

CHAPTER 8

THE NPT, IAEA SAFEGUARDS AND PEACEFUL NUCLEAR ENERGY: AN “INALIENABLE RIGHT,” BUT PRECISELY TO WHAT?

Robert Zarate

In mid-October 2006, a few days after North Korea’s surprise detonation of a nuclear explosive device, the Director General of the International Atomic Energy Agency (IAEA) sounded the alarm on what he now sees as a troubling trend: the growing number of states seeking to enrich uranium, reprocess spent nuclear fuel to separate from it plutonium, and engage in other sensitive nuclear fuel-making activities that provide direct access to weapons-ready fissile material.¹ During an address to the IAEA’s symposium on international safeguards, Dr. Mohamed ElBaradei candidly acknowledged that nuclear fuel-making “creates many new challenges, both for the international community and for [the Agency], because verifying enrichment facilities or reprocessing facilities is quite difficult, and the so-called conversion time” – that is, the time required to convert fissile material for use in a nuclear explosive device – “is very short.”² Then, the IAEA Director General went so far as to say that when non-nuclear-weapon states become nuclear fuel-makers, then “we are dealing with what I call *virtual nuclear-weapon states*.”³

As North Korea’s recent nuclear detonation and Iran’s ongoing nuclear intransigence demonstrate, the emergence of more nuclear fuel-making states – of what ElBaradei now describes as *virtual nuclear-weapon*

states—not only challenges the continuing relevance of the *Treaty on the Nonproliferation of Nuclear Weapons* (Nuclear Nonproliferation Treaty or NPT)⁴ and the IAEA safeguards system, but also threatens the security of the many nuclear-weapon states and non-nuclear-weapon states that participate in the NPT-IAEA safeguards system. For if a non-nuclear-weapon state has acquired fuel-making capabilities sufficient to accumulate stocks of fissile material (principally in the form of highly enriched uranium or separated plutonium), then that state has cleared *the* most difficult obstacle on the path to its first nuclear explosive. This is why, during the May 2005 quadrennial NPT review conference, then-Secretary-General of the United Nations Kofi Annan called attention to what he called the “Janus-like character” of nuclear fuel-making:

The [nonproliferation] regime will not be sustainable if scores more States develop the most sensitive phases of the fuel cycle and are equipped with the technology to produce nuclear weapons on short notice—and, of course, each individual State which does this only will leave others to feel that they must do the same. This would increase all the risks—of nuclear accident, of trafficking, of terrorist use, and of use by States themselves.⁵

The extent to which the Nuclear Nonproliferation Treaty precludes—or should be interpreted as precluding—“the most sensitive phases of the fuel cycle” remains unclear, however. On the one hand, the NPT’s Articles I and II articulate the fundamental, corresponding, and overriding responsibilities of the legally-recognized nuclear-weapon signatories and non-nuclear-weapon signatories, the *sine qua non* obligations that make this treaty a *nonproliferation* treaty.⁶ On the other hand, the NPT’s Article IV

recognizes both the “inalienable right” of signatories “to develop research, use, and production of nuclear energy for peaceful purposes without discrimination and in conformity with articles I and II”; and the right of signatories “to participate” in the “fullest possible exchange of equipment, materials, and scientific and technological information for the peaceful uses of nuclear energy.”⁷ Precisely what Articles I and II should prohibit, and when and how these prohibitions should apply to Article IV and the most weapons-relevant civilian applications of nuclear technology, continue to be a matter of heated debate.

Article IV never explicitly mentions enrichment, reprocessing, and other nuclear fuel-making technologies, yet some governments nevertheless interpret Article IV as implicitly recognizing the *per se* right of signatories to any nuclear technological activities that can be conceivably labeled “peaceful,” short of actually inserting fissile material into a nuclear explosive device.⁸ Under this interpretation, all that is required is that a non-nuclear-weapon signatory conclude, in accordance with the NPT’s Article III, a comprehensive safeguards agreement with the IAEA; that the IAEA administer safeguards on the nuclear materials involved in the civilian nuclear activities of the signatory; and that the signatory be in full compliance with its NPT and IAEA safeguards obligations.

The Islamic Republic of Iran has pushed the *per se* right interpretation of Article IV much, much further, however. In 2003, the IAEA became aware of the broad range of sensitive nuclear materials and technologies that the Iranian government had concealed from it for nearly two decades.⁹ Over the next two years, Tehran failed to cooperate fully and transparently as IAEA inspectors attempted to reconstruct the shrouded

history of the Islamic Republic's nuclear program and ensure the absence of undeclared nuclear activities in Iranian territory in order to verify both the correctness and completeness of Iran's declarations to the Agency.¹⁰ In September 2005, the IAEA Board of Governors responded to Tehran's lack of cooperation by finding Iran to be in non-compliance with its NPT and IAEA safeguards obligations.¹¹ As a consequence, the IAEA Board declared—and subsequently the Security Council of the United Nations decided in a legally-binding manner—that Iran should suspend all nuclear fuel-making activities *until* the IAEA fully resolves the many serious issues surrounding Iran's history of non-compliance.¹² In rejecting any suspension, though, Iranian officials have argued that absolutely no circumstance whatsoever—not even a finding of non-compliance by the IAEA Board or a legally-binding resolution from the UN Security Council—can limit what they interpret to be their government's "specific and undeniable right" to enrichment, reprocessing, and other sensitive nuclear fuel-making activities under the NPT.¹³ In short, the Iranian government claims that Article IV recognizes not merely the *per se* right, but rather the *per se* right without any qualification whatsoever, of signatories to nuclear fuel-making.

Given the many challenges that the spread of enrichment, reprocessing, and other sensitive nuclear fuel-making technologies pose to the NPT-IAEA safeguards system, this chapter addresses two related questions:

1. To what extent can the IAEA, given its own safeguarding goals, effectively safeguard nuclear materials—especially weapons-ready nuclear materials involved in nuclear fuel-making and other sensitive activities?

2. Does the NPT recognize the right of signatories to develop, access, or use nuclear materials and technologies that the IAEA cannot effectively safeguard, even if these unsafeguardable materials and technologies are claimed to be “for peaceful purposes”?

Answers to these questions have far-reaching implications for the nuclear energy and nonproliferation policies of individual governments and international organizations. Indeed, these questions go to the very heart of the global nonproliferation system’s rationale for sharing widely the civilian uses of nuclear technology. If, in fact, the IAEA actually is capable of safeguarding effectively even the most sensitive nuclear materials and technologies, then this provides a strong warrant for interpretations that view the NPT’s Article IV as permitting any and all nuclear activities short of inserting fissile material into a nuclear weapon. However, if the IAEA cannot safeguard effectively all nuclear materials and technologies, then broadly permissive interpretations of Article IV become not only unwarranted, but also perversely detrimental to the NPT’s fundamental goal of nuclear *nonproliferation*.

With respect to the first question, this chapter argues that the IAEA, given its own safeguarding criteria, remains unable to safeguard effectively a broad range of sensitive nuclear materials, technologies, and activities. In particular, the Agency cannot provide – even in principle – timely warning of a non-nuclear-weapon state’s diversion of weapons-ready nuclear materials from civilian applications to nuclear weapons or unknown purposes; it must tolerate, under its current accounting methods, large amounts of unaccounted nuclear material at facilities that handle such material in bulk form before even beginning to suspect a diversion; and it appears to lack

adequate financial resources to carry out many of its safeguarding activities effectively.

With respect to the second question, this chapter argues that—in conformity with the generally accepted principles of treaty interpretation that the *Vienna Convention of the Law of Treaties* codifies—the NPT, at a minimum, can be interpreted as not recognizing the “inalienable right” of signatories to nuclear materials, technologies, and activities that the IAEA cannot effectively safeguard. The NPT’s Article IV appears to establish three legally-binding qualifications that clarify the scope of the “nuclear energy for peaceful purposes” to which signatories have a “right” to develop and use—a key qualification being the effective safeguardability of civilian application of nuclear technology and related nuclear materials. But while the NPT may be understood as prohibiting non-nuclear-weapon signatories from unsafeguardable nuclear materials, technologies, and activities, the treaty also provides for mechanisms by which nuclear-weapon signatories can provide, individually or through multilateral frameworks, non-nuclear-weapon signatories with the benefits of proscribed, unsafeguardable peaceful applications of nuclear technology in an economically-sound, nondiscriminatory manner. In short, though some governments continue to insist on reading the NPT as implying the *per se* right—and now in Iran’s case, the unqualified *per se* right—of signatories to nuclear fuel-making, Article IV need not be interpreted as providing *de jure* cover for the *de facto* status of a *virtual nuclear-weapon state*. Indeed, the NPT can be read in a more sustainable way.¹⁴

The remainder of this chapter proceeds in three sections. The first section revisits key IAEA safeguards documents in order to unpack the Agency’s goals for effective safeguarding, and analyzes the extent to

which the Agency actually can meet these goals when it administers safeguards. The second section uses the generally accepted principles of treaty interpretation, as codified by the *Vienna Convention of the Law of Treaties*, to explore the extent to which the NPT recognizes the “inalienable right” of signatories to, and prohibits signatories from, sensitive nuclear materials, technologies, and activities—especially those that the IAEA cannot effectively safeguard. Finally, the conclusion considers what the chapter’s analysis on the NPT and IAEA safeguards system implies for national and multilateral policies to limit and manage the dangers of nuclear proliferation.

ASSESSING THE EFFECTIVENESS OF IAEA SAFEGUARDS

The Nuclear Nonproliferation Treaty’s preamble stresses not only the importance of “the principle of *safeguarding effectively* [emphasis added] the flow of source and special fissionable materials by use of instruments and other techniques at certain strategic points,” but also the need for “research, development, and other efforts to further the [principle’s] application, within the framework of the International Atomic Energy Agency safeguards system”¹⁵ The extent to which the IAEA today can actually administer effective safeguards on nuclear materials—especially weapons-ready nuclear materials involved in civilian applications of nuclear technology—remains unclear, however.

In accordance with the NPT preamble’s principle of effective safeguarding, Article III requires that each non-nuclear-weapon signatory conclude a comprehensive safeguards agreement with the IAEA “for the exclusive purpose of verification of the fulfillment of [the

signatory's] obligations assumed under this Treaty with a view to preventing the diversion of nuclear energy from peaceful purposes to nuclear weapons and other nuclear explosive devices."¹⁶ In 1972, 2 years after the NPT entered into force, the IAEA released *The Structure and Content of Agreements Between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons* ("Model Comprehensive Safeguards Agreement" or "INFCIRC/153"), which defines the technical objective of safeguards as "the timely detection of diversion of significant quantities of *nuclear material* from peaceful nuclear activities to the manufacture of nuclear weapons or of other nuclear explosive devices or for purposes unknown, and deterrence of such diversion by the risk of early detection" (emphasis in the original).¹⁷ To meet this objective, the *Model Comprehensive Safeguards Agreement* identifies the IAEA's means as "the use of material accountancy as a safeguards measure of fundamental importance, with containment and surveillance as important complementary measures."¹⁸

When the Agency released INFCIRC/153, it had not yet determined the specific methods and metrics to evaluate the effectiveness of safeguards. In the mid-to-late 1970s, however, the IAEA's Standing Advisory Group on Safeguards Implementation ("SAGSI") used the numerical estimates of four terms from INFCIRC/153—namely, *significant quantity*, *timely detection*, *risk of detection*, and *probability of raising a false alarm*—to define precisely the Agency's "detection goals" (emphasis added).¹⁹ In theory, these detection goals provide the IAEA with ways to measure the extent to which it is obtaining INFCIRC/153's safeguards objective, and verifying the fulfillment of NPT-signatory obligations. In practice, though, the Agency

cannot meet these goals with respect to a wide range of nuclear materials and civilian applications of nuclear fuel-making technology. Although it is far beyond the scope of this chapter to describe in exhaustive detail every difficulty that the IAEA faces in attempting to safeguard effectively, the sections below summarize representative examples of these difficulties.

Abrupt Diversion of Nuclear Materials: Conversion Time vs. Timely Warning.

When the IAEA administers safeguards, it aims to account for and inspect declared nuclear materials in civilian applications of nuclear technology frequently enough to detect the diversion of a significant quantity (“SQ”) of nuclear material before it has been—or can be—converted into a bomb. A *significant quantity* is defined by the Agency as “the approximate amount of nuclear material for which the possibility of manufacturing a nuclear explosive device cannot be excluded.”²⁰ Table 1 gives the SQ values that the IAEA currently uses. Here, it is worth noting that some analysts have concluded that the IAEA’s current SQ values are inadequate. For example, in October 2005 Thomas Cochran of the National Resources Defense Council argued that “the IAEA’s SQ values for direct use materials are not technically valid or defensible,” and that, in some circumstances, “the SQ values for direct use plutonium and high enriched uranium (HEU) [should] be reduced by a factor of about eight.”²¹

Direct-Use Material	SQ
Plutonium (containing < 80% ²³⁸ Pu)	8 kg Pu
Uranium-233	8 kg ²³³ U
High Enriched Uranium (²³⁵ U ≥ 20%)	25 kg ²³⁵ U
Indirect-Use Material	SQ
Uranium (²³⁵ U < 20%) ^a	75 kg ²³⁵ U (or 10 t natural U or 20 t depleted U)
Thorium	20 t Th
a. Including low enriched, natural and depleted uranium.	
Data Source: <i>IAEA Safeguards Glossary</i> , 2001 Ed., International Nuclear Verification Series No. 3, Vienna, Austria: IAEA, June 2002, sec. 3, para. 13, Table II.	

Table 1. IAEA’s Estimated Values for Significant Quantities.

To express quantitatively the extent to which a non-nuclear-weapon state in possession of at least one SQ of diverted nuclear material could pose an immediate proliferation threat, the IAEA uses a metric known as *conversion time*, defined as “the time required to convert different forms of nuclear material to the metallic components of a nuclear explosive device.”²² In order to provide *timely warning* of a non-nuclear-weapon state’s diversion of nuclear material “from peaceful nuclear activities to the manufacture of nuclear weapons or of other nuclear explosive devices or for purposes unknown” so that governments can organize diplomatic and other forms of pressure on the diverting state, the numerical value of the IAEA’s *timeliness detection goal* for a given category of nuclear

material should be, in principle, much less than the value of its estimated *conversion time* for that category of nuclear material.²³

Even in principle, though, this is not always the case. Table 2 compares the IAEA’s estimated *conversion time* for special and source nuclear materials with its corresponding *timeliness detection goals* in states where either the IAEA’s Additional Protocol (a voluntary agreement which grants the Agency greater inspection authority) has not entered into force; or the Agency has not concluded the absence of undeclared nuclear material or activities, and thus has not verified the completeness of the state’s declarations.

Type Nuclear Material	Est. Conversion Time	Timeliness Detection Goal
Unirradiated Direct-Use (Metallic Form) ^a	7 – 10 days	1 month
Unirradiated Direct-Use (Chemical Compounds/ Mixtures) ^b	7 – 21 days	1 month
Irradiated Direct-Use ^c	1 – 3 months	3 months
Indirect Use ^d	3 – 12 months	12 months

a. Pu, HEU or ²³³U metal.
b. PuO₂, Pu(NO₃)₄ or other pure Pu compounds; HEU or ²³³U oxide or other pure U compounds; MOX or other non-irradiated pure mixtures containing Pu, U (²³³U + ²³⁵U ≥ 20%); Pu, HEU and/or ²³³U in scrap or other miscellaneous impure compounds.
c. Pu, HEU or ²³³U in irradiated fuel.
d. U containing <20% ²³³U and/or ²³⁵U; Th.

Data Source: *IAEA Safeguards Glossary*, 2001 Ed., International Nuclear Verification Series No. 3, Vienna, Austria: IAEA, June 2002, sec. 3, paras. 13 and 20.

Table 2. IAEA’s Estimated Conversion Time vs. Timeliness Detection Goal.

To take the most time-sensitive proliferation scenario, if a non-nuclear-weapon state has acquired at least one SQ of highly enriched uranium, uranium-233, or separated plutonium in metallic form, then the IAEA

estimates that this state requires roughly seven-to-ten days to prepare its unirradiated, direct-use fissile material for insertion into a nuclear weapon.²⁴ Yet in terms of detecting a non-nuclear-weapon state's diversion of such material, the IAEA sets its *timeliness detection goal* as one month.²⁵

Other plausible proliferation scenarios raise alarms because they illustrate just how easily non-nuclear-weapon states, through the possession of overt or covert nuclear fuel-making technologies, can clandestinely acquire weapons-ready nuclear material long before the IAEA is able to detect the acquisition. For example, reprocessing experts from Oak Ridge National Laboratory showed in an August 1977 technical brief how a non-nuclear-weapon state – which possesses irradiated direct-use materials, such as the sort of plutonium-laden spent nuclear fuel generated by light water reactors (LWRs) – could build, using simple industrial tools and a compact facility, a concealed “quick and dirty” reprocessing plant.²⁶ To take another example, former Nuclear Regulatory Commissioner Victor Gilinsky, MIT professor Marvin Miller, and former weapons-lab physicist Harmon Hubbard described in a 2004 report the relative ease and rapidity with which a state that possesses declared or clandestine centrifuge enrichment capability as well as nuclear fuel containing low enriched uranium (LEU), an “indirect-use” material used in LWRs, could enrich without detection this LEU to weapons-usable HEU.²⁷ “It is now generally appreciated that gas centrifuge plants for LEU can fairly easily be turned into plants for HEU,” Gilinsky and company explained. “It is less appreciated that LEU at, say, 4 percent enrichment, is about 80 percent of the way to HEU. It takes comparatively little additional ‘separative

work' to upgrade LEU to HEU. It would be difficult for the IAEA to keep close enough track of all the LEU to stay ahead of any such conversion."²⁸

Nuclear Facilities: Detecting Abrupt and Protracted Diversions.

When administering safeguards on nuclear material at facilities, the Agency has further translated its detection goals into what it now terms the *IAEA inspection goal*, defined as “[p]erformance targets specified for IAEA verification activities at a given facility as required to implement the facility safeguards approach.”²⁹ To determine the IAEA inspection goal, the Agency uses the concept of a “material balance period” – that is, the amount of time between inventory accounts of declared nuclear materials at a given facility³⁰ – to clarify the two sorts of diversions-over-time that can occur at facilities: *abrupt diversions*, which occur when “the amount diverted is 1 SQ or more of nuclear material in a short time (i.e., within a period that is less than the material balance period)”; and *protracted diversions*, which occur when “the diversion of 1 SQ or more occurs gradually over a material balance period, with only small amounts removed at any one time.”³¹ The IAEA inspection goal at facilities thus consists of two corresponding components: the *timeliness component*, which “relates to the periodic activities that are necessary for the IAEA to be able to draw the conclusion that there has been no *abrupt diversion* of 1 SQ or more at a facility during a calendar year”;³² and the *quantity component*, which “relates to the scope of the inspection activities at a facility that are necessary for the IAEA to be able to draw the conclusion that there has been no [*protracted*] *diversion*

of 1 SQ or more of nuclear material over a material balance period and that there has been no undeclared production or separation of direct use material at the facility over that period.”³³

However, when the Agency administers safeguards on nuclear material at so-called “bulk-handling” facilities – such as “plants for conversion, enrichment (or isotope separation), fuel fabrication and spent fuel reprocessing, and storage facilities for bulk material,”³⁴ it sometimes faces difficulties in meeting the IAEA inspection goal. In using materials accountancy to establish the timeliness and quantity components of the IAEA inspection goal at facilities, the Agency generally assumes a “detection probability” of 95 percent, a corresponding “false alarm probability” of 5 percent, and a measurement error of ± 1 percent. The *false alarm probability*, which the IAEA defines as “[t]he probability . . . that statistical analysis of accountancy verification data would indicate that an amount of nuclear material is missing when, in fact, no diversion has occurred,”³⁵ depends on both the estimated total amount of nuclear material going through the facility during an interval of time, and the threshold amount of the facility’s nuclear material that the Agency must measure as missing during this time interval before it will begin suspecting a diversion.

The serious risks raised by abrupt diversion were outlined in the section discussing the gap between the conversion times of various nuclear materials and the respective IAEA’s *timeliness detection goal* metrics for such materials. With respect to protracted diversions at facilities, the Agency faces even more serious difficulties in determining whether or not the “measured” missing nuclear material is explained by simply a measurement error or, since the quantity diverted from the facility

at any one time over the material balance period need only be small compared to the absolute amount of material accounted for during the period, by an actual protracted diversion.

In a 1990 essay, MIT professor Marvin Miller offers an example in which a state operates a commercial-sized plutonium reprocessing plant through which 800 metric tons of spent nuclear fuel passes annually. To arrive at a *false alarm probability* of no more than five percent and a corresponding *detection probability* of 95 percent at such a plant over a 1-year material balance period, Miller calculates that the IAEA would have tolerate annually as much as 246 kilograms of “measured” missing plutonium—*an amount equivalent to over 30 significant quantities (or nuclear weapons-worth) of plutonium!*³⁶

Yet, even if the IAEA should detect a sufficiently large discrepancy pointing potentially to protracted diversion at a nuclear fuel-making facility, resolution of this discrepancy would be far from timely. “If a large discrepancy is detected, the Agency will have to spend months working with the plant operator to figure out the technical reason for the discrepancy, prior to officially declaring the discrepancy an anomaly that needs to be resolved,” observed Paul Leventhal in a 1994 essay. “The process of resolving an anomaly to the point of determining whether a suspected diversion should be reported to the IAEA Board of Governors could take months more, as could the process of the Board determining whether the matter needs to be referred back to the [IAEA] inspectors for further resolution or is of a magnitude to be referred to the UN Security Council.”³⁷ With good reason, then, did Dr. Pierre Goldschmidt, the former IAEA Deputy Director General for Safeguards and Verification, concede

after leaving the Agency that “there are still problems inherent in ensuring that, in ‘bulk facilities,’ even small amounts of nuclear material—a few kilograms among tons—are not diverted without timely warning.”³⁸

Moreover, as Union of Concerned Scientists’ Edwin Lyman, one of many analysts today arguing for the IAEA to accept higher *false alarm probabilities*, recently noted, “The Agency’s reluctance to pursue higher confidence levels for detection of diversion, at the expense of higher false alarm rates, would seem to be a lesser concern in the context of the heightened security levels that have become standard operating practice around the world since the 9/11 [September 11, 2001] attacks.” He added:

Today, most people are willing to tolerate a level of sensitivity for security screening at airports and critical facilities that would not have been acceptable in the past because of a common appreciation that the occasional false alarm is an appropriate price to pay to ensure that policy of as close to zero-tolerance as possible for the prevention of another 9/11-scale terrorist attack. Similarly, the standards for assurance that safeguards on plutonium used in the civil sector will be stringent enough to ensure an extremely high level of deterrence against diversion or theft should likewise be increased today, *yet it has not been* (emphasis added).

“On the contrary,” Lyman lamented, “a growing appreciation of the inability of current measures to meet quantitative detection goals have led to a retreat from the notion that such goals should even be considered as standards for future achievement.”³⁹ He explained:

Although society may tolerate small leaks from a chemical plant to the environment if the hazards are limited, when the material in question can be used to build nuclear weapons, there is no acceptable level of

leakage into the hands of hostile states or terrorists. The consequences of a single nuclear weapon falling into the wrong hands would be so catastrophic that there must be a zero-tolerance policy for diversion.⁴⁰

If the very standards which the IAEA has established for safeguarding nuclear fuel-making cannot be met, then claims that the entire nuclear fuel-cycle can be effectively safeguarded deserve to be not merely questioned, but also directly challenged.

Sufficiency of IAEA Resources.

The extent to which the IAEA actually possesses sufficient financial resources to perform its mission remains unclear. In turn, this uncertainty points to the larger issue of whether the Agency can effectively safeguard nuclear activities, and thus verify the fulfillment of NPT obligations by signatories.⁴¹

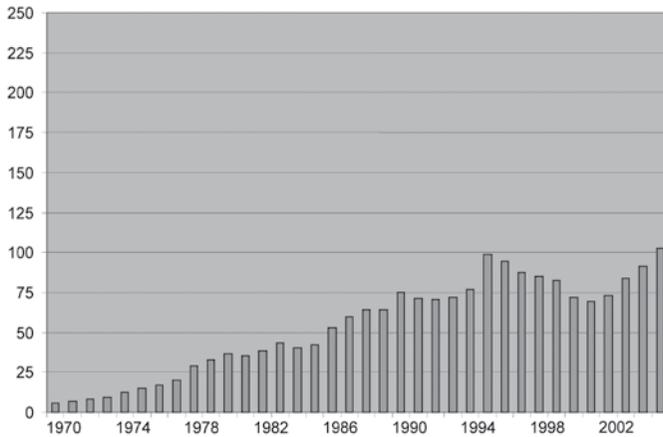
In September 2006, Henry Sokolski, executive director of the Nonproliferation Policy Education Center, warned of the growing gap between IAEA resources and safeguarding responsibilities when he testified before the U.S. House of Representatives' Subcommittee on National Security, Emerging Threats, and International Relations. Table 3, which the author assisted Sokolski in preparing, gives the figures on the IAEA's safeguards budget obligation in constant dollars, and amounts of unirradiated direct-use nuclear materials for the years 1984 and 2004.⁴²

	As of 1984	As of 2004
IAEA Safeguards Budget Obligation (In Constant Fiscal Year 2004 U.S. Dollars)	\$45.7 million	\$104.9 million
Separated Plutonium (Pu) Outside Reactor Cores	7.7 tonnes	89.0 tonnes
High Enriched Uranium (HEU)	11.8 tonnes	32.0 tonnes
Total IAEA Safeguarded Weapons-Usable Nuclear Materials	19.5 tonnes	121.0 tonnes
Data Sources: For data on the IAEA's safeguards budget obligation in current—not constant—U.S. dollars, see <i>The Agency's Accounts for 1984</i> , GC(XXIX)/749, p. 26; and <i>The Agency's Accounts for 2004</i> , GC(49)/7, p. 47. For data on the amount of nuclear material safeguarded by the IAEA, see <i>Annual Report for 1984</i> , GC(XXIX)/748, p. 63; and <i>Annual Report for 2004</i> , GC(49)/5, Annex, Table A19, Vienna, Austria: IAEA, July 1985.		

Table 3. IAEA Safeguards Budget, and Safeguarded Weapons-Usable Nuclear Materials in Non-Nuclear-Weapon Signatories of the NPT.

Over a 20-year period, the IAEA's safeguards and verification budget only roughly doubled in constant dollars, while civilian stockpiles of plutonium and highly-enriched uranium in non-nuclear-weapon States—unirradiated weapons-ready nuclear materials for which the Agency must account—increased by a factor of six.

Figure 1 graphically illustrates the IAEA's safeguards budget obligation in constant fiscal year 2000 U.S. dollars from 1970, the year when the NPT entered into force, to 2005. As the graph shows, after 1995 the IAEA safeguards budget obligation did not just experience zero real growth, but rather contracted significantly, and began only within



Data Sources: For data on the IAEA’s safeguards budget obligation in current—not constant—U.S. dollars, see *The Agency’s Accounts for 1970*, GC(XV)/459, Vienna, Austria: IAEA, July 1971, p. 12; *The Agency’s Accounts for 1971*, GC(XVI)/484, Vienna, Austria: IAEA, July 1972, p. 16; *The Agency’s Accounts for 1972*, GC(XVII)/504, Vienna, Austria: IAEA, August 1973, p. 16; *The Agency’s Accounts for 1973*, GC(XVIII)/527, Vienna, Austria: IAEA, August 1974, p. 16; *The Agency’s Accounts for 1974*, GC(XIX)/549, Vienna, Austria: IAEA, August 1975, p. 13; *The Agency’s Accounts for 1975*, Draft, GOV/1781, Vienna, Austria: IAEA, April 1976, p. 11; *The Agency’s Accounts for 1976*, GC(XXI)/581, Vienna, Austria: IAEA, June 1977, p. 13; *The Agency’s Accounts for 1977*, GC(XXII)/598, Vienna, Austria: IAEA, July 1978, p. 13; *The Agency’s Accounts for 1978*, GC(XXIII)/611, Vienna, Austria: IAEA, August 1979, p. 16; *The Agency’s Accounts for 1979*, GC(XXIV)/629, Vienna, Austria: IAEA, July 1980, p. 18; *The Agency’s Accounts for 1980*, GC(XXV)/645, Vienna, Austria: IAEA, July 1981, p. 18; *The Agency’s Accounts for 1981*, GC(XXVI)/665, Vienna, Austria: IAEA, July 1982, p. 20; *The Agency’s Accounts for 1982*, GC(XXVII)/685, Vienna, Austria: IAEA, August 1983, p. 20; *The Agency’s Accounts for 1983*, GC(XXVIII)/714, Vienna, Austria: IAEA, August 1984, p. 20; *The Agency’s Accounts for 1984*, GC(XXIX)/749, Vienna, Austria: IAEA, August 1985, p. 26; *The Agency’s Accounts for 1985*, GC(XXX)/776, Vienna, Austria: IAEA, August 1986, p. 30; *The Agency’s Accounts for 1986*, GC(XXXI)/801, Vienna, Austria: IAEA, August 1987, p. 46; *The Agency’s Accounts for 1987*, GC(XXXII)/836, Vienna, Austria: IAEA, August 1988, p. 46; *The Agency’s Accounts for 1988*, GC(XXXIII)/874, Vienna, Austria: IAEA, August 1989, p. 42; *The Agency’s Accounts for 1989*, GC(XXXIV)/916, Vienna, Austria: IAEA, July 1990, p. 44; *The Agency’s Accounts for 1990*, GC(XXXV)/954, Vienna, Austria: IAEA, August 1991, p. 52; *The Agency’s Accounts for 1991*, GC(XXXVI)/1005, Vienna, Austria: IAEA, August 1992, p. 68; *The Agency’s Accounts for 1992*, GC(XXXVII)/1061, Vienna, Austria: IAEA, August 1993, p. 24; *The Agency’s Accounts for 1993*, GC(XXXVIII)/4, Vienna, Austria: IAEA, August 1994, p. 18; *The Agency’s Accounts for 1994*, GC(39)/5, Vienna, Austria: IAEA, August 1995, p. 22; *The Agency’s Accounts for 1995*, GC(40)/9, Vienna, Austria: IAEA, August 1996, p. 36; *The Agency’s Accounts for 1996*, GC(41)/9, Vienna, Austria: IAEA, August 1997, p. 34; *The Agency’s Accounts for 1997*, GC(42)/6, Vienna, Austria: IAEA, August 1998, p. 50; *The Agency’s Accounts for 1998*, GC(43)/5, Vienna, Austria: IAEA, August 1999, p. 44; *The Agency’s Accounts for 1999*, GC(44)/5, Vienna, Austria: IAEA, July 2000, p. 50; *The Agency’s Accounts for 2000*, GC(45)/7, Vienna, Austria: IAEA, August 2001, p. 46; *The Agency’s Accounts for 2001*, GC(46)/6, Vienna, Austria: IAEA, July 2002, p. 32; *The Agency’s Accounts for 2002*, GC(47)/4, Vienna, Austria: IAEA, August 2003, p. 44; *The Agency’s Accounts for 2003*, GC(48)/9, Vienna, Austria: IAEA, August 2004, p. 39; *The Agency’s Accounts for 2004*, GC(49)/7, Vienna, Austria: IAEA, August 2005, p. 47; and *The Agency’s Accounts for 2005*, GC(50)/8, Vienna, Austria: IAEA, July 2006, p. 54.

To convert the current U.S. dollars (USD) into crudely estimated constant FY2000 USD, the author inferred deflators from data of the U.S. Department of Defense’s Office of the Comptroller and the Congressional Budget Office.

Figure 1. IAEA Safeguard Budget Obligations, 1970-2005.
(Estimated Constant FY2000 \$USD Millions)

recent years to return to mid-1990s spending levels. Such trends in IAEA funding have led nonproliferation experts like Sokolski to call for drastic revisions to the IAEA's budget and the system by which the Agency assess governments for annual funding. "If we are serious about safeguarding against the spread of nuclear weapons and preventing nuclear theft or terrorism," Sokolski told the House subcommittee, "these trends [of under-funding the IAEA] must change." In fact, in October 2006 IAEA Director General Mohamed ElBaradei himself argued emphatically for more Agency resources:

Our [safeguards] budget is only 130 million dollars. That's the budget with which we're supposed to verify the nuclear activities of the entire world . . . Our budget, as I have said before, is comparable with the budget of the police department in Vienna. So we don't have the required resources in many ways to be independent, to buy our own satellite monitoring imagery, or crucial instrumentation for our inspections. We still do not have our laboratories here in Vienna equipped for state-of-the-art analysis of environmental samples.⁴³

At a minimum, ElBaradei's argument suggests the need for more transparent discussion of the extent to which the IAEA, given its limitations in financial and other resources, is capable of administering effective safeguards worldwide.

In sum, the analysis of this section suggests that the IAEA, given its own safeguarding goals, remains unable to safeguard effectively a broad range of sensitive nuclear materials and activities. In particular, the Agency cannot provide—even in principle!—timely warning of a non-nuclear-weapon state's abrupt diversion of the most weapons-ready nuclear materials (i.e., highly enriched uranium

and plutonium) from civilian applications to nuclear weapons or purposes unknown. Moreover, under current accounting methods dictating a false alarm rate of at most five percent, the IAEA must tolerate many significant quantities of unaccounted nuclear material at bulk-handling facilities before even suspecting a protracted diversion. Finally, the Agency appears to lack adequate financial resources to carry out many of its safeguarding activities effectively.

Taken together, these findings raise important questions:

- Does the NPT's Article IV affirm the right of signatories to nuclear materials and activities that the IAEA cannot effectively safeguard?
- More broadly, does Article IV affirm the right of signatories to peaceful nuclear energy without any qualifications whatsoever?

These questions go to the heart of debates over the precise meaning of the "research, production, and use of nuclear energy for peaceful purposes without discrimination and in conformity with Articles I and II [of the NPT]," and the "fullest possible exchange of equipment, materials, and scientific and technological information for the peaceful uses of nuclear energy," to which treaty signatories have a right under Article IV. Answers to these questions require a sustained analysis and interpretation of the NPT itself.

CLARIFYING THE SCOPE AND LIMITS OF THE NPT'S ARTICLE IV

Treaties demand careful interpretation, and the Nuclear Nonproliferation Treaty is no exception. Careful interpretation is demanded because treaties

sometimes contain *ambiguous* language and, as Fred C. Iklé noted in his important 1964 study on negotiation, treaty language that lacks specificity can lead parties to “have an honest misunderstanding about implications that the agreement fails to spell out”; or one party, “while knowing what its opponent expected of the bargain,” to “pretend that it had a different understanding of it (i.e., the ambiguities are exploited to cover up a deliberate violation.)”⁴⁴ Careful interpretation is also demanded because treaties may sometimes contain *equivocal* language. According to Iklé, such equivocality occurs when:

the parties to the agreement *know* that the ambiguous terms mean different things to each of them Equivocal language is used to *cover up* disagreement on issues which must be included for some reason in a larger settlement or which must be dealt with as if there was agreement. An equivocal agreement is similar to a partial agreement that leaves certain undecided issues for future negotiation, with the difference that the equivocal terms serve to cover up differences rather than mark them for future resolution (emphasis in the original).⁴⁵

When governments interpret treaties to deal with issues of ambiguity and equivocality, they generally adhere to a set of internationally-accepted principles that Section Three of the *Vienna Convention on the Law of Treaties* (VCLT) seeks to codify.⁴⁶ Article 31 of the VCLT identifies the primary means of interpretation as the close reading of a treaty “in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of [the treaty’s] object and purpose.”⁴⁷ In addition, the VCLT’s Article 32 endorses the use of “supplementary means of interpretation,” such as a treaty’s negotiation history and other *travaux préparatoires* (preparatory

materials), in order to confirm an Article 31-derived interpretation, or to determine a treaty's meaning when such an interpretation "leaves the meaning ambiguous or obscure" or "leads to a result which is manifestly absurd or unreasonable."⁴⁸ To the extent that governments advocating a per se right or unqualified per se right interpretation of the NPT's Article IV have arrived at this reading using the means of interpretation codified by the VCLT, the VCLT's Article 32 provides a warrant for recourse to the NPT's negotiation history, at the very least, to confirm whether or not this history supports this reading.

Negotiating and Concluding the NPT.

The multilateral negotiations that led eventually to the NPT's conclusion took place during the mid-to-late 1960s in several contexts.⁴⁹ Among the most important of these was the Eighteen Nation Disarmament Committee (ENDC).⁵⁰ Formed in late 1961, the ENDC consisted of five states from the West: Britain, Canada, France, Italy, and the United States; five states from the Soviet bloc: Bulgaria, Czechoslovakia, Poland, Romania, and the Union of Soviet Socialist Republics (USSR); and eight nonaligned states: Brazil, Burma, Ethiopia, India, Mexico, Nigeria, Sweden, and the United Arab Republic.⁵¹ (France, however, declined to participate in the ENDC.)

When the ENDC began meeting in Geneva, Switzerland, in March 1962, it initially set out to negotiate and conclude an agreement on "general and complete disarmament under effective international control."⁵² Over the next few years, though, negotiations stalled as American and Soviet delegates continually found themselves at loggerheads. But after the People's Republic of China's surprise detonation of a nuclear

explosive device in October 1964, ENDC delegates changed the focus of their negotiations to concluding a nuclear nonproliferation treaty.⁵³

Prior to August 24, 1967, no draft nuclear nonproliferation treaty submitted to the ENDC contained any language whatsoever viewing peaceful uses of nuclear energy through the prism of “legal rights.” The idea for treaty language affirming the “rights” of signatories to peaceful nuclear energy apparently came from the *Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean* (Treaty of Tlatelolco), Article 17 of which states “Nothing in the provisions of this Treaty shall prejudice the rights of the Contracting Parties, in conformity with this Treaty, to use nuclear energy for peaceful purposes, in particular for their economic development and social progress.”⁵⁴ The negotiations for the Treaty of Tlatelolco took place in the mid-to-late 1960s within the context of the Preparatory Commission for the Denuclearization of Latin America (known also by its Spanish acronym, COPREDAL). According to a confidential telegram from the U.S. Embassy in Mexico to the Department of State, the Peruvian delegation first proposed to COPREDAL the idea of including an article on nuclear energy for peaceful purposes.⁵⁵

Soon after the conclusion of the Treaty of Tlatelolco’s negotiations in mid-February 1967, Latin American delegations to the ENDC began proposing that the draft nuclear nonproliferation treaty include language similar to Tlatelolco’s Article 17. The following month, American and Soviet negotiators began privately discussing possible language to deal with the issue of nuclear rights. As a mid-April 1967 memorandum suggests, originally the United States proposed to the USSR that language dealing with nuclear rights

appear in the preamble, and later proposed placing such language at the end of Article III, the provision on international control and IAEA safeguards. Throughout these private bilateral consultations, though, U.S.-origin draft language did not propose to treat nuclear-rights language in terms of “inalienable rights.”⁵⁶ According to an internal, now-declassified negotiation history from the U.S. Arms Control and Disarmament Agency, it was the Soviets who first proposed using the phrase “inalienable right” in Article IV:

While we originally preferred to leave the question of specific treaty language to nonaligned initiative during later negotiations, we agreed in May [1967] to a brief Soviet draft article:

Article IV

Nothing in the Treaty shall be interpreted as affecting the inalienable right of all the Parties to develop research, production and use of nuclear energy for peaceful purposes without discrimination and in conformity with Articles I and II of this treaty, as well as the right of the Parties to participate in the fullest possible exchange of information for, and to contribute alone or in co-operation with other States to, the further development of the applications of nuclear energy for peaceful purposes.⁵⁷

In late August 1967, the American and Soviet delegations, after months of consultations with each other and with officials from other governments, tabled in the ENDC identical nonproliferation treaty drafts. These drafts contained this first, and a much shorter, version of Article IV that is quoted above.⁵⁸

Over the next year, ENDC delegates struggled to refine (among other things) the language of the NPT’s Article IV. At each turn, though, they collectively rejected several proposals to insert language into the treaty that would have expressly and explicitly

recognized the per se right of signatories to the supply of enrichment, reprocessing and other sensitive nuclear fuel-making technologies – and, in certain cases, to the acquisition of so-called nuclear explosive devices for civilian purposes. Several proposals stand out:

- In September 1967, Mexican delegate Jorge Castañeda proposed to the ENDC that Article IV includes a second paragraph establishing “the duty” (or express legal obligation) of “[t]hose parties that are in a position to do so . . . to contribute, according to their ability, alone or in cooperation with other States or international organizations, to the further development of the production, industries, and other applications of nuclear energy for peaceful purposes, especially in the territories of non-nuclear-weapon States.”⁵⁹
- In mid-October 1967, the Romanian delegation to the ENDC submitted a working paper suggesting the inclusion of language in the preamble recognizing the right of signatories to nuclear energy for peaceful purposes as an “absolute right,” which is to say, an unqualified right.⁶⁰
- In late October 1967, the Brazilian delegation to the ENDC offered its own working paper proposing that Article IV expressly recognize the “inalienable right” of signatories to develop not only “nuclear energy for peaceful purposes,” but all nuclear technologies (presumably including nuclear fuel-making) up to “nuclear explosive devices for civil uses.”⁶¹
- In early November 1967, the Nigerian delegation (in what appears to be an elaboration and

extension of the obligatory “duty” language found in Mexico’s September 1967 working paper) proposed that Article IV add several paragraphs that would legally oblige transfers of nuclear material and technology.⁶²

- In early February 1968, the Spanish government, which was not a member of the ENDC, submitted a memorandum to the committee calling for Article IV’s second paragraph to refer expressly to nuclear fuel-making technologies:

The measures in the new draft concerning the right to participate as fully as possible in scientific and technical information for the peaceful uses of atomic energy are sound, and can have important effects on the development of non-nuclear countries. Nevertheless, the Spanish Government takes the view that this information should refer *specifically to the entire technology of reactor and fuels* [emphasis added].⁶³

- In mid-February 1968, the Brazilian delegation once again proposed that Article IV’s first paragraph affirm the right of all signatories to develop not only “nuclear energy for peaceful purposes,” but also all nuclear technology up to so-called peaceful nuclear explosive devices.⁶⁴
- And in late February 1968, the Italian delegation proposed that Article IV’s second paragraph be revised to contain instead the following negative declaration:

Nothing in this Treaty shall be interpreted as affecting the inalienable right of all the Parties to *the supply of source and special fissionable materials or equipment for the use of source and special fissionable materials for peaceful purposes*.⁶⁵

All of these proposals were rejected by the ENDC. Indeed, the final text of the NPT contained no language explicitly referring to enrichment, reprocessing, and other nuclear fuel-making activities, or so-called nuclear explosive devices for peaceful purposes—let alone expressly recognizing the per se right of signatories to nuclear fuel-making.⁶⁶

That said, the NPT's Article III contains language that, at the very least, appears to contemplate that both nuclear-weapon and non-nuclear-weapon signatories might produce, access, and use even the most weapons-ready nuclear materials in civilian applications of nuclear technology. Article III's first paragraph states:

Procedures for the safeguards required by this Article shall be followed with respect to source or special fissionable material whether it is being produced, processed or used in any principal nuclear facility or is outside any such facility. The safeguards required by this Article shall be applied on all source or special fissionable material in all peaceful nuclear activities within the territory of such State, under its jurisdiction, or carried out under its control anywhere.⁶⁷

Paragraph two adds:

Each State Party to the Treaty undertakes not to provide: (a) source or special fissionable material, or (b) equipment or material especially designed or prepared for the processing, use or production of special fissionable material, to any non-nuclear-weapon State for peaceful purposes, unless the source or special fissionable material shall be subject to the safeguards required by this Article.⁶⁸

Yet, though these provisions describe the scope of responsibility for IAEA safeguards, they do not explicitly address the range of nuclear activities that are prohibited or permitted. Rather, the key to

harmonizing these provisions with the NPT's larger prohibitions against proliferation in Articles I and II lies in Article III's third paragraph, which states: "The safeguards required by this Article shall be implemented in a manner designed to comply with Article IV of this Treaty..."⁶⁹ If Article IV is read broadly and permissively to permit any nuclear activity short of inserting fissile material into a nuclear explosive, then the IAEA safeguards required by Article III will play, at best, a formalistic role, and the importance of the effectiveness (or lack of effectiveness) of IAEA safeguards will be of little consequence. In contrast, if Article IV—as well as Articles I and II, the NPT provisions to which Article IV itself *shall conform*—are read carefully and less permissively, then the actual effectiveness of IAEA safeguards will play a crucial role in determining whether or not certain types of nuclear materials, technologies and activities should enjoy protection under Article IV.

The Three Qualifications of Article IV's "Inalienable Right."

To be sure, Article IV of the NPT recognizes the "inalienable right" of signatories to peaceful nuclear energy. However, it also explicitly imposes two qualifications on the "nuclear energy for peaceful purposes" to which NPT signatories have an "inalienable right." Signatories shall develop "research, production, and use" of peaceful nuclear energy (1) "without discrimination," and (2) "in conformity with articles I and II of this Treaty."⁷⁰ Moreover, when the NPT's Article III defines the purpose of comprehensive safeguards by the IAEA as the "*verification of the fulfillment of [signatory] obligations assumed under this Treaty with*

a view to preventing the diversion of nuclear energy from peaceful purposes to nuclear weapons and other nuclear explosive devices,"⁷¹ it effectively establishes (3) "conformity with Article III" as a third qualification. These three qualifications, when understood in relation to the treaty's preamble and main text, not only narrow the scope of "nuclear energy for peaceful purposes" to which signatories have an "inalienable right," but also establish criteria that signatories must meet in order to exercise this right.

To begin with, paragraph seven of the NPT's preamble lays out the principle that addresses the special meaning of Article IV's first qualification, "without discrimination," within the context of the treaty.⁷² That paragraph affirms:

the principle that *the benefits* of peaceful applications of nuclear technology, including any technological by-products which may be derived by nuclear-weapon States from the development of nuclear explosive devices, should be available for peaceful purposes to all Parties of the Treaty, whether nuclear-weapon or non-nuclear weapon States (emphasis added).⁷³

To be clear, neither this principle (which hereinafter I refer to as the "benefits-without-discrimination" principle), nor any other part of the NPT, ever expressly requires that any specific *nuclear technology*, or any specific *peaceful application* of nuclear technology, be made available to all signatories, but rather that only that *the benefits* of a given nuclear technology's peaceful application be made available somehow. In essence, this principle recognizes that some nuclear technologies and some peaceful applications of nuclear technology—to take an extreme example, so-called "nuclear explosions for peaceful purposes" in civilian mining, excavation, or canal-digging operations—

may be too uneconomical, too proliferative, and too unsafeguardable to permit non-nuclear-weapon states to acquire and use them. Thus, when Article IV's first qualification applies this principle to peaceful nuclear energy, it appears to permit, in principle, the denial of a given nuclear technology or a given nuclear technology's peaceful application to a signatory as long as the benefits of the denied nuclear technology's peaceful application are made available somehow.

Article IV's second qualification requires that the development of "research, production, and use" of peaceful nuclear energy be "in conformity with articles I and II" of the NPT. These two articles articulate the NPT's main prohibitions against the direct and indirect proliferation of nuclear weapons by treaty signatories. Article I prohibits nuclear-weapon signatories from giving nuclear weapons and other nuclear explosive devices, or control over such devices, to "any recipient whatsoever," and also forbids them from "assist[ing], encourage[ing], or induc[ing]" any non-nuclear-weapon state "to manufacture or otherwise acquire" nuclear explosive devices.⁷⁴ Article II correspondingly prohibits non-nuclear-weapon signatories from receiving nuclear explosive devices, or control over such devices, and also forbids them from building or acquiring in any way nuclear explosive devices, and from receiving or seeking "any assistance in the manufacture" of such devices.⁷⁵ Article IV's second qualification therefore effectively narrows the scope of "nuclear energy for peaceful purposes" to which signatories have an "inalienable right" under Article IV, for peaceful nuclear energy "in conformity with articles I and II" excludes *not only* nuclear explosive technology for peaceful or nonpeaceful purposes, *but also* other nuclear technology and assistance that could

“assist, encourage, or induce” non-nuclear-weapon states “to manufacture or otherwise acquire” nuclear explosive technology.⁷⁶

Furthermore, the NPT’s Article III requires each non-nuclear-weapon signatory to conclude a comprehensive safeguard agreement with the IAEA “for the exclusive purpose of *verification of the fulfillment of its obligations assumed under this Treaty* with a view to preventing the diversion of nuclear energy from peaceful purposes to nuclear weapons and other nuclear explosive devices” (emphasis added).⁷⁷ By requiring non-nuclear-weapon signatories to submit to full-scope IAEA safeguards in order to verify the fulfillment of their obligations under Articles I and II, as well as other parts of the NPT, Article III effectively establishes a third legally-binding qualification on the “nuclear energy for peaceful purposes” to which signatories have an “inalienable right” under Article IV. That is, to develop “research, production, and use” of peaceful nuclear energy “in conformity with articles I and II” necessarily implies full “conformity with article III.”⁷⁸ Thus, Article IV’s third qualification appears to recognize the “inalienable right” of a signatory to peaceful nuclear energy only when the signatory’s nuclear activities are *effectively* safeguardable by the IAEA, and the signatory complies fully with its obligations under Article III of the NPT and related IAEA comprehensive safeguards agreements.⁷⁹

Article IV’s Three Qualifications and Nuclear Explosions for Peaceful Purposes.

With respect to “nuclear explosions for peaceful purposes,” the majority of the NPT negotiators understood that, at the time of their negotiations and

for the foreseeable future, nuclear explosive technology in civilian projects not only lacked clear and immediate economic benefits, especially when compared to non-nuclear alternatives; but also possessed an unacceptable risk of nuclear proliferation since such technology *could not be effectively safeguarded by the IAEA*. Hence, the final text of the NPT denies non-nuclear-weapon signatories access both to nuclear explosive technology and its peaceful applications.

In conformity with the preamble's "benefits-without-discrimination" principle, though, the NPT's Article V outlines the framework by which non-nuclear-weapon signatories could avail themselves of "the potential benefits" of nuclear explosive technology's peaceful application, if such economic benefits should ever materialize. The relevant part of Article V reads:

Each Party to the Treaty undertakes to take appropriate measures to ensure that, in accordance with this Treaty, under appropriate international observation and through appropriate international procedures, *potential benefits* from any peaceful applications of nuclear explosions will be made available to non-nuclear-weapon States Party to the Treaty on a *non-discriminatory basis* and that the charge to such Parties for the explosive devices used will be as low as possible and exclude any charge for research and development. Non-nuclear-weapon States Party to the Treaty shall be able to obtain such benefits, pursuant to a special international agreement or agreements, through an appropriate international body with adequate representation of non-nuclear-weapon States . . . (emphasis added).⁸⁰

As the NPT's negotiation history reveals, many of the non-nuclear-weapon states represented at the ENDC did not view either the denial of nuclear explosive technology and its peaceful applications, or Article

V's framework for providing the "potential benefits" of the denied nuclear explosive technology's peaceful applications, as discriminatory per se.⁸¹ For example, in late January 1968 Polish delegate Mieczyslaw Blusztajn remarked to the ENDC:

I should like once again to stress that *the right of all countries to conduct peaceful nuclear explosions is not at stake*. The only matter to be settled is the procedure and the conditions to be observed so that countries which forgo the manufacture of nuclear devices shall not be deprived of *the benefits* that may be derived from the use of nuclear explosives (emphasis added).⁸²

Bulgarian delegate Kroum Christov echoed the Polish delegate's sentiments:

[I]t seems to us quite clearly impossible to admit and to include in the non-proliferation treaty the right to manufacture nuclear devices and to carry out nuclear explosions. *There is no question in this case of denying a right; nor should the prohibition of all activity of this nature be regarded as an infraction of that right*. Account is taken of a state of facts which, for reasons which cannot be refuted and which have been explained here at length, renders the manufacture of nuclear devices incompatible with a non-proliferation treaty (emphasis added).⁸³

In retrospect, the efforts of NPT negotiators to limit the spread of nuclear explosive technology for peaceful purposes proved to be well-founded. Indeed, the "potential benefits" of so-called peaceful nuclear explosives (PNEs) never materialized as non-nuclear explosive alternatives for mining, excavation, and canal-digging operations emerged as safer and more economical choices.⁸⁴ In fact, in May 1995 the quadrennial NPT review conference made the following conclusions about PNEs:

The Conference records that *the potential benefits* of the peaceful applications of nuclear explosions envisaged in article V of the Treaty *have not materialized*. In this context, the Conference notes that the potential benefits of the peaceful applications of nuclear explosions have not been demonstrated and that serious concerns have been expressed as to the environmental consequences that could result from the release of radioactivity from such applications and on the risk of possible proliferation of nuclear weapons. Furthermore, no requests for services related to the peaceful applications of nuclear explosions have been received by IAEA since the Treaty entered into force. The Conference further notes that no State party has an active programme for the peaceful application of nuclear explosions (emphasis added).⁸⁵

Moreover, though the *Comprehensive Nuclear-Test-Ban Treaty* has not entered into force, it has nonetheless helped to support an international norm against the use of nuclear explosions, whether for nonpeaceful or allegedly peaceful purposes.⁸⁶

By prohibiting non-nuclear-weapon states from developing, accessing, and using so-called peaceful nuclear explosive devices, the NPT reinforces the importance of the following principle: When the IAEA cannot effectively safeguard the nuclear material involved in an allegedly-peaceful application of nuclear technology, then the NPT does not protect the right of states to develop, access or use that allegedly-peaceful application of nuclear technology.

Article IV's Three Qualifications and Nuclear Energy for Peaceful Purposes.

In conformity with Article IV's three qualifications, then, both (a) the "benefits-without-discrimination" principle of the NPT's preamble, and (b) the framework

by which Article V allows non-nuclear-weapon signatories to avail themselves of the “potential benefits” of nuclear explosive technology’s peaceful applications without providing them actual access to the technology or its peaceful application, can be applied to enrichment, reprocessing, and other sensitive nuclear fuel-making activities. It is both plausible and consistent for governments to interpret Article IV as affirming the “inalienable right” of nuclear signatories to develop “research, production, and use” of nuclear fuel making only to the extent that such nuclear fuel-making activities: (1) are economically beneficial in accordance with the treaty’s preamble (Article IV’s first qualification); (2) possess a low risk of proliferation in accordance with Articles I and II (Article IV’s second qualification); and (3) are *effectively* safeguardable and undertaken in full compliance with NPT and IAEA safeguard obligations in accordance with Article III (Article IV’s third qualification).⁸⁷ Moreover, it is both plausible and consistent with the treaty to deny signatories from developing, acquiring, and using nuclear fuel-making technologies (especially those which are related to nuclear materials that the IAEA cannot effectively safeguard) that can assist them in manufacturing nuclear weapons under some circumstances—at the very least, when they fail to comply with their obligations under the NPT’s Article III and related IAEA safeguards agreements—as long as the benefits of peaceful applications of such nuclear fuel-making technologies are made available to them.⁸⁸

As the NPT’s negotiation history reveals, ENDC delegations from both nuclear-weapon states and non-nuclear-weapon states viewed nuclear fuel-making in a manner similar to nuclear explosives for peaceful

purposes: that is, as potentially aiding and even constituting the manufacture of nuclear weapons. For example, in September 1962 British delegate Sir Michael Wright told the ENDC:

The thing which is unique to a nuclear weapon is its warhead. And what is there in a nuclear warhead that is found in no other weapons? . . . It is the fissile material in the warhead; that is to say, the plutonium and uranium-235, the two fissile materials now most commonly used in nuclear weapons.

*If we are to deal effectively with nuclear weapons we must concentrate on the fissile material which every nuclear weapon has and which no other weapon has [emphasis added].*⁸⁹

To take another example, in February 1966 Swedish delegate Alva Myrdal argued before the ENDC:

We could, of course, all agree that it is important to block the road to nuclear-weapon development as early as possible. But we must be aware that what we are facing is a long ladder with many rungs, and the practical question is: on which of these is it reasonable and feasible to introduce the international blocking? . . . *To prohibit just the final act of "manufacture" would seem to come late in these long chains of decisions [emphasis added].* . . . Could a middle link be found on which the prohibitory regulation should most definitely be focused?⁹⁰

A month later, during a speech to the ENDC, Burmese delegate U. Maung Maung Gyi answered Myrdal's question:

*An undertaking on the part of the non-nuclear weapon Powers not to manufacture nuclear weapons would in effect mean forgoing the production of fissionable material [emphasis added] . . . and such production is the first essential step for the manufacture of these weapons and constitutes an important dividing line between restraint from and pursuit of the nuclear path.*⁹¹

Proponents of the *per se* right or unqualified *per se* right reading of Article IV might counter the above reading by claiming that Article IV's second paragraph necessarily obliges signatories to transfer any and all nuclear technology, materials, and assistance—including nuclear fuel making—in an unqualified and unfettered manner. The relevant part of that paragraph states: "All the Parties of the Treaty undertake to facilitate, and have the right to participate in, the fullest possible exchange of equipment, materials, and scientific and technological for the peaceful uses of nuclear energy."⁹² It is important to note, though, that this paragraph is carefully worded to call not for "the fullest exchange," but rather for only "the fullest *possible* exchange," and thus actually encourages NPT signatories to exchange nuclear technology, materials, and know-how with great care, caution, and restraint.⁹³ In May 2005, during a speech to the quadrennial NPT review conference, Christopher Ford (at the time the Principal Deputy Assistant Secretary of State for Verification, Compliance and Implementation) elaborated this point:

The use of the term "fullest possible" is an acknowledgement that cooperation may be limited. Parties are not compelled by Article IV to engage in nuclear cooperation with any given state—or to provide any particular form of nuclear assistance to any other state. The NPT does not require any specific sharing of nuclear technology between particular States Party, nor does it oblige technology-possessors to share any specific materials or technology with non-possessors.⁹⁴

"[T]o conform both to the overall objective of the NPT—strengthening security by halting nuclear proliferation and to any Article I and III obligations," Ford added, "supplier states must consider whether certain

types of assistance, or assistance to certain countries, are consistent with the nonproliferation purposes and obligations of the NPT, other international obligations, and their own national requirements." NPT signatories, Ford concluded, "should withhold assistance if they believe that a specific form of cooperation would encourage or facilitate proliferation, or if they believe that a state is pursuing a nuclear weapons program in violation of Article II, is not in full compliance with its safeguards obligations, or is in violation of Article I."⁹⁵ Moreover, by establishing no per se obligation or duty of nuclear exporters to give any specific nuclear technology, material, or assistance, Article IV's second paragraph suggests that nuclear importers, at the same time, have no reciprocal per se right to receive or otherwise acquire any specific nuclear technology, material or assistance.⁹⁶

In sum, the analysis of this section suggests that the NPT does not affirm the "inalienable right" of signatories to nuclear materials and activities that the IAEA cannot effectively safeguard. In fact, this explains why the treaty prohibits non-nuclear-weapon signatories from developing, accessing, or using so-called "nuclear explosions for peaceful purposes," the most military-relevant of civilian applications of nuclear technology. Instead, the NPT appears to establish three qualifications on Article IV which condition the extent to which signatories have an "inalienable right" to develop and use peaceful nuclear energy—key qualifications being a signatory's full compliance with its obligations under the NPT and IAEA comprehensive safeguards agreements and the actual ability of the IAEA to administer *effective* safeguards on nuclear materials in a given civilian application of nuclear technology. But while the NPT may be understood as prohibiting non-nuclear-weapon signatories from

unsafeguardable nuclear materials and activities, the treaty also provides for mechanisms by which nuclear-weapon signatories can provide, individually or through multilateral frameworks, *the benefits* of proscribed, unsafeguardable peaceful applications of nuclear technology in a nondiscriminatory manner to non-nuclear-weapon signatories in full compliance.

MOVING AWAY FROM A CROWD OF VIRTUAL NUCLEAR-WEAPON STATES

On the morning of October 9, 2006, the Democratic People's Republic of Korea exploded a nuclear weapon.⁹⁷ Having long subscribed to the unqualified per se right reading of the Nuclear Nonproliferation Treaty, North Korea became the first ever non-nuclear-weapon state to use the treaty as cover for the overt and covert production of weapons-usable fissile material, and then to quit the treaty, and later build and detonate a nuclear explosive device.⁹⁸

If governments continue to interpret the NPT as recognizing the per se right or, worse, the unqualified per se right of signatories to enrichment, reprocessing, and other sensitive nuclear activities, then this will all but guarantee the emergence of more nuclear fuel-making states—of what IAEA Director General Mohammed ElBaradei now chillingly describes as *virtual nuclear-weapon states*. The world will move towards a nuclear-armed crowd.

As we have seen, though, the NPT need not be read this way. Governments can—and should—interpret the treaty in a pragmatic and sustainable way that rejects not only claims of an unqualified per se right, but also of a per se right, of signatories to nuclear fuel making.

The Role of IAEA Candor.

A necessary condition for more pragmatic and sustainable readings of the NPT, however, will be IAEA candor with respect to what it can and cannot effectively safeguard. In the past, the Agency avoided discussion of this issue, but such avoidance served only to promote widely the mistaken belief that IAEA safeguards are always effective, even when applied to uranium enrichment, plutonium reprocessing, and other sensitive nuclear activities. In turn, this mistaken belief lent support to interpretations of the NPT's Article IV recognizing the *per se* right—and, in Iran's case, even the unqualified *per se* right—of NPT signatories to nuclear fuel-making.

The IAEA is certainly capable of candor. When the Persian Gulf War's aftermath exposed the extent to which the Agency could not verify the completeness of a state's declaration, the IAEA moved to clarify its legal inspection authority⁹⁹ and improve its technical capabilities.¹⁰⁰ To meet the dangers posed by the emergence of ever more *virtual nuclear-weapon states*, though, the Agency will have to do much more. In particular, the IAEA—given its inability at times to meet, in practice, key safeguarding goals, as well as its budgetary limitations—will need to admit the dangerous nuclear materials (e.g., direct-use materials, such as highly enriched uranium, mixed-oxide fuels, and separated plutonium) and activities (e.g., nuclear fuel-making, especially at bulk-handling facilities) for which it cannot provide timely warning of diversion, and thus cannot effectively safeguard. Moreover, the Agency should make a point of describing and identifying its accountancy, inspection, containment,

and surveillance of these still unsafeguardable activities and materials as, at best, “monitoring” rather than “safeguarding.”¹⁰¹

In short, with greater candor and clarity about the IAEA’s safeguarding shortfalls, the Agency can help governments to clarify the line between effectively safeguardable, and therefore truly “safe,” nuclear materials, technologies, and activities; and those which are not currently safeguardable and thus not merely “sensitive,” but also inherently “dangerous.”¹⁰²

The Role of Legal Clarity by Governments.

Within the last few years, Iran’s nuclear intransigence and North Korea’s nuclear detonation have created a greater sense of urgency among governments seeking to curb nuclear proliferation. For example, in an attempt to clarify further the extent to which nuclear technology, materials, and know-how should be exchanged, the French Republic went so far as to propose a set of criteria during the lead-up to the 2005 quadrennial NPT review conference, criteria which importing states would need to meet in order to receive nuclear goods. “The export of such materials, facilities, equipment, or related technologies,” France suggested in a May 2004 working paper, “should only be envisaged in the light of the existence of a set of conditions relevant to the global nonproliferation regime and NPT objectives” – conditions such as:

- an alleged energy need in the [importing] country;
- a credible nuclear power generation program and related fuel cycle needs;
- an economically rational plan for developing such projects;

- an Additional Protocol [granting the IAEA greater legal authority to inspect for undeclared nuclear materials and activities] brought into force and implemented before any physical transfer or transfer of know-how;
- the highest standard of nonproliferation commitments;
- the effective and efficient implementation of an export control system with adequate sanctions;
- the highest standard of nuclear security and safety;
- an analysis of the stability of the country and the region concerned.¹⁰³

Within recent months, moreover, the U.S. Government has again signaled its support of proposals in the French working paper.¹⁰⁴

That said, the United States and like-minded governments have yet to counter directly readings of the NPT's Article IV recognizing the per se right, or the unqualified per se right, to nuclear fuel-making. One can think of Article IV as international law's equivalent of a Rorschach Test: What a government claims to see in this treaty provision—either *de jure* cover for its approach to *de facto* status as *virtual nuclear-weapon state*, or clear criteria limiting the scope of “nuclear energy for peaceful purposes” to which signatories have an “inalienable right”—certainly reveals a great deal about how it views the NPT's fundamental and overriding goal of nuclear nonproliferation.

Certainly, the clarity or confusion with which governments seeking to curb nuclear proliferation interpret Article IV will substantially impact the decisions of other NPT signatories in the not-too-distant future. Although a consistent and sustainable reading

of the NPT, by itself, cannot prevent the emergence of future proliferation problems, it can provide governments with a clear and legal foundation for effective policies which, at the very least, delegitimize unqualified per se readings of Article IV, and thus strongly discourage other NPT signatories from imitating, or even improving upon, the North Korean and Iranian examples. In contrast, a confused and muddled answer—or, equally as bad, no response at all—will have precisely the opposite effect. It will encourage ever more signatories to believe, and act on the belief, that they have a right under all circumstances, even non-compliance with NPT and IAEA obligations, to any nuclear activity short of inserting fissile material into a nuclear weapon.

In such a world, signatories in full compliance with their NPT and IAEA obligations would face, to borrow key phrases from Article 32 of the *Vienna Convention on the Law of Treaties*, the “manifestly absurd” and “unreasonable” outcome of ever more *virtual nuclear-weapon states* like Iran, and ever more actual nuclear-armed states like North Korea.

The author wishes to thank Henry Sokolski, executive director of the Nonproliferation Policy Education Center (NPEC), for his generous feedback and continuing guidance. Indeed, Mr. Sokolski’s article, “Nuclear Rights and Wrongs” (*National Review Online*, September 21, 2004), along with Paul Lettow’s unpublished essay, “Fatal Flaw? The NPT and the Problem of Enrichment and Reprocessing” (April 2005), provided early sources of information and inspiration. All faults in this essay belong to the author, however.

The author presented an early version of this chapter as “Life, Liberty, and the Pursuit of Fissile Material? How the NPT’s Preamble and Article V Can Help To Properly Interpret Articles III and IV,” to “Assessing the IAEA’s Ability to Safeguard Peaceful Nuclear Energy,” a symposium, held on November 13, 2006, at

the Centre de Conférences Internationales in Paris, France, which was co-hosted by the French Ministry of Foreign Affairs, the *Fondation pour la Recherche Stratégique* and NPEC. This symposium was attended by officials from the French, American, and German governments, as well as the IAEA. Attendees also provided feedback that helped the author to improve the chapter.

ENDNOTES - CHAPTER 8

1. After negotiations for the *Treaty on the Nonproliferation of Nuclear Weapons* concluded in 1968, a handful of analysts warned, in classified and unclassified reports in the years following, that the spread of nuclear fuel-making would encourage the emergence of many more non-nuclear-weapon states within months, or even days, of completing a nuclear explosive device. For example, see Richard Rosecrance, *After the NPT, What?* Washington, DC: U.S. Department of State, Policy Planning Council, May 28, 1968, SECRET (Declassified on December 6, 1994), Declassified Documents Reference System Document (“DDRS”) No. CK3100082939; Victor Gilinsky and William Hoehn, *Nonproliferation Treaty Safeguards and the Spread of Nuclear Technology*, R-501, Santa Monica, CA: RAND Corporation, May 1970; and Albert Wohlstetter, *et al.*, *Moving Toward Life in a Nuclear Armed Crowd?* PH-76-04-389-14, final report to the U.S. Arms Control and Disarmament Agency (ACDA), Contract No. ACDA/PAB-263, Los Angeles, CA: PAN Heuristics, December 4, 1975, Revised April 22, 1976.

2. Dr. Mohamed ElBaradei, “Addressing Verification Challenges,” Statement of the IAEA Director General to the *Symposium on International Safeguards*, Vienna, Austria, October 16, 2006, available from www.iaea.org/NewsCenter/Statements/2006/ebsp2006n018.html. The author of this chapter attended the symposium.

3. *Ibid.* ElBaradei’s arguments about what he now terms *virtual nuclear-weapon states* are similar to those that Albert Wohlstetter and colleagues made in studies on the military potential of civilian nuclear energy that were conducted for various U.S. government agencies in the 1970s. For example, as Wohlstetter and company

argued in a 1979 report to the Arms Control and Disarmament Agency:

The interpretation of Article IV is by no means a trivial matter. If, in fact, technological transfers can bring a “nonnuclear weapon state” within weeks, days or even hours of the ability to use a nuclear explosive, [then] *in the operational sense* that “nonnuclear weapon state” will have nuclear weapons [emphasis added]. The point is even more fundamental than the fact that effective safeguards [according to the IAEA] mean timely warning. A necessary condition for timely warning is that there be a substantial elapsed time. But if there is no substantial elapsed time before a government may use nuclear weapons, [then] in effect it *has* them [emphasis original].

See Albert Wohlstetter, Gregory Jones, and Roberta Wohlstetter, *Why the Rules Have Needed Changing*, Part I of II in *Towards a New Consensus on Nuclear Technology*, Vol. 1, PH-78-04-832-33, a summary report prepared for ACDA, Contract No. AC7NC106, Los Angeles, CA: Pan Heuristics, July 6, 1979, pp. 36-37.

4. *Treaty on the Non-Proliferation of Nuclear Weapons*, July 1, 1968, entered into force on March 5, 1970, 21 U.S.T. 483, 729 UNT.S. 161. (Hereafter NPT.)

5. Kofi Annan, “Secretary-General’s Address to the Nuclear Non-Proliferation Treaty Review Conference,” New York, NY, May 2, 2005, available from www.un.org/events/npt2005/statements/npt02.sg.pdf.

6. Article I of the NPT states:

Each nuclear-weapon State Party to the Treaty undertakes not to transfer to any recipient whatsoever nuclear weapons or other nuclear explosive devices or control over such weapons or explosive devices directly, or indirectly; and not in any way to assist, encourage, or induce any non-nuclear-weapon State to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices, or control over such weapons or explosive devices.

Article II states:

Each non-nuclear-weapon State Party to the Treaty undertakes not to receive the transfer from any transferor whatsoever of nuclear weapons or other nuclear explosive devices or of control over such weapons or explosive devices directly, or indirectly; not to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices; and not to seek or receive any assistance in the manufacture of nuclear weapons or other nuclear explosive devices.

7. Article IV of the NPT states:

1. Treaty to develop research, production and use of nuclear energy for peaceful purposes without discrimination and in conformity with Articles I and II of this Treaty.

2. All the Parties to the Treaty undertake to facilitate, and have the right to participate in, the fullest possible exchange of equipment, materials and scientific and technological information for the peaceful uses of nuclear energy. Parties to the Treaty in a position to do so shall also co-operate in contributing alone or together with other States or international organizations to the further development of the applications of nuclear energy for peaceful purposes, especially in the territories of non-nuclear-weapon States Party to the Treaty, with due consideration for the needs of the developing areas of the world.

8. For example, a number of Non-Aligned Movement (NAM) governments that are signatories of the NPT argued in the 2006 NAM summit's nonlegally-binding final document that: "each country's choices and decision in the field of peaceful uses of nuclear energy should be respected without jeopardizing its policies or international cooperation agreements and arrangements for peaceful uses of nuclear energy and its fuel-cycle policies." See Fourteenth Summit Conference of the Heads of State or Government of the Non-Aligned Movement, Final Document, NAM 2006/Doc.1/Rev. 3, September, 16, 2006, para. 95, available from www.cubanoal.cu/ingles/docadoptados/docfinal.htm.

9. See IAEA, *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran*, Report by the Director General, GOV/2003/40, June 6, 2003, *esp.* paras. 32-35, available from www.iaea.org/Publications/Documents/Board/2003/gov2003-40.pdf; *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran*, Report by the Director General, GOV/2003/63, August 26, 2003, *esp.* paras. 47-53, available from www.iaea.org/Publications/Documents/Board/2003/gov2003-63.pdf; *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran*, Report by the Director General, GOV/2003/75, November 10, 2003, *esp.* paras. 45-56, available from www.iaea.org/Publications/Documents/Board/2003/gov2003-75.pdf.

10. See IAEA, *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran*, Report by the Director General, GOV/2004/83, November 15, 2004, *esp.* paras. 85-114, available from www.iaea.org/Publications/Documents/Board/2004/gov2004-83.pdf; and *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran*, Report by the Director General, GOV/2005/67, September 2, 2005, *esp.* paras. 42-52, available from www.iaea.org/Publications/Documents/Board/2005/gov2005-67.pdf.

11. See IAEA, *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran*, Resolution Adopted by the IAEA Board of Governors, GOV/2005/77, September 24, 2005, available from www.iaea.org/Publications/Documents/Board/2005/gov2005-77.pdf.

12. See *ibid.*, and Security Council of the United Nations, *Resolution 1696*, S/RES/1696, July 31, 2006, available from www.un.org/Docs/sc/unsc_resolutions06.htm, *Resolution 1737*, S/RES/1737, December 27, 2006, available from www.un.org/Docs/sc/unsc_resolutions06.htm, and *Resolution 1747*, S/RES/1747, March 24, 2007, available from www.un.org/Docs/sc/unsc_resolutions07.htm.

13. In early 2006, for example, the Iranian ambassador to the IAEA argued before the Agency's Board of Governors that his government possessed an "inalienable right [to] peaceful uses of nuclear energy, including nuclear fuel cycle and research and development, as envisaged in the Agency's Statute and the NPT."

See "Statement by Ali Ashgar Soltanieh, Resident Representative of the Islamic Republic of Iran to the IAEA," Vienna, Austria, February 2, 2006, p. 10, available from www.iaea.org/Publications/Documents/Infcircs/2006/infcirc666.pdf. Moreover, when the Iranian government rejected a mid-2006 proposal from the five permanent members of the Security Council and Germany to abandon enrichment and other nuclear fuel-making activities in exchange for political, economic, and technological incentives, it asserted: "Development of [Iran's] peaceful nuclear program is based on its *specific and undeniable rights* [emphasis added] under the NPT. [Iran] cannot accept deprivation from its legal rights in [the] development and use of peaceful nuclear energy including the fuel cycle, and continuing research and development of enrichment process as underscored in the NPT and IAEA safeguards." See Islamic Republic of Iran, *Response to the Package Presented on June 6, 2006*, English trans., published by the Council on Foreign Relations on August 22, 2006, available from www.cfr.org/publication/11432/.

14. Here it is worth noting that individual members of the U.S. Government's legislative and executive branches have attempted to counter readings of the NPT that affirm a per se right, or unqualified per se right, of signatories to enrichment and reprocessing, (ENR) and other sensitive nuclear fuel-making technologies. For example, see Senators Richard Lugar (R-IN) and Evan Bayh (D-IN), "A Nuclear Fuel Bank Advocated," op-ed, *Chicago Tribune*, October 22, 2006. "For too long, the Nuclear Non-Proliferation Treaty has been exploited," Lugar and Bayh wrote. "We need a new international non-proliferation standard that prevents countries from using the guise of nuclear energy to develop nuclear weapons," they added. "The dangers are so great that the world community must declare that there is no right under the Nuclear Non-Proliferation Treaty to enrich uranium or separate plutonium from spent nuclear fuel." See also John R. Bolton, "The NPT: A Crisis of Non-Compliance," Statement of the Under Secretary of State for Arms Control and International Security to the Third Session of the Preparatory Committee for the 2005 Review Conference of the Treaty on the Non-Proliferation of Nuclear Weapons, New York, April 27, 2004, available from www.state.gov/t/us/rm/31848.htm. With respect to ENR technologies, Bolton asserted, "The Treaty provides no right to such sensitive fuel cycle technologies." Most recently, Congresswoman Ileana Ros-Lehtinen (R-FL), the ranking member of the House Committee

on Foreign Affairs, argued against reading the NPT's Article IV as recognizing an "absolute right" to nuclear fuel-making. See Ileana Ros-Lehtinen, "The Right to Survive: Nuclear 'Rights' Don't Trump It," *National Review Online*, October 5, 2007, available from article.nationalreview.com/?q=MDYyNjBjNWM3MzBIZGRlYjBjODM3N2ZkZDcxOGViODk=.

15. NPT, preamble, para. 6.

16. NPT, Art. III, para. 1.

17. IAEA, *The Structure and Content of Agreements Between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons*, INFCIRC/153, Corrected, June 1972, para. 28. In February 1992, after the IAEA had discovered the extent to which Ba'athist Iraq had failed to declare a host of nuclear materials and activities, the Agency's Board of Governors affirmed that INFCIRC/153's objective of detecting and deterring the diversion of nuclear material applies not only "to nuclear material declared by a State," but also to "any nuclear material [and related activities] subject to safeguards that *should have been declared*." See IAEA, *The Safeguards System of the International Atomic Energy Agency*, undated, circa 2002, para. 13, available from www.iaea.org/OurWork/SV/Safeguards/safeg_system.pdf.

18. INFCIRC/153, Corrected, para. 29.

19. For background on SAGSI, see Marvin M. Miller, "Are IAEA Safeguards on Plutonium Bulk-Handling Facilities Effective?" Washington, DC: Nuclear Control Institute, August 1990, available from www.nci.org/k-m/mmsgrds.htm. As Miller notes, "The values recommended by SAGSI for the detection goals were carefully described as provisional guidelines for inspection planning and for the evaluation of safeguards implementation, not as requirements, and were so accepted by the Agency."

20. IAEA *Safeguards Glossary*, 2001 Edition, International Nuclear Verification Series No. 3, Vienna, Austria: IAEA, June 2002, sec. 3, para. 14, available from www-pub.iaea.org/MTCD/publications/PDF/nvs-3-cd/PDF/NVS3_prn.pdf.

21. See Thomas B. Cochran, "Adequacy of IAEA's Safeguards for Achieving Timely Detection," an essay presented at "After Iran: Safeguarding Peaceful Nuclear Energy," London, UK, October 2005 p. 2, available from www.npec-web.org/Frameset.asp?PageType=Single&PDFFile=Paper050930CochranAdequacyofTime&PDFFolder=Essays. See also Cochran and Christopher E. Paine, "The Amount of Plutonium and Highly-Enriched Uranium Needed for Pure Fission Nuclear Weapons," New York: Natural Resources Defense Council, August 22, 1994, Revised April 13, 1995, available from www.nrdc.org/nuclear/fissionw/fissionweapons.pdf.

22. *IAEA Safeguards Glossary*, sec. 3, para. 13.

23. As Marvin Miller of the Massachusetts Institute of Technology argued in August 1990:

[Timely warning of diversion] is taken to be detection of a diversion quickly enough to take diplomatic action to prevent the fabrication and insertion of the diverted material into a first bomb that is otherwise complete. Thus, detection time must be even shorter than conversion time, in order to allow for evaluation and response.

See Marvin M. Miller, "Are IAEA Safeguards on Plutonium Bulk-Handling Facilities Effective?" See also Paul Leventhal, "Safeguards Shortcomings: A Critique," Washington, DC: Nuclear Control Institute, September 12, 1994, available from www.nci.org/p/plsgrds.htm; and Thomas B. Cochran, "Adequacy of IAEA's Safeguards for Achieving Timely Detection," pp. 5-12.

24. *IAEA Safeguards Glossary*, sec. 3, para. 13, table I.

25. *Ibid.*, sec. 3, para. 20.

26. See D. E. Ferguson, "Simple, Quick Processing Plant," Memorandum to F. L. Culler, Oak Ridge National Laboratory, August 30, 1977. See also J. A. Hassberger, "Light-Water Reactor Fueling Handling and Spent Fuel Characteristics," Fission Energy and Systems Safety Program, Lawrence Livermore National Laboratory, circa February 26, 1999.

27. As Gilinsky, Miller and Hubbard argued:

Having a gas centrifuge plants producing LEU makes it much easier to construct and operate a clandestine one. The presence of the larger plant would mask many of the intelligence indicators and environmental indications of a clandestine one so it would harder to find.

But even in the absence of any commercial enrichment — in the case of a country with one or more stand alone LWRs — the presence of LWRs means that a substantial supply of fresh LWR fuel would also be present at times. That such fresh fuel can provide a source of uranium for clandestine enrichment is another possibility that has received essentially no attention in proliferation writings. Since the fuel is already low enriched uranium, a much smaller gas centrifuge plant would suffice to raise the enrichment to bomb levels than would be the case if the starting point is natural uranium. By starting with such LEU fuel pellets, which are uranium oxide, UO₂, the enricher would be able to skip the first five processes required to go from uranium ore to uranium hexafluoride gas, the material on which the gas centrifuge operate. To go from the uranium oxide pellets to uranium hexafluoride the would-be bomb-maker would crush the pellets and react the powder with fluorine gas. Suitably processed, the LEU pellets could provide feed for clandestine enrichment.

See Gilinsky *et al.*, *A Fresh Examination of the Proliferation Dangers of Light Water Reactors*, Washington, DC: Nonproliferation Policy Education Center, October 22, 2004, p. 14, available from www.npec-web.org/Frameset.asp?PageType=Single&PDFFile=20041022-GilinskyEtAl-LWR&PDFFolder=Essays.

28. *Ibid.*

29. IAEA *Safeguards Glossary*, sec. 3, para. 22.

30. The IAEA *Safeguards Glossary* more technically defines a “material balance period” as:

Under an INFCIRC/153-type safeguards agreement, the term is used to refer to the time between two consecutive physical inventory takings (PITs) as reflected in the State's material balance report. Under an INFCIRC/66-type safeguards agreement, the term is used to refer to what more accurately should be called the book balance period, since the beginning and the ending dates of the period are not necessarily linked to PITs.

See *ibid.*, sec. 6, para. 47.

31. *Ibid.*, sec. 3, para. 10.

32. *Ibid.*, sec. 3, para. 24, emphasis added.

33. *Ibid.*, sec. 3, para. 23, emphasis added.

34. *Ibid.*, sec. 5, para. 28.

35. *Ibid.*, sec. 3, para. 17.

36. As Marvin M. Miller explained in 1990:

A relevant example is the planned 800 tonne/yr Rokkasho reprocessing facility at Aomori in Japan. Assuming that: (1) the plant processes spent fuel with an average total plutonium content of 0.9%, (2) the error in measuring the MUF [material unaccounted for], specified by (MUF), is dominated by the error in measuring the plutonium input, and is equal to 1% of this input, and, (3) the material balance calculation is done once a year, then the absolute value of (MUF) = 72 kg of Pu/yr. It is straightforward to show that the minimum amount of diverted plutonium which could be distinguished from this measurement "noise" with detection and false alarm probabilities of 95% and 5%, respectively, is 3.3 (MUF, or 246 kg in this example, equivalent to more than 30 significant quantities.

See Miller, "Are IAEA Safeguards on Plutonium Bulk-Handling Facilities Effective?"

37. Paul Leventhal, "Safeguards Shortcomings: A Critique."

38. Pierre Goldschmidt, "The Nuclear Non-proliferation Regime: Avoiding the Void," Washington, DC: Nonproliferation Policy Education Center, February 28, 2006, p. 3, available from www.npec-web.org/Frameset.asp?PageType=Single&PDFFile=Paper060221%20Goldschmidt%20-%20The%20Nuclear%20Non-proliferation%20Regime%20-%20Avoiding%20the%20Void&PDFFolder=Essays.

39. Edwin S. Lyman, "Can Nuclear Fuel Production in Iran and Elsewhere Be Safeguarded Against Diversion?" an essay presented at "After Iran: Safeguarding Peaceful Nuclear Energy," London, UK, October 2005, p. 7, available from www.npec-web.org/Frameset.asp?PageType=Single&PDFFile=Paper050928LymanFuelSafeguardDiv&PDFFolder=Essays.

40. *Ibid.*, p. 15.

41. For background on the issue of IAEA resources, see Thomas Shea, "Financing IAEA Verification of the NPT," a paper presented to "Assessing the IAEA's Ability to Verify the NPT," Paris, France, November 12-13, 2006, available from www.npec-web.org/Essays/20061113-Shea-FinancingIAEAVerification.pdf.

42. Table 3 is adapted from Henry D. Sokolski, "Clarifying and Enforcing the Nuclear Rules," prepared testimony before "Weapons of Mass Destruction: Current Nuclear Proliferation Challenges," a hearing before the Committee on Government Reform's Subcommittee on National Security, Emerging Threats, and International Relations, U.S. House of Representatives, September 6, 2006 p. 3, note 2, available from www.npec-web.org/Frameset.asp?PageType=Single&PDFFile=20060921-FINAL-Sokolski-TestimonyHouseSubcommittee&PDFFolder=Testimonies.

43. ElBaradei, "Addressing Verification Challenges."

44. Fred C. Iklé, *How Nations Negotiate*, New York Praeger, 1964, p. 15.

45. *Ibid.*

46. Vienna Convention on the Law of Treaties, May 23, 1969, entered into force on January 27, 1980, 1155 UNT.S. 331 (hereafter VCLT). Although the U.S. Government is not a party to the VCLT, the *Restatement (Third) of Foreign Relations Law of the United States* notes that the VCLT “represents generally accepted principles and the United States has also appeared willing to accept them despite differences of nuance and emphasis.” See *Restatement (Third) of Foreign Relations Law of the United States*, Washington, DC: American Law Institute, 1987, Part III, Ch. 3, Sec. 325, Comment a.

47. *Ibid.*, Art. 31, para. 1.

48. *Ibid.*, Art. 32.

49. There are a number of histories of the negotiations that led eventually to the NPT. For examples of unclassified histories, see U.S. Arms Control and Disarmament Agency, *International Negotiations on the Treaty on the Nonproliferation of Nuclear Weapons*, Publication No. 48, Washington, DC: U.S. Government Printing Office, January 1969; Mohamed Ibrahim Shaker, *The Treaty on the Non-Proliferation of Nuclear Weapons: A Study Based on the Five Principles of UN General Assembly Resolution 2028, XX*, Doctoral Dissertation, Geneva, Switzerland: University of Geneva, Department of Political Science, 1976; Arthur Steiner, “Article IV and the ‘Straightforward Bargain’,” PAN Heuristics Paper 78-832-08, in Wohlstetter, *et al.*, *Towards a New Consensus on Nuclear Technology*, Vol. II, Supporting Papers, ACDA Report No. PH-78-04-832-33, Marina del Rey, CA: Pan Heuristics, 1979, pp. 1-8; Eldon V. C. Greenberg, “NPT and Plutonium: Application of NPT Prohibitions to ‘Civilian’ Nuclear Equipment, Technology, and Materials Associated with Reprocessing and Plutonium Use,” Washington, DC: Nuclear Control Institute, 1984, Revised May 1993; Henry D. Sokolski, *Best of Intentions: America’s Campaign Against Strategic Weapons*, Westport, CT: Praeger, 2001; and Paul Lettow, “Fatal Flaw? The NPT and the Problem of Enrichment and Reprocessing,” unpublished essay, April 27, 2005. In addition, a number of declassified histories of the NPT negotiations, which were written from the institutional viewpoints of various U.S. Government agencies, are now available. For example, see U.S. Arms Control and Disarmament Agency, *The U.S. Arms Control and Disarmament Agency during the Johnson Administration*, Volume

I: "Summary and Analysis of Principal Developments," undated, circa 1969, CONFIDENTIAL, Declassified on August 21, 1992, DDRS No. CK3100005560; ACDA, *The U.S. Arms Control and Disarmament Agency during the Johnson Administration*, Volume II: "Policy and Negotiations," Part B: "Non-Proliferation of Nuclear Weapons," January 2, 1969, SECRET/NOFORN, Declassified on March 22, 1999, DDRS No. CK3100152990; and U.S. Atomic Energy Commission, *The Atomic Energy Commission during the Administration of Lyndon B. Johnson, November 1963-January 1969*, Volume I: "Administrative History," Part II, undated, circa 1969, SECRET, Declassified May 10, 1994, DDRS No. CK3100062802, esp. Chapter 9, "Negotiation of the Nonproliferation Treaty."

50. The Eighteen Nation Disarmament Committee (ENDC) grew out of the so-called Ten Nation Committee on Disarmament (TNCD). The TNCD was formed in late 1959 through an agreement among the United States, USSR, Britain, and France. It consisted of five nations from the West: the United States, Britain, France, Canada, and Italy; and five nations from the Soviet bloc: the USSR, Bulgaria, Czechoslovakia, Poland, and Romania. See "Four-Power Communiqué on Disarmament Negotiations," September 7, 1959, in U.S. Department of State, Bureau of Public Affairs, Historical Office, *Documents on Disarmament, 1945-1959*, Vol. 2 of 2, 1957-1959, Publication No. 7008, Washington, DC: U.S. Government Printing Office, August 1960, pp. 1441-1442. In late 1960, after negotiations in the TNCD had stalled, the USSR proposed adding five states—namely, Ghana, India, Indonesia, Mexico, and the United Arab Republic—to the TNCD. The United States, however, did not endorse the proposal, and instead criticized the USSR for walking out of TNCD negotiations earlier in the year. See "Soviet Draft Resolution Submitted to the General Assembly: Enlargement of the Ten Nation Committee on Disarmament," September 26, 1960, in U.S. Department of State, Bureau of Public Affairs, Historical Office, *Documents on Disarmament, 1960*, Publication No. 7172, Washington, DC: U.S. Government Printing Office, July 1961, pp. 250-251, and p. 250, note 1. In mid-1961, though, the United States proposed to the USSR that the TNCD be expanded to include 20 members. See "United States Memorandum Submitted During the Bilateral Talks with the Soviet Union: Composition of the Disarmament Forum," July 29, 1961, in U.S. Arms Control and Disarmament Agency, *Documents on Disarmament, 1961*, Publication No. 5, Washington, DC: U.S.

Government Printing Office, August 1962, pp. 271-273. The Soviet Union initially rejected this proposal, however. See "Statement by the Soviet Government on the Bilateral Talks," September 22, 1961, *ibid.*, pp. 444-458. In mid-to-late 1961, the United States nevertheless pushed this proposal in the UN General Assembly. See "Statement by the United States Representative (Stevenson) to the First Committee of the General Assembly," November 15, 1961, in *ibid.*, pp. 616-631.

51. By late 1961, the United States and USSR were able to agree to an expanded Eighteen Nation Disarmament Committee, which would include the original 10 members of the Ten Nation Committee on Disarmament, plus eight nonaligned members—namely, Brazil, Burma, Ethiopia, India, Mexico, Nigeria, Sweden, and the United Arab Republic. The UN General Assembly endorsed the proposed ENDC with a resolution. See "General Assembly Resolution 1722 (XVI): Question of Disarmament," December 20, 1961, available from www.un.org/documents/ga/res/16/ares16.htm.

52. UN General Assembly Resolution 1722 (XVI) endorsed the formation of ENDC, and recommended that it resume negotiations on an agreement for "general and complete disarmament under effective international control." See "General Assembly Resolution 1722 (XVI): Question of Disarmament," December 20, 1961, in *ibid.*

53. At the opening of the ENDC's eighth session, the United States called for delegations to focus instead on concluding a nuclear nonproliferation treaty consistent with UN General Assembly Resolution 1665 (XVI) also known as "the Irish Resolution." See "Statement by ACDA Director Foster to the Eighteen Nation Disarmament Committee," ENDC/PV. 218, July 27, 1965, in U.S. Arms Control and Disarmament Agency, *Documents on Disarmament, 1965*, Publication No. 34, Washington, DC: U.S. Government Printing Office, December 1966, pp. 281-286. For the Irish Resolution's text, see "General Assembly Resolution 1665 (XVI): Prevention of the Wider Dissemination of Nuclear Weapons," December 4, 1961, available from www.un.org/documents/ga/res/16/ares16.htm. For background on how, in the aftermath of Communist China's 1964 nuclear detonation, the U.S. Government came to view the conclusion of a nuclear

nonproliferation treaty as an urgent priority, see "Report by the Committee on Nuclear Proliferation" (Gilpatric Committee), January 21, 1965, in U.S. Department of State, *Foreign Relations of the United States*, Vol. 11, No. 64, Washington, DC: U.S. Government Printing Office, 1997, available from www.state.gov/www/about_state/history/vol_xi/g.html. For a more recent historical account of the Gilpatric Committee's role in changing the Johnson Administration's nonproliferation policy, see Frank J. Gavin, "Blasts from the Past: Proliferation Lessons from the 1960s," *International Security*, Vol. 29, No. 3, Winter 2004/05, pp. 112-113.

54. *Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean*, February 14, 1967, entered into force April 22, 1968, 634 UNT.S. 326, Art. 17. (Hereafter Treaty of Tlatelolco.)

55. "From U.S. Embassy, Mexico, Telegram No. 2419," U.S. Department of State, February 13, 1967, CONFIDENTIAL, Declassified on January 3, 1980, DDRS Document No. CK3100432606.

56. "Redraft of Possible Non-Proliferation Treaty Formations," U.S. Department of State, April 17, 1967, SECRET, Declassified on April 14, 1999, DDRS Document No. CK3100472688.

57. U.S. Arms Control and Disarmament Agency, *The U.S. Arms Control and Disarmament Agency during the Johnson Administration*, Volume I: "Summary and Analysis of Principal Developments," undated, circa 1969, CONFIDENTIAL, Declassified on August 21, 1992, DDRS No. CK3100005560, p. 56.

58. "Draft Treaty on the Nonproliferation of Nuclear Weapons," ENDC/192 (U.S. submission) and ENDC/193 (USSR submission), August 24, 1967, in *U.S. Arms Control and Disarmament Agency, Documents on Disarmament, 1967*, Publication No. 46, Washington, DC: U.S. Government Printing Office, July 1968, pp. 394-395.

59. Mexico's working paper proposed the following formulation for Article IV:

1. Nothing in this Treaty shall be interpreted as affecting the inalienable right of all the Parties to the Treaty to develop research, production, and use of nuclear energy

for peaceful purposes without discrimination and in conformity with Articles I and II of this Treaty.

2. All the Parties to this Treaty have the right to participate in the fullest possible exchange of scientific and technological information on the peaceful uses of nuclear energy. Those Parties that are in a position to do so, have *the duty* to contribute, according to their ability, alone or in cooperation with other States or international organizations, to the further development of the production, industries, and other applications of nuclear energy for peaceful purposes, especially in the territories of non-nuclear-weapon States (emphasis added).

See "Mexican Working Paper Submitted to the Eighteen Nation Disarmament Committee: Suggested Additions to Draft Nonproliferation Treaty," ENDC/196, September 19, 1967, in U.S. Arms Control and Disarmament Agency, *Documents on Disarmament, 1967*, Publication No. 46, Washington, DC: U.S. Government Printing Office, July 1968, pp. 394-395. Mexico's working paper was cited by Eldon V. C. Greenberg, "The NPT and Plutonium: Applications of NPT Prohibitions to 'Civilian' Nuclear Equipment, Technology, and Materials Associated with Reprocessing and Plutonium Use," Washington, DC: Nuclear Control Institute, 1984, Revised May 1993, p. 16 and note 63, available from www.nci.org/03NCI/12/NPTandPlutonium.pdf.

60. Romania's working paper proposed the inclusion of the following language in the treaty's preamble: "Affirming *the absolute right* of all States, whether they possess nuclear weapons or not, to undertake research on the peaceful applications of nuclear energy and to use nuclear energy for peaceful purposes, both now and in the future, on the basis of equality and without any discrimination" (emphasis added). See "Romanian Working Paper Submitted to the Eighteen Nation Disarmament Committee: Amendments and Additions to the Draft Nonproliferation Treaty," ENDC/199, October 19, 1967, in U.S. Arms Control and Disarmament Agency, *Documents on Disarmament, 1967*, pp. 525-526.

61. Brazil's proposed amendments suggested that Article IV contain the following language:

Nothing in this Treaty shall be interpreted as affecting the inalienable right of all the Parties to the Treaty to develop, alone or in cooperation with other States, research, production, and use of nuclear energy for peaceful purposes, *including nuclear explosive devices for civil uses*, without discrimination, as well as the right of the Parties to participate in the fullest possible exchange of information for, and to contribute or in cooperation with other States to, the further development of the applications of nuclear energy for peaceful purposes (emphasis added).

See "Brazilian Amendments to the Draft Nonproliferation Treaty," ENDC/201, October 31, 1967, in *ibid.*, p. 546.

62. In early November 1967, the Nigerian delegation proposed the following amendments to Article IV:

ARTICLE IV A:

Each Party to the Treaty undertakes to cooperate directly or through the IAEA, in good faith and according to its technological and/or material resources, with any other State or group of States Party to this Treaty in the development and advancement of nuclear technology for peaceful purposes, and in the fullest possible exchange of scientific and technological information on the peaceful uses of nuclear energy.

The nuclear weapon States Party to this Treaty shall make available through the IAEA, to all non-nuclear weapon Parties, full scientific and technological information on the peaceful applications of nuclear energy accruing from research on nuclear explosive devices.

The nuclear weapon States Party to the Treaty shall also provide facilities for scientists from non-nuclear weapon countries Party to the Treaty to collaborate with their scientists working on nuclear explosive devices, in order to narrow the intellectual gap which will be created in that field as a result of restrictions imposed by this Treaty on non-nuclear weapon States.

ARTICLE IV B:

Each Party to the Treaty undertakes to communicate annually to the IAEA, full information on the nature, extent and results of its cooperation with any other Party or group of Parties, in the development of nuclear energy for peaceful purposes. The Reports so received by the IAEA shall be circulated by the Agency to all the Parties to the Treaty.

ARTICLE IV C:

Each Party to this Treaty shall take necessary legal and administrative steps to ensure that all organisations working on the development of nuclear energy in territory under its jurisdiction do so conformity with the aims and provisions of the Treaty.

See "Nigerian Working Paper Submitted to the Eighteen Nation Disarmament Committee: Additions and Amendments to the Draft Nonproliferation Treaty," ENDC/202, November 2, 1967, in *ibid.*, p. 558.

63. "Spanish Memorandum to the Co-Chairman of the ENDC," ENDC/210, February 8, 1968, in U.S. Arms Control and Disarmament Agency, *Documents on Disarmament, 1968*, Publication No. 52, Washington, DC: U.S. Government Printing Office, September 1969, p. 40. Spain's memorandum was cited by Greenberg, "The NPT and Plutonium," p. 16 and note 64.

64. Brazil proposed that Article IV be revised to read:

Nothing in this Treaty shall be interpreted as affecting the inalienable right of all the Parties to the Treaty to develop, along or in cooperation with other States, research, production and use of nuclear energy for peaceful purposes, *including nuclear explosive devices for civil uses*, without discrimination (emphasis added).

See "Brazilian Amendments to the Draft Treaty on Nonproliferation of Nuclear Weapons," ENDC/201/Rev. 2, February 13, 1968,

in U.S. Arms Control and Disarmament Agency, *Documents on Disarmament, 1968*, p. 64.

65. Italian Working Paper Submitted to the Eighteen Nation Disarmament Committee: Additions and Amendments to Articles IV, VIII, and X of the Draft Nonproliferation Treaty, ENDC/218, February 20, 1968, Corr. 2, February 22, 1968, in *ibid.*, p. 92.

66. Moreover, though the NPT views “nuclear energy for peaceful purposes” through the prism of “inalienable rights,” it is worth noting that an “inalienable right” is not an undeniable right. For example, though the *Declaration of Independence* affirms “life, liberty, and the pursuit of happiness” as inalienable rights of man, this affirmation does not imply that the U.S. Government cannot fine, imprison, or even execute an individual if s/he violates certain laws.

67. NPT, Art. III, para. 1.

68. *Ibid.*, Art. III, para. 2.

69. *Ibid.*, Art. III, para. 3.

70. *Ibid.*, Art. IV, para. 1.

71. *Ibid.*, Art. III, para. 1, .

72. The NPT’s negotiation history confirms that the “benefits-without-discrimination” principle is meant to be understood in relation to Article IV. In August 1967, when American delegate William Foster, along with Soviet delegate Alexey Roshchin introduced the first version of what we know today as Article IV, he said that the article’s two paragraphs “are *specific elaborations of the principle stated in the preamble* ‘that the benefits of peaceful applications of nuclear technology should be available for peaceful purposes to all Parties . . . whether nuclear-weapon or non-nuclear-weapon States’.” See “Statement by ACDA Director [William] Foster to the Eighteen Nation Disarmament Committee: Draft Nonproliferation Treaty,” ENDC/PV. 325, August 24, 1967, in U.S. Arms Control and Disarmament Agency, *Documents on Disarmament, 1967*, p. 345, emphasis added.

73. NPT, preamble, para. 7.

74. *Ibid.*, Art. I.

75. *Ibid.*, Art. II.

76. Albert Wohlstetter and colleagues stressed this point in studies conducted for a number of U.S. Government agencies in the 1970s. In a 1979 report for ACDA, for example, they argued, "Article IV explicitly states that the inalienable right of all parties to the Treaty to the peaceful use of nuclear energy has to be in conformity with Articles I and II . . . [T]hese Articles are what make the Treaty a treaty against proliferation." See Wohlstetter *et al.*, *Towards a New Consensus on Nuclear Technology*, 1979, pp. 34-35. A few years later, Eldon V. C. Greenberg reiterated this point in a legal memorandum on the NPT's relation to plutonium fuel-making and use:

There is, in short, a dynamic tension in the Treaty between its prohibitions and its injunctions to cooperate in peaceful uses of nuclear energy. An analysis of the language and history of the NPT, and particularly the key phrase "in conformity with [articles I and II]" in Article IV, paragraph 1, which is the link between the Treaty's promises and its prohibitions, tends to support the conclusion that Articles I, II and IV must be read together in such a way that assistance or activities which are ostensibly peaceful and civilian in nature do not as a practical matter lead to proliferation of nuclear weapons. The NPT, in other words, can and should be read as permitting the evaluation of such factors as proliferation risk, economic or technical justification, and safeguards effectiveness in assessing the consistency of specific or generic types of assistance and activities with the Treaty's restrictions, to ensure that action is not taken in the guise of peaceful applications of nuclear energy under Article IV which in fact is violative of the prohibitions of Articles I and II.

See "The NPT and Plutonium," p. 10.

77. NPT, Art. III, para. 1.

78. It is of interest to note that both the 2000 NPT Review Conference and 2006 summit of the Non-Aligned Movement released a politically-binding final documents affirming that “nothing in the Treaty shall be interpreted as affecting the inalienable right of all the parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes without discrimination and in conformity with articles I, II and III of the Treaty.” See 2000 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, *Final Document*, NPT/CONF.2000/28, Parts I and II, p. 8, para. 2, available from disarmament2.un.org/wmd/npt/finaldoc.html; and Fourteenth Summit Conference of the Heads of State or Government of the Non-Aligned Movement, *Final Document*, NAM 2006/Doc.1/Rev.3, September, 16, 2006, para. 95. I am grateful to Andreas Persbo, a nuclear law and policy researcher at the Verification Research, Training and Information Centre (VERTIC) in London, who first drew my attention to this passage of the 2000 NPT Review Conference’s *Final Document*.

79. Henry D. Sokolski and George Perkovich, “It’s Called Nonproliferation,” *Wall Street Journal*, Apr il 29, 2005, p. A16, available from www.npec-web.org/Frameset.asp?PageType=Single&PDFFile=OpEd50429ItsCalledNonprolife&PDFFolder=OpEds; and Perkovich, “Defining Iran’s Nuclear Rights,” Washington, DC: Carnegie Endowment for International Peace, September 7, 2006, available from www.carnegieendowment.org/npp/publications/index.cfm?fa=view&id=18687.

80. NPT, Art. V.

81. Exceptions included Brazil, the government of which had argued before the ENDC that non-nuclear-weapon states should be allowed to develop peaceful nuclear explosive devices. For example, see “Brazilian Amendments to the Draft Nonproliferation Treaty,” ENDC/201, October 31, 1967, U.S. Arms Control and Disarmament Agency, *Documents on Disarmament*, 1967, Publication No. 46, Washington, DC: U.S. Government Printing Office, July 1968, p. 546.

82. ENDC/PV. 359, January 25, 1968, p. 6, available from www.hti.umich.edu/e/encd/.

83. ENDC/PV. 360, January 30, 1968, p. 7, available from www.hti.umich.edu/e/encd/.

84. On the comparative economics and proliferation dangers of PNEs, see Thomas Blau, *Rational Policy-Making and Peaceful Nuclear Explosives*, Doctoral Dissertation, Chicago, IL: University of Chicago, Department of Political Science, December 1972.

85. *Report of Main Committee III, Treaty on the Nonproliferation of Nuclear Weapons Review and Extension Conference*, May 5, 1995, NPT/CONF.1995/MC.III/1, sec. I, para. 2, available from www.un.org/Depts/ddar/nptconf/162.htm.

86. *Comprehensive Nuclear-Test-Ban Treaty*, September 10, 1996, 35 I.L.M. 1430.

87. Here I use what I view to be Article IV's three qualifications on the "nuclear energy for peaceful purposes" to which NPT signatories have an "inalienable right" to elaborate Eldon V. C. Greenberg's argument for the specific facts and circumstances under which peaceful nuclear energy should not be permissible:

If the [proliferation] risks are great, if there can be no reasonable civilian justification for particular forms of assistance or activities, and if there can be no certainty that safeguards would be effective with respect to such assistance or activities, then a presumption should arise under the Treaty that such assistance or activities are not for permissible, peaceful purpose but are rather for a weapons or explosive purpose and therefore in violation of Articles I and II. Only in this way can there be any assurance that the NPT's objectives will be achieved.

See Greenberg, "The NPT and Plutonium," p. 13.

88. Eldon V. C. Greenberg's legal memorandum on the NPT and plutonium fuel making argues:

[T]he distinction between permissible and impermissible activities must come down ultimately to quite pragmatic considerations. Activities must not be free from the

Treaty's prohibitions just by virtue of being denominated "peaceful," civilian," power" or "research." The Treaty must be interpreted as viewing proliferation through something more than an "explosive lens." Rather, depending upon the facts and circumstances, assistance and activities relating to declared "peaceful," civilian," "power" or "research" purposes may be subject to the NPT's restrictions, if an evaluation of all the facts and circumstances, including such factors as economic or technical justification or effectiveness of safeguards, would indicate that the legitimacy of the assistance and/or activity is questionable. Such a pragmatic, rather than a formalistic reading of the Treaty, is most consistent with the overriding purpose of stemming the proliferation of nuclear weapons.

See Greenberg, "The NPT and Plutonium," p. 24.

89. ENDC/PV. 82, September 7, 1962, p. 37, available from www.hti.umich.edu/e/endc/. See also "British Paper Submitted to the Eighteen Nation Disarmament Committee: Technical Possibility of International Control of Fissile Material Production," ENDC/60, August 31, 1962, Corr. 1, November 27, 1962, in U.S. Arms Control and Disarmament Agency, *Documents on Disarmament, 1962*, Publication No. 19, Vol. 2 of 2, Washington, DC: U.S. Government Printing Office, November 1963, pp. 834-852.

90. "Statement by the Swedish Representative [Alva Myrdal] to the Eighteen Nation Disarmament Committee: Nonproliferation of Nuclear Weapons," ENDC/PV. 243, February 24, 1966, in U.S. Arms Control and Disarmament Agency, *Documents on Disarmament, 1966*, Publication No. 43, Washington, DC: U.S. Government Printing Office, September 1967, p. 56.

91. ENDC/PV. 250, March 22, 1966, p. 28, available from www.hti.umich.edu/e/endc/.

92. NPT, Art. IV, para. 2.

93. As strategist Albert Wohlstetter and colleagues argued in a 1979 report for the U.S. Arms Control and Disarmament Agency:

If the “fullest possible exchange” were taken to include the provision of stocks of highly concentrated fissile material within days or hours of being ready for incorporation into an explosive, this would certainly “assist” an aspiring nonnuclear weapons state in making such an explosive. No reasonable interpretation of the Nonproliferation Treaty would say that the Treaty intends, in exchange for an explicitly revocable promise by countries without nuclear explosives not to make them or acquire them, to transfer to them material that is within days or hours of being ready for incorporation into a bomb The NPT is, after all, a treaty against proliferation, not for nuclear development.

See Wohlstetter *et al.*, *Towards a New Consensus on Nuclear Technology*, 1979, pp. 34-35.

94. Christopher Ford, “NPT Article IV: Peaceful Uses of Nuclear Energy,” Statement of the Principal Deputy Assistant Secretary of State for Verification, Compliance and Implementation, to the 2005 Review Conference of the Treaty on the Nonproliferation of Nuclear Weapons, New York, May 18, 2005, available from www.state.gov/t/oci/rls/rm/46604.htm.

95. *Ibid.*

96. According to Henry D. Sokolski,

[The Principal Deputy Assistant Secretary of State for Verification, Compliance and Implementation] had attempted, to my knowledge, to get more cleared than what he was able to say [at the 2005 NPT Review Conference]. What he was able to say and what was cleared was that the United States at least is under no duty or obligation under Article IV to supply enrichment and reprocessing technologies to anyone. I think what he wanted to say might have included that countries really don’t have a per se right to acquire this from others or to develop it even indigenously, but that was not approved.

See “Statement of Henry D. Sokolski,” in “Assessing ‘Rights’

Under the Nuclear Nonproliferation Treaty," a hearing before the Subcommittee on International Terrorism and Nonproliferation, Committee on International Relations, U.S. House of Representatives, 109th Congress, Second Session, Serial No. 109-148, March 2, 2006, Washington, DC: U.S. Government Printing Office, 2006, p. 28, available from www.foreignaffairs.house.gov/archives/109/26333.pdf.

97. See "Statement by the Office of the Director of National Intelligence on the North Korea Nuclear Test," Office of the Director of National Intelligence (ODNI) News Release No. 19-06, October 16, 2006.

98. North Korea acceded to the NPT on December 12, 1985, but officially withdrew from the treaty and terminated its IAEA safeguards agreement on January 11, 2002. See United Nations News Center, "Security Council Notified of DPR of Korea's Withdrawal from Nuclear Arms Accord," January 10, 2003; and IAEA, *Report of the Director General on the Implementation of the Resolution Adopted by the Board on 6 January 2003 and of the Agreement Between the IAEA and the Democratic People's Republic of Korea for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons*, GOV/2003/4, January 22, 2003.

99. In February 1992, for example, the IAEA Board of Governors affirmed that the Agency's comprehensive safeguards agreements apply not only to declared nuclear material, but also to undeclared nuclear material that falls under the safeguards agreements and therefore should have been declared. See IAEA, *The Safeguards System of the International Atomic Energy Agency*, sec. B, para. 13, available from www.iaea.org/OurWork/SV/Safeguards/safeg_system.pdf. In May 1997, moreover, the IAEA Board approved the so-called *Additional Protocol*, a voluntary agreement which provides the Agency greater authority to inspect both the nuclear materials and the nuclear activities and technologies of states that have signed and ratified it. See IAEA, *Model Protocol Additional to the Agreement(s) Between State(s) and the International Atomic Energy Agency for the Application of Safeguards*, INFCIRC/540, Corrected, September 1997.

100. See Nikolai Khlebnikov, David Parlse, and Julian Whichello, "Novel Technologies for the Detection of Undeclared Nuclear Activities," IAEA-CN-148/32, released by NPEC in March 2007, available from www.npec-web.org/Essays/20070301-IAEA-NovelTechnologiesProject.pdf. Co-author Dr. Whichello serves as Head of the IAEA's Novel Technologies Unit of the Division of Technical Support's Section for Technical Support Coordination.

101. Henry D. Sokolski made this point when he testified before the House Subcommittee on National Security, Emerging Threats, and International Relations:

The IAEA may be able to monitor nuclear fuel-making in rough terms, but it cannot inspect these facilities to provide timely warning of diversions or thefts equivalent to many nuclear weapons. It should admit this publicly. This would help put a spotlight on the dangers associated with additional governments trying to create even more nuclear fuel-making plants than already exist.

See Sokolski, "Clarifying and Enforcing the Nuclear Rules." Eldon V. C. Greenberg made a comparable point in 1993, when he wrote: "The NPT negotiators contemplated that safeguards had more than a merely formal role to play. If that role cannot be effectively fulfilled with respect to particular assistance or activities, then perhaps, in the presence of other factors, i.e., risk, lack of economic viability, such forms of assistance or activities should fall within the Treaty's prohibitions." See Greenberg, "The NPT and Plutonium," p. 19.

102. In November 2006, the IAEA decided to deny Iran (a government that is still in non-compliance not only with its NPT and IAEA safeguards obligations, but also several UN Security Council resolutions) technical cooperation at the latter's heavy-water reactor at Arak. This decision is a welcome development in the direction of increased candor from the Agency. For further background, see IAEA, *Cooperation Between the Islamic Republic of Iran and the Agency in the Light of United Nations Security Council Resolution 1737, 2006*, Report by the Director General, GOV/2007/7, February 9, 2007, available from www.iaea.org/Publications/Documents/Board/2007/gov2005-7.pdf.

103. French Republic, *Strengthening the Nuclear Non-Proliferation Regime*, Working Paper Submitted to the Preparatory Committee for the 2005 Review Conference of the Parties of the Treaty on the Non-Proliferation of Nuclear Weapons, NPT/CONF.2005/PC.III/WP.22, May 4, 2004, p. 2, available from disarmament2.un.org/wmd/npt/2005/PC3-listofdocs.html.

104. Christopher Ford, "The NPT Review Process and the Future of the Nuclear Nonproliferation Regime," Remarks by the U.S. Special Representative for Nuclear Nonproliferation to the NPT-Japan Seminar, "NPT on Trial: How Should We Respond to the Challenges of Maintaining and Strengthening the Treaty Regime?" Vienna, Austria, February 6, 2007, available from www.state.gov/t/isn/rls/rm/80156.htm.