAEA.

(3) Whether or not the development in such country or countries of the complete nuclear fuel cycle would impose new, costly IAEA safeguards measures that cannot be supported by current IAEA safeguards implementation in such country or countries, such that there is a reasonable assurance that all nuclear materials in such country or countries are for peaceful purposes and that there are no undeclared nuclear materials or activities in such country or countries.

(4) An evaluation of the proliferation dangers of such country or countries developing nuclear fuel cycle facilities for the production and disposition of source and special nuclear materials.

(5) Whether or not the country or countries that would be recipients of nuclear fuel or other assistance provided by the United States are or have ever been designated as state sponsors of terrorism pursuant to section 620A of the Foreign Assistance Act of 1961 (22 U.S.C. 2371), section 40 of the Arms Export Control Act (22 U.S.C. 2780), or section 6(j) of the Export Administration Act (50 U.S.C. App. 2405(j)).

(6) If done under a bilateral supply mechanism, whether IAEA safeguards are being applied or will be applied to any facility, site, or location where international nuclear fuel supply activities are to be carried out.

(7) Whether, in the case of a multilateral supply mechanism, procedures are in place to ensure that when United States funds are used or when United States nuclear materials are to be used, exported, or reexported, all applicable provisions of United States law are followed.

(8) Whether the recipient country or countries of any fuel provided under this Act are or will become a party, prior to the commencement of any nuclear fuel supply under this Act, to—

(A) the Nuclear Non-Proliferation Treaty;

(B) in the case of a non-nuclear-weapon State Party to the Nuclear Non-Proliferation Treaty, a comprehensive safeguards agreement that is in force, pursuant to which the IAEA has the right and obligation to ensure that safeguards are applied, in accordance with the terms of the agreement, on all source or special fissionable material in all peaceful nuclear activities within the territory of such country, under its jurisdiction, or carried out under its control anywhere, for the exclusive purpose of verifying that such material is not diverted to nuclear weapons or other nuclear explosive devices;

(C) an additional protocol;

(D) the Convention on Nuclear Safety, done at Vienna September 20, 1994, and entered into force October 24, 1996;

(E) the Convention on Physical Protection of Nuclear Materials, done at Vienna October 26, 1979, and entered into force February 8, 1987; and

(F) the Convention on Supplementary Compensation for Nuclear Damage, done at Vienna September 12, 1997.

(9) The extent to which the recipient country or countries have or will have prior to the commencement of any nuclear fuel supply under this Act effective and enforceable export controls regarding nuclear and dual-use nuclear technology and other sensitive materials comparable to those maintained by the United States.

(10) The conformity of the safety and regulatory regimes in the recipient country or countries regarding the nuclear power sector with similar United States laws and regulations.

(11) The history of safety or environmental problems associated with any nuclear site, facility, or location in the recipient country or countries in the past, and the potential for future safety or environmental problems or issues in connection with the civilian nuclear power development plan of the country or countries.

(12) Whether the recipient country or countries have resident within them any persons or entities involved in the illicit trafficking of nuclear weapons, nuclear materials, or dual-use nuclear technology.

(13) Whether the recipient country or countries have or will have sufficiently open and transparent civilian power markets such that United States firms may benefit from any such bilateral or multilateral supply mechanisms.

The committee notes that one of these factors, section 201(b)(7), requires an examination by the President of compliance with relevant U.S. laws when providing funds or materials for international fuel assurances. For example, United States law would appear to prohibit supply in cases where ultimate use of material is to be by a state sponsor of terrorism. Section 201(b)(5) would also provide that the President take into account whether state sponsors of terrorism would be involved in any assurance of supply. In view of the complexity presented by this question, the committee hopes the administration will initiate consultations with the committee regarding its own analysis of U.S. laws and regulations at the earliest possible time, so as to permit clearer understandings of the various problems that may present themselves.

Section 201(c) provides a rule of construction, stipulating that nothing in this Act shall be construed to provide any authority with respect to bilateral cooperation with another country or countries or any international organization or organizations in atomic energy that is additional to the authority provided under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) and all other applicable laws and regulations in effect on the date of the enactment of this Act. This provision guards against an overbroad reading of the Act's terms to obviate restrictions in current law regarding nuclear cooperation with other nations.

Section 202 requires a new report from the executive branch regarding the creation of an International Nuclear Fuel Authority or INFA, which Congress first required in section 104(a)(1) of the NNPA (22 U.S.C. 3223(a)(1)). In addition to the factors that were

reported many years ago, this section would call for an updated and expanded report that would take into account, under section 202(b), new elements:

(1) United States laws and regulations that could be affected by the establishment of an INFA.

(2) What the cost to the United States Government could be of establishing an INFA.

(3) Potential locations for the INFA.

(4) The potential for creating a fuel supply bank under the control of the INFA.

(5) Nuclear materials that should be placed within the control of the INFA, including which nuclear activities should be carried out by the INFA for the production of nuclear fuel or for use as fuel.

(6) Whether the INFA should provide nuclear fuel services to recipient countries.

(7) Whether a multilateral supply mechanism, such as the INFA, is, in the judgment of the President, superior to bilateral mechanism for nuclear fuel supply.

(8) How such an international organization should operate to preserve freedom of markets in nuclear fuel and avoid undue interference in the efficient operation of the international nuclear fuel market.

(9) The degree and extent to which such a multilateral supply mechanism should be under the control of, or a subordinate organization within, the IAEA, including whether establishing such an INFA would be superior or preferable to allowing the IAEA, pursuant to Article IX of the Statute of the IAEA, to become an international broker of nuclear fuel and nuclear fuel services, including with respect to an examination of the costs to IAEA Member States of effectively carrying out clauses (1) through (4) of paragraph (H) of such Article.

(10) The likely receptivity of the major countries involved in the supply of nuclear fuel and nuclear services to the creation of a multilateral supply mechanism such as the INFA or one under the IAEA.

Section 203 provides a sense of the Senate on an IAEA-administered fuel bank. Section 203(4) concludes that

> [A] combination of public and private efforts, including the provisions of law previously enacted in the Nuclear Non-Proliferation Act of 1978 (22 U.S.C. 3201 et seq.) and other applicable laws, initiatives supported by the President, efforts provided for by private groups, and the recommendations of many relevant studies, such as those cited in section 101, will be necessary to effectively and flexibly manage the growth of civilian nuclear power in a manner that does not result in undue burdens on the IAEA safeguards system.

IV. COST ESTIMATE

In accordance with Rule XXVI, paragraph 11(a) of the Standing Rules of the Senate, the committee provides this estimate of the

costs of this legislation prepared by the Congressional Budget Office.

UNITED STATES CONGRESS,
CONGRESSIONAL BUDGET OFFICE,
Washington, DC, July 20, 2007.

Hon. JOSEPH R. BIDEN, JR.,
Chairman, Committee on Foreign Relations,
U.S. Senate, Washington, DC.

DEAR MR. CHAIRMAN: The Congressional Budget Office has prepared the enclosed cost estimate for S. 1138, the Nuclear Safeguards and Supply Act of 2007.

If you wish further details on this estimate, we will be pleased to provide them. The CBO staff contact is Sam Papenfuss.

Sincerely,

PETER R. ORSZAG.

CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

S. 1138

Nuclear Safeguards and Supply Act of 2007

AS ORDERED REPORTED BY THE SENATE COMMITTEE ON FOREIGN RELATIONS ON JUNE 27, 2007

S. 1138 would authorize the appropriation of $10 million for a contribution to the International Atomic Energy Agency (IAEA) to refurbish or replace the IAEA Safeguards Analytical Laboratory. Additionally, the bill would authorize the Secretary of State to pursue a program to develop better safeguards for the civilian use of nuclear energy to prevent proliferation of nuclear weapons. The bill also would authorize the President to develop a process by which nuclear fuel could be provided to other countries in the event of a disruption in the market supply.

Both the development of safeguards and of a reliable supply of nuclear fuel are already authorized under current law and would not have a significant budgetary effect, CBO estimates. Based on historical spending patterns for contributions to international organizations, CBO estimates that implementing S. 1138 would cost $10 million in 2008 for increased contributions to IAEA, assuming appropriation of the authorized amount. Enacting the bill would not affect direct spending or receipts.

S. 1138 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act and would not affect the budgets of state, local, or tribal governments.

On June 1, 2007, CBO transmitted an estimate for H.R. 885, the International Nuclear Fuel for Peace and Nonproliferation Act of 2007, as ordered reported by the House Committee on Foreign Affairs on May 23, 2007. The differences in the estimates reflect differences in the bills. In particular, H.R. 885 would authorize the appropriation of $50 million for a contribution to the IAEA for an international nuclear fuel bank and would not authorize the appropriation of funds for the IAEA's laboratory.

The CBO staff contact for this estimate is Sam Papenfuss. This estimate was approved by Peter H. Fontaine, Deputy Assistant Director for Budget Analysis.

V. EVALUATION OF REGULATORY IMPACT

Pursuant to Rule XXVI, paragraph 11(b) of the Standing Rules of the Senate, the committee has determined that there is no regulatory impact as a result of this legislation.

VI. CHANGES IN EXISTING LAW

In compliance with paragraph 12 of Rule XXVI of the Standing Rules of the Senate, the committee notes that no changes to existing law are made by this bill.

VII ANNEX: ADDITIONAL DOCUMENTS AND INFORMATION

U.S. SENATE,
COMMITTEE ON FOREIGN RELATIONS,
Washington, DC, July 19, 2005.

Hon. GEORGE W. BUSH,
President of the United States,
The White House, Washington, DC.

DEAR MR. PRESIDENT; I share with you a great concern about the future of the Nuclear Non-Proliferation Treaty and the larger non-proliferation system it supports. Attached is an interim report I have received from the Policy Advisory Group (PAG), a panel of experts I convened to provide advice to me and the Senate Foreign Relations Committee on what Congress and the administration should do to strengthen the NPT system. The group has had a number of meetings, and their deliberations continue. However, they have already reached conclusions about one crucial aspect of the issue that I felt I should share with you now.

The existing safeguards regime used by the International Atomic Energy Agency (IAEA) succeeded in forestalling nuclear weapons programs in the world's advanced industrial states, several of which were weighing the nuclear option 40 years ago. This regime has failed to keep pace, however, with the increase in the global availability of nuclear weapons technology, especially the technology and equipment for uranium enrichment and spent nuclear reactor fuel reprocessing to produce the fissile material for such weapons. Now the road to nuclear weapons can be traveled by determined countries with only a minimal industrial base. While the number of recognized nuclear-weapon states (NWS) has not dramatically increased over the years, the dangers of proliferation have become all too apparent as demonstrated by the A.Q. Khan network, and the Iranian, North Korean, and Libyan examples.

The PAG believes, and I concur, that the construction of new facilities for the enrichment of uranium and reprocessing of spent nuclear reactor fuel, even for ostensibly peaceful purposes, poses an unacceptable long-term risk to the national security of the United States. You pointed to this same risk in your February 11, 2004, speech at National Defense University. The enrichment technology intended to produce fuel for nuclear power reactors can also be used to create material for a nuclear weapon, and the plutonium that is produced from reprocessing spent fuel is also suitable for

nuclear weapons and susceptible to diversion to terrorists. The spread of enrichment and reprocessing capabilities will dangerously increase the chances that more nations will develop their own nuclear weapons and that terrorists might obtain fissile or radiological materials for a crude or even highly destructive nuclear bomb. It is therefore incumbent upon the United States to lead an international effort to halt the expansion of enrichment and reprocessing to new countries.

The PAG found that the use of nuclear power is likely to increase, both in developed countries and, in particular, in developing countries. Importantly, however, the experts of the PAG concluded that expansion of nuclear power does not require—either technically or economically—the construction of enrichment or reprocessing facilities in countries that do not currently have them. "Under most scenarios," the PAG found, "excess capacity already exists and will continue to exist for many years."

Therefore, I believe the United States should adopt as a basic nonproliferation principle that countries which forego their own enrichment and reprocessing programs have guaranteed access to nuclear reactor fuel at reasonable prices. I encourage your administration to begin to implement this policy immediately by seeking international concurrence on new arrangements to control enrichment and reprocessing technology, a Proliferation Safeguards Initiative, or PSI–II. Such efforts would also aim to continue to strengthen, in terms of technology, funding, and policy, the existing international nuclear safeguards regime. Taking as a model your successful Proliferation Security Initiative, PSI–II should be a U.S.-led coalition of willing states, assembled without the cumbersome and time-consuming negotiation of new international agreements.

Based on my own experience and the discussions of the PAG, I would recommend several criteria to guide the creation and operation of this effort.

1. It should seek to buttress, not undermine, the NPT and the Nuclear Suppliers Group.

2. It should be accompanied by a significant increase in funding for the Safeguards Division of the International Atomic Energy Agency to improve its ability to meet its inspection and verification responsibilities. The IAEA is underfunded to perform its current tasks and would be required to do much more should nuclear energy become more widespread globally. The current staffing and budget of the IAEA cannot sustain further stress, nor can the world afford to allow another state to develop nuclear weapons in secret.

3. Non-nuclear weapon states which agree to accept fuel services and leasing of fuel, in return for giving up reprocessing and enrichment facilities, must consent to wide access and close monitoring of their nuclear energy activities, exceeding the requirements of the IAEA Additional Protocol. This would include activities, locations, and information not directly related to nuclear material itself, but that could be associated with nuclear weapons development.

4. Countries wishing to initiate or expand a nuclear power program should be required to demonstrate an economic need for such nuclear power capacity before they are granted access

to nuclear fuel services. The United States should develop criteria to evaluate such need.

5. The United States should explore means for disposing and storing of spent nuclear fuel from those countries which agree to accept a closed fuel cycle and forego a reprocessing capability. No such repository for spent fuel now exists for use in an international closed fuel cycle plan. Past discussions in this area have suggested that Russia would be a candidate for such a repository.

6. The administration should take great care as it implements the Next Steps Strategic Partnership with India's nuclear power sector to which you have just agreed. We must provide clear and credible warnings to current non-nuclear weapon states party to the NPT that they will not be able to gain similar arrangements should they leave the treaty.

Mr. President, I look forward to working closely with you to prevent the proliferation of these dangerous technologies. The future peace and security of our Nation and the world is at stake. The inherent dual-use nature of the nuclear fuel cycle, combined with its wide availability in civilian nuclear power, uniquely challenges the world to find ways to stop diversion of such technologies to military uses while ensuring that no state uses the cover of nuclear power to develop nuclear weapons. A decade ago, I took action with those in Congress who were ready to meet the threat of proliferation posed by the collapse of the Soviet Union. Today, we must work together to ensure that the global nonproliferation regime does not collapse through inaction.

Sincerely,

RICHARD G. LUGAR,
Chairman.

JULY 1, 2005.

Memorandum to: Senator Richard G. Lugar, Chairman, Senate Committee on Foreign Relations
From: Policy Advisory Group on Nonproliferation
Subject: Interim Report On Nuclear Threat Reduction and the Fuel Cycle

MR. CHAIRMAN: With the Review Conference on the Nuclear Nonproliferation Treaty (NPT) behind us, the Senate Foreign Relations Committee, under your leadership, is looking to the long-term future of the NPT System. The Policy Advisory Group (PAG) has started its work in making recommendations for American leadership to update and improve the workings of the NPT and related nonproliferation efforts over the long term.

While the PAG has only begun its deliberations, it has already arrived at some observations with respect to one key issue: How the nuclear nonproliferation system of the future should treat the proliferation of uranium enrichment and plutonium reprocessing.

President Bush addressed the danger posed by the spread of fuel-cycle capabilities to more countries in his February 11, 2004, speech at National Defense University. The PAG supports the priority the President attached to this issue and urges the U.S. Government to take a strong position of international leadership to

stop the proliferation of uranium enrichment and plutonium reprocessing facilities and technology. After 9/11, the specter of nuclear terrorism and its close connection to nuclear proliferation must occupy center stage in our national security policy.

An initiative to oppose the proliferation of enrichment and reprocessing capabilities to additional countries can directly reinforce the effort to stop the Iranian nuclear program, since the international understanding it would seek would be fully consistent with the European-led multilateral effort backed by the United States to prevent Iran from completing enrichment facilities. And while influencing North Korea is probably well beyond the reach of any such initiative, both North Korea and Iran would not have realized their nuclear ambitions nor continue their respective progress in the fuel cycle unchallenged if elements the system recommended here had been in place. Indeed, the 1991 North-South Denuclearization Agreement prohibited reprocessing and enrichment in both North and South Korea. Had it been implemented successfully, we might have an entirely different situation in the two Koreas today. Hindsight on the Iranian and North Korean crises therefore suggests the foresight necessary to prevent future situations like these from developing. The PAG believes that without such a system in place, the future world could contain many states engaged in enrichment and reprocessing, some of which would inevitably pose the threat of nuclear attack and the spread to terrorists of such knowledge, technology, and materials as possessed today by Iran and North Korea.

The PAG has made these key observations in its deliberations:

1. The Dangers and Promise of Nuclear Power

- Proliferation of uranium enrichment and plutonium reprocessing to additional nations is inherently dangerous to U.S. national security because it can lead to both state and nonstate nuclear threats:
  - State proliferation: Possessing these facilities brings a state close to the point of a nuclear weapons capability.
  - Nuclear terrorism: Security failures at any such facility, or during storage and transportation, could provide a source of fissile material (highly enriched uranium, or HEU, and plutonium) for non-state terrorists.
- Preventing this threat is only one component—but a vital one—of a multi-layered defense against nuclear attack. This multilayered defense ranges across the spectrum of tools at our disposal, from diplomatic to military action, and must address weaponization research and development as well as fissile materials production.
- Much of the expansion of nuclear power is likely to take place in the developing world. This expansion could be desirable on economic and environmental grounds, but it can and must be accomplished in a manner consistent with U.S. national security.
- This expansion in the use of nuclear power will require uranium enrichment capacity that could also produce tens of thousands of nuclear bombs *per year,* and it could produce as a byproduct enough plutonium for tens of thousands of additional nuclear bombs *per year.*

- Expansion of nuclear power does not require proliferation of enrichment or reprocessing—either technically or economically—to countries that do not have it. Under most scenarios, excess capacity already exists and will continue to exist for many in states with functioning nuclear fuel production facilities.
- On the other hand, were acts of nuclear terrorism to occur because of "loose" fissile material, the expansion of nuclear electricity generation would likely be brought to an abrupt halt.
- National security, economics, and environmental protection are therefore all in alignment in recommending that the United States oppose the proliferation of enrichment and reprocessing facilities into new countries and especially into troubled regions. The spread of such technology truly deserves to be spotlighted as a centerpiece of "proliferation."

2. The Fuel Cycle and the NPT

- A policy of active opposition to the spread, under today's circumstances, of enrichment and reprocessing know-how to countries that do not currently possess such technology, in particular to troubled regions, is consistent with the *principal intent* of the NPT. Indeed, action in this area is essential to strengthening the nonproliferation regime. Moreover, opposition to the proliferation of enrichment and reprocessing is made more urgent by technological, security, economic, and environmental forces, all equally compelling:
  - Technology: On the weapons front, when the NPT was first signed it was beyond the reach of all but developed nation states to master the art of fission bomb design. In the interim, the general progress of technology and the proliferation of specific know-how in bomb-making by the A.Q. Khan network, have resulted in a situation in which the mere possession of highly enriched uranium or plutonium removes a major obstacle to bomb-making capability for the possessor whether they are a state or non-state actor. Today, on the nuclear power front, the once-through fuel cycle producing and using low-enriched uranium for power generation is the fuel-cycle and plant design of choice. Advanced "proliferation-resistant" reactor designs may be technically and economically feasible in the future; however, interest is growing in some circles for greater use of closed fuel cycles. These factors must be taken into account now, while there is more opportunity to influence the future to ensure that U.S. national security concerns are met.
  - Security: Two major events since the signing of the NPT have changed the nature of nuclear security in fundamental ways. First, the collapse of the Soviet Union showed that seemingly stable governments in possession of nuclear capabilities can be replaced by fluid, even chaotic, situations in which nuclear capabilities can fall into dangerous hands. Second, the terrorist attacks of 9/11 should be a clear wakeup call that nonstate nuclear use is likely if fissile materials are available to certain terrorist groups that are accessing the know-how.

- Economics: When the NPT was signed the future of nuclear power seemed open-ended: Electricity generated by nuclear power would be "too cheap to meter"; every country's economic future would depend on nuclear power; and importantly, the economics of expanding nuclear power would require many locations where uranium would be enriched and plutonium would be reprocessed. Today experts and industry have a more refined view of the economics of nuclear energy. There is enough enrichment capacity in existing facilities and their planned expansion to fuel all the world's reactors for many years, and at reasonable prices. Reprocessing is not currently economically competitive with once-through fuel cycles, and there is plenty of raw uranium to fuel the once-through cycle long into this century under most scenarios. Today we can assert that stopping the proliferation of enrichment and reprocessing need not slow the spread of nuclear power nor increase its cost.
- Environment: Carbon-free nuclear electricity generation could be an important ingredient in slowing global warming, displacing natural gas, some oil, and especially coal.

- While the United States is therefore entirely justified in a policy of opposition to the proliferation of enrichment and reprocessing, we are not well positioned to promote such a policy internationally and will need the help of other nations:
  - Most countries with enrichment and reprocessing are nuclear weapon states, which introduces political complications arising from claims made by non-nuclear weapon states regarding Article VI of the NPT.
  - Our position as a nation with an active uranium enrichment industry likewise makes it difficult for us to appear even-handed in opposing the proliferation of enrichment facilities.
  - Any approach that denies to some what is permitted to others, no matter how valuable, must address the political question of discrimination or fairness.
- Success in opposing the proliferation of enrichment and reprocessing will therefore require adroit and sustained U.S. diplomacy that systematically enlists a growing body of international support.

3. Assessing Proposals for U.S. Policy

- The PAG has reviewed a number of specific proposals for stemming the proliferation of enrichment and reprocessing capabilities, including the President's NDU proposals, IAEA Director General ElBaradei's, and those of other governments (e.g., France) and recognized experts. All have merits, yet all have drawbacks and their own opponents.
- Many of these proposals overlap in one common feature—that states foregoing their own enrichment or reprocessing facilities will be guaranteed various cradle-to-grave fuel services for their nuclear reactors at reasonable prices and within a strictly controlled and verified transfer system. U.S. policy should therefore focus on this common ground to stand the best chance of succeeding. A number of mechanisms have been suggested to provide guarantees to states that renounce their own

capacity to enrich nuclear fuel, and to provide inducements to store or reprocess spent fuel outside of their country. The PAG assesses that a combination of industry contract provisions, national policies, and strengthened safeguards can together provide reasonable assurance of fuel supply to such states.

- We believe that identifying the "best" compromise to bring the necessary players together will require further work and, above all, a vigorous testing of the diplomatic waters.

4. Interim PAG Recommendations

- The PAG does, however, make the following recommendations for USG action at this time:
  - ○ The administration should attach a high priority to achieving broad international agreement to a U.S. policy opposing proliferation of enrichment and reprocessing. The priority attached to this mission should be comparable to that devoted by the USG to the Proliferation Security Initiative (PSI), a "Proliferation Safeguards Initiative" or PSI–II.
  - ○ The diplomatic strategy pursued should take PSI as its model—an effort that has been able to garner the support of willing states. An initial "core group" of suppliers and consumers of fuel services should be carefully selected as a starting point.
  - ○ The administration should be prepared to amend the President's February 11, 2004, proposal if further analysis or diplomatic experience suggests that doing so will lead to a greater chance of success.
  - ○ The administration should work with the Foreign Relations Committee if it finds that amendments to U.S. law are necessary to implement fuel-cycle proposals.
  - ○ The USG should be willing to accept a temporary arrangement (perhaps 10 to 15 years) that might lead over time to a more permanent arrangement.
  - ○ The United States can and should use this fuel-cycle nonproliferation initiative synergistically to promote other national security goals:
    - □ This initiative could reinforce efforts to encourage responsible practices by states that are not parties to the NPT (e.g., India) and might provide some additional realms for cooperation to prevent further proliferation.
    - □ The initiative could reinforce the continuing effort to encourage the Russian Government to take more active leadership on the security of nuclear materials and to make the Russian nuclear power infrastructure more secure and more in line with today's economic realities. Russia could, for example, downblend more HEU as a strategic reserve for assured supply, and build a profitable international spent fuel repository.
    - □ The initiative could further remove any veil of economic necessity from the Iranian and (to the extent this claim is made by North Korea) North Korean nuclear programs and further isolate these states diplomatically.
    - □ The initiative would reinforce and augment key counterproliferation efforts such as the newly globalized Cooperative Threat Reduction program ("Nunn-Lugar"), National Missile

Defense, PSI, UNSCR 1540, and the new priority for counterproliferation within DOD's Quadrennial Defense Review by adding fuel cycle restraints to the Nation's growing layered defense against nuclear attack and the proliferation of nuclear weapons.

- ☐ The initiative would express the willingness of the United States to spearhead multinational initiatives where they serve the interests of U.S. and international security.
- ☐ Above all, the initiative would reflect President Bush's determination that his highest priority is to "not permit the world's most dangerous regimes and terrorists to threaten our Nation and our friends and allies with the world's most destructive weapons."
- ○ The President should appoint a senior diplomat with authority and accountability for success in this initiative.
- ○ The administration should report progress in this endeavor to the Congress, and the Senate Foreign Relations Committee should engage the administration to further prospects for success. The PAG stands ready to assist the committee in monitoring and assessing progress.

Mr. Chairman, following the collapse of the Soviet Union you and Senator Nunn and your Senate colleagues saw more clearly than most that the terms of nuclear security had changed fundamentally and that a basic change in the American approach to the nuclear relationship between Moscow and Washington was required. Today in the wake of 9/11, your appointment of this PAG signifies how urgent it is to make equally profound changes in the way nuclear proliferation is countered due to the threat of nuclear terrorism. We appreciate your leadership and are honored to serve. We will continue to deliberate and to make recommendations to the committee on this and other aspects of updating the NPT and the system of counterproliferation efforts surrounding it.

Sincerely,

Ashton B. Carter, Cochair; Ronald Lehman II, Cochair; Robert Einhorn; Alan A. Foley; Arnold Kanter; David Kay; Susan Koch; Lawrence Scheinman; William Schneider, Jr.

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