
PART III

GLOBAL PROBLEMS
AND GLOBAL SOLUTIONS

Climate Change and Nuclear Power

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RECOMMENDATIONS OF THE WMD COMMISSION

It is widely expected that global reliance on nuclear power will increase in the next decades, as the price of fossil oil and gas goes up and the greenhouse gas-free nuclear energy becomes more attractive. If so, there will be a greater demand for uranium fuel, possibly leading to the construction of more enrichment plants. As reprocessing of spent fuel will allow a drastically better use of the energy content of the original uranium fuel, there may also be a demand for more reprocessing plants. The concern is that an increase in the number of enrichment and reprocessing plants and an increased flow of fissile material may increase the risk of misuse and diversion. (*Weapons of Terror*, 74)

[A]ll countries possessing an enrichment or reprocessing capability are technically able—just like the states that have nuclear weapons—to make nuclear material that can be used in weapons. (*Weapons of Terror*, 76)

It is often said these days that the most dire collective security threat facing the world, aside from nuclear annihilation, is the catastrophic effects of climate change. In recent decades the scientific community has compiled an alarming and incontrovertible collection of data describing the human causes of climate change and its dire consequences for human and other life. Recognized as a looming global security catastrophe, governments and civil society have struggled to find the means to mitigate the causes of climate change. These concerns have sparked renewed interest in nuclear power as a non-carbon dioxide (CO₂) emitting energy alternative. Scenarios anticipating the widespread growth of nuclear energy raise a number of serious concerns, most notably the threat of nuclear weapons proliferation due to the spread of nuclear fuel-cycle technologies. Ignoring the inextricable link between nuclear weapons and nuclear power, the WMD Commission does not offer a coherent and comprehensive set of recommendations taking into account the enormous risks and realities associated with the spread of nuclear technology. Like climate change, the problems of nuclear power are global in nature and thus require a global response which will only be sustainable if based on the principles of the rule of law and non-discrimination.

The Effects of Climate Change

Due to human activities, the concentration of greenhouse gases in the atmosphere rose dramatically in the years between 1750, pre-industrial revolution, and 2000. The atmospheric concentration of CO₂ rose from a constant of 280 parts per million (ppm), in the period between 1000 and 1750, to 368 ppm in 2000.¹ By the end of this century the Intergovernmental Panel on Climate Change (IPCC) projects that the concentration of atmospheric CO₂ will increase to between 540 and 970 ppm, with the variance depending largely on demographic, social, economic, and technological factors. The projected increases in the global concentration of greenhouse gases will have a variety of consequences for global and regional climate, the environment and ecosystems, human security, and socio-economic development.

The 1990s were the hottest decade on record and, based on indirect environmental sampling, likely the hottest decade in the past 1,000 years.² And the pace of the warming trend is accelerating. Between 1990 and 2100 average surface temperature is anticipated to rise globally between 2.4 and 6.4°C, if fossil fuels remain a predominant source of energy.³ This projected warming, popularized by the infamous “hockey-stick” graph, is between two and ten times larger than the increase experienced over the 20th Century and, moreover, “is very likely to be without precedent during at least the last 10,000 years.”⁴

These alarming data have led the IPCC to conclude that “overall, climate change is projected to increase threats to human health, particularly in lower income populations, predominantly within tropical/subtropical countries.”⁵ The threats include loss of life due to direct causes such as increased extreme heat conditions, more frequent and intense floods and storms, and indirect causes like increases in water-borne pathogens and decreases in water and air quality. While crop yields may increase in some temperate areas, in most tropical and sub-tropical regions they are expected to decrease. Populations inhabiting small islands and low-lying coastal areas are at risk from the rise in sea level, expected to increase on average between 0.009 to 0.88 meters by 2100, primarily as a result of glacier and ice cap melting.⁶ Less predictable are the social and economic effects of global warming, which are expected to adversely affect developing nations much more acutely than the industrialized societies.

This is only a select sampling of the predicted consequences facing humanity over the course of this century if immediate action is not taken globally to reduce greenhouse gas emissions. Taken as whole, some of the effects of climate change will be undeniably positive—for instance, fewer deaths expected from extreme cold. But the net effect of climate change will be resoundingly negative in regard to its impact on humans and global ecology. Furthermore, the IPCC has concluded that “the impacts of climate change will fall disproportionately upon developing countries and the poor persons within all countries, and thereby exacerbate inequities in health status and

access to adequate food, clean water, and other resources.”⁷⁷ Thus, the issue of climate also becomes one of justice, as those industrialized states that have contributed the most to the causes of climate change, and whose actions are required to mitigate these looming crises, will not be the nations to suffer the overwhelming bulk of these negative consequences.

Climate Change and Global Security

If the most dire effects of climate change are to be mitigated, and their root causes eliminated, the solution can only be achieved through a global approach. While unilateral initiatives such as mandating tighter regulations on power plant and vehicle emissions can help reduce the sources of global warming, such policies will be insufficient to achieve the drastic reductions required to avoid potentially catastrophic consequences.

In this regard, the situation of climate change shares many similarities with the problem of NBC weapons. Both issues touch to the core of state security, and in extreme cases, even have implications for the survival of states. Likewise, both issues require an urgent shift in the conception and conduct of collective security if any progress is to be made. And indeed, both issues, and the corresponding global agendas and frameworks designed to address them, have recently suffered from stalemate and setbacks, largely attributable to the conduct of one actor, the United States.

Over the past several decades there have been two notable multilateral framework conventions aimed at coordinating global responses to human-caused environmental problems. One has proven to be largely successful and a model for future cooperation; the other has stagnated. The first is the 1985 Vienna Convention for the Protection of the Ozone Layer, a framework approach which led to the adoption and entry into force of the 1987 Montreal Protocol. The second is the 1992 UN Framework Convention on Climate Change (UNFCCC) and its 1997 Kyoto Protocol, which entered into force in 2005 upon Russian ratification. However, it represents merely a first step on the path toward addressing the causes of climate change, a path which may never be taken if the United States adheres to its policy of non-participation.

In a sense, Article VI of the NPT and its mandate for negotiations leading to nuclear disarmament is another example of a framework approach, similar to the Vienna Convention and the UNFCCC. Like the UNFCCC, the disarmament framework remains imperiled due largely to the intransigence of one state party, the United States, as detailed in section 2.1. In both cases the failure of the initiative stems from the abandonment of international legal norms and instruments as a tool to solve global problems (*see sections 1.1 and 2.5*).

A study by the Institute for Energy and Environmental Research (IEER) estimates that reductions in greenhouse gas emissions “on the order of 60 to 80 percent will be required by 2050 in order to avoid the more serious potential consequences of global climate change.”⁷⁸ There are several commonly cited

options available for all states to take in order to reduce emissions, including increased reliance on renewable energy, carbon sequestration, increased energy efficiency, and nuclear power. The conventional view is that none of these solutions alone will be sufficient to achieve the necessary reductions in emissions, but it is also true that not all measures must be taken. With the promotion of nuclear power as a means of combating climate change, there is now a cross-over between the global security problems of climate change and nuclear weapons. The remainder of this section and the next examine the problems associated with nuclear power and the nuclear fuel-cycle in general, particularly as a solution to climate change.

The Troubles with the Nuclear Option

The nuclear industry, the Bush administration, and some environmental advocates are campaigning for a renaissance in nuclear power as a means to address climate change. The WMD Commission cites this future expansion of nuclear energy as a non-greenhouse gas emitting source of energy as a “concern” because of the security and proliferation risks posed by the potential spread of nuclear fuel-cycle technologies.⁹ However, the Commission fails to adequately examine the problem.

The primary flaw in the WMD Commission’s assessment of the nuclear fuel-cycle is its failure to anticipate how *and where* nuclear power might expand over the coming decades. A 2003 MIT study examined a plausible growth scenario for nuclear energy of a global expansion to 1,000 gigawatts of nuclear energy online by 2050, up from about 360 gigawatts today.¹⁰ While the study foresees considerable expansion of nuclear energy in industrialized states with significant existing nuclear infrastructures, it also anticipates large-scale expansion in the developing world. By 2050, the MIT study predicts that the total combined nuclear capacity in the developing world will expand to 325 gigawatts, nearly the same capacity as the global total today. While most of the expansion in the developing world is expected to come from nuclear weapon-possessing China, India and Pakistan, other states are also expected to develop large-scale nuclear power industries, including Brazil, Mexico and Iran. In contrast to the MIT scenario, the IEER study found that in order to reach the 60%-80% reduction in greenhouse gas emission necessary to avoid the more catastrophic effects of climate change, nuclear energy would have to expand to the implausible level of 2,500 gigawatts by 2050.¹¹

The spread of nuclear energy on either of these scales is risky and presents a great number of challenges and dangers. The foremost danger comes from the spread of nuclear fuel-cycle technology and its implications for the proliferation of nuclear weapons, discussed below and further examined in the case of Iran in section 3.2. While our report deals primarily with issues relating to nuclear weapons, there are several other dilemmas uniquely associated with nuclear energy which should not be underestimated, both in

reality and as a matter of public perception. One such problem is the possibility of contamination due to the release of radioactive materials into the environment through catastrophic reactor accidents similar to those at Three Mile Island and Chernobyl, terrorist attack, or accidents involving the transportation of nuclear materials. Another problem is the disposal of nuclear waste. The MIT study projects that under its 1,000 gigawatt growth scenario, in order to permanently store the spent nuclear fuel, “new repository storage capacity equal to the currently planned capacity of the Yucca Mountain facility would have to be created somewhere in the world roughly every three to four years.”¹²

The greatest danger from the spread of nuclear energy comes from the proliferation of technology used to make the nuclear fuel for power reactors. The vast majority of the world’s power reactors use uranium fuel enriched to about 3.5% U-235. It is not feasible to use uranium enriched to this grade as fissile material for a bomb. However, with some adjustment the very same facilities and equipment used to produce the low-enriched uranium for power reactors can produce uranium with a concentration of over 90% U-235, suitable for direct use in a nuclear weapon. Unlike plutonium-based weapons, the designs for uranium-based nuclear explosives can be so simple that even a terrorist group, by stealing or otherwise acquiring adequate high-enriched uranium, could plausibly manufacture a weapon as powerful as the Hiroshima bomb.

There are presently 14 commercial scale uranium enrichment plants in operation around the world. In the view of the WMD Commission, these plants, together with existing reprocessing facilities, can satisfy the demand arising from a “considerable expansion” of nuclear power.¹³ The enrichment plants are located in the nuclear weapon-possessing states China, France, Russia, the United Kingdom and the United States, and in non-weapon possessing states Brazil, Germany, Japan and the Netherlands. However, in order to meet the demand for enrichment services anticipated by the MIT study, the global enrichment capacity would have to be expanded by 120 to 165 percent over existing levels. This figure does not take into account the plans in France and the United States to close down their sole existing enrichment plants, representing nearly 50% of the global capacity, and to replace them with smaller, more efficient, and lower capacity plants.¹⁴ Thus, the global capacity for producing material for nuclear fuel will need to expand to meet future demand, if nuclear power expands as well.

As nuclear power spreads, the technology for producing nuclear fuel will undoubtedly spread as well, notably in the developing world where such facilities are generally lacking. Beyond interest in acquiring a weapons capability, the IAEA notes that:

States have sought such capabilities for a variety of reasons: to carry out entirely legitimate, peaceful programmes; to remove doubts about the reliability of fuel supply from foreign sources; ...to achieve the

prestige of possessing advanced, sophisticated fuel cycle facilities; to benefit from industrial, technological and scientific spin-offs; to sell enrichment or reprocessing services on the international market; and because the State considers it to be economically justifiable.¹⁵

Therefore, it can be reasonably assumed that as nuclear power continues to spread, interest in fuel-cycle facilities will continue to spread as well. With the spread of nuclear fuel-cycle technology comes the fear that such facilities might be misused and nuclear material diverted to use in weapons, or that the knowledge gained from operating such facilities might be employed in a clandestine bomb program. As these facilities spread into less stable regions of the world, another fear comes from the terrorist theft of nuclear materials, which could be used to make a crude nuclear weapon, or more likely used in a so-called “dirty bomb,” a conventional explosive that spreads radioactive materials.

The reprocessing of spent reactor fuel, specifically in order to separate and recycle plutonium for re-use in reactors as mixed-oxide fuel (MOX), could lead to greater proliferation challenges than uranium enrichment. All commercial nuclear power reactors produce plutonium as a by-product. Plutonium separated from spent fuel is directly usable in a nuclear weapon. Moreover, it is estimated that a developing state with a relatively primitive weapons program can construct a bomb out of only eight kilograms of plutonium, compared to 25 kg of U-235 enriched above 90%. An estimated 238 tons of separated plutonium existed in civilian nuclear programs worldwide at the end of 2003, enough for nearly 30,000 nuclear weapons.¹⁶

Even safeguarded plutonium reprocessing facilities are risky from a non-proliferation perspective. Present difficulties in material accountancy at large-scale plutonium reprocessing plants create unacceptably large margins of errors in calculating the amount of material unaccounted for, complicating efforts to credibly and confidently apply safeguards.¹⁷ For example, a 1990 study by MIT nuclear researcher Marvin Miller examined the effectiveness of material accountancy for the then-planned industrial scale Rokkasho reprocessing plant in Japan. Miller demonstrated that the annual measurement error for input material into the plant, calculated to be about 1%, amounts to the equivalent of 72 kg of plutonium, enough material for at least a dozen nuclear weapons.¹⁸

Fortunately, due to the high costs of operating reprocessing plants and the availability of inexpensive uranium, the spread of such facilities has been very limited. The only non-nuclear weapon possessing state to operate a commercial-scale reprocessing plant is Japan. This trend is likely to hold. The MIT study concludes that, based on the availability of uranium resources and expected technological advances aiding its recovery, resorting to reprocessing will be unnecessary to meet the fuel service needs of the world’s nuclear reactors for the lifetime of the plants they envision in their 1,000 gigawatt growth scenario.¹⁹ These factors point to the undesirability of spent fuel re-

processing in the near to midterm and should propel efforts to permanently limit its spread and phase out its use.

According to the MIT study, limitations in the NPT safeguards regime, as discussed in section 3.2, “raise significant questions about the wisdom of a global growth scenario that envisions a major increase in the scale and geographical distribution of nuclear power.”²⁰ We wholeheartedly agree with that assessment. Moreover, several near and mid-term energy options exist, both in the way of sustainable energy and advanced technologies, that could help move the world closer to the goal of achieving greenhouse gas reductions on the scale necessary to avoid the most severe consequences of climate change. Such options, if promoted and developed, provide an alternative to the use of nuclear energy to combat climate change.

A study by the Oxford Research Group found that for advanced industrialized societies, “there is no need to rely on nuclear energy as an alternative to the current dependence on fossil fuels.”²¹ For the United States, the best near-term non-nuclear options include immediate deployment of wind turbines, which could account for 15%-20% of the domestic electrical generating capacity before intermittency becomes an inhibiting factor for the present grids.²² While a variety of studies have concluded that integrating wind power to higher levels is technically feasible, geographical limitations, the nature of existing electricity markets, and more cost-effective non-carbon based alternatives present formidable economic and political barriers.²³ The greater utilization of energy efficient technologies and conservation practices can also contribute to reducing energy demand in both the near and mid-term.

For the midterm, between now and the end of the period covered by the MIT scenario in 2050, several cleaner fossil-based technologies exist. IEER argues these technologies could serve as a transition away from energy sources such as pulverized coal plants, pending the development and commercialization of emerging sustainable solutions such as thin-film solar cells and the further exploitation of bio-mass. The transitional technologies include a switch to integrated gasification combined cycle coal plants, which emit less CO₂ and are more efficient than traditional coal plants, and the expanded use of natural gas through developing liquefied natural gas infrastructure. Coupled with carbon sequestration, these technologies may even be capable of achieving a net reduction in CO₂ emissions.²⁴ The IEER study explains that each of these technologies are commercially viable and are cost competitive compared to nuclear energy.

The MIT study observes that the expansion of nuclear power on the scale envisioned by the study “is not likely to happen without United States leadership. It also requires continued European commitment and the initiation or expansion of nuclear power programs in many developing countries around the world.”²⁵ The inverse of this statement is almost undoubtedly true as well, as it can be reasoned that the leadership of the United States and Europe will also be crucial in developing non-nuclear, sustainable energy solutions to

combat climate change. This leadership can be exercised in many ways, most notably through the example set by domestic policy. Nuclear technology enjoys a strong reputation as a status symbol for the more advanced, developing states of the world.²⁶ Like railroads and steamships in the past, it is viewed as a benchmark of modernity, but also has appeal due to its connection to the weapons which still form the backbone of the security policies of the most powerful states. As long as this technology continues to be valued as essential in the most advanced states, its desirability will continue to spread and become entrenched throughout the developing world. Therefore, any move away from nuclear power globally must start with its greatest proponents.

Furthermore, multilateral approaches must be employed. Section 1.1 made the case for the necessity of employing treaty regimes and global norms to address the security challenges faced by the world. Indeed, the global nature of the consequences for either failing to do too little in the face of climate change, or for choosing the wrong set of solutions and increasing the likelihood of weapons proliferation, compels such an approach. Thus, renewed effort is required, especially by the industrialized states and particularly the U.S., to reinvigorate the multilateral frameworks addressing climate change and nuclear weapons, and to work toward just and sustainable solutions. Reformed or new international agencies may be necessary, such as a sustainable energy agency.²⁷

Recommendations for U.S. Policy

- The United States should accelerate and enlarge its support for development of commercially viable renewable and non-carbon emitting sources of energy, and for energy conservation.
- The United States should ratify the Kyoto Protocol and work within the UN Framework Convention on Climate Change to further establish norms and regulations on the emission of greenhouse gases.
- The United States should terminate subsidies for new nuclear power plants and phase out nuclear power, and should refrain from promoting nuclear energy as a means to combat climate change.

Iran and the Nuclear Fuel-cycle

MICHAEL SPIES

RECOMMENDATIONS OF THE WMD COMMISSION

Recommendation 3: To enhance the effectiveness of the nuclear non-proliferation regime, all Non-Proliferation Treaty non-nuclear-weapon states parties should accept comprehensive safeguards as strengthened by the International Atomic Energy Agency Additional Protocol.

Recommendation 6: Negotiations must be continued to induce Iran to suspend any sensitive fuel-cycle-related activities and ratify the 1997 Additional Protocol and resume full cooperation with the International Atomic Energy Agency in order to avoid an increase in tensions and to improve the outlook for the common aim of establishing a Middle East zone free of weapons of mass destruction. The international community and Iran should build mutual confidence through measures that should include: reliable assurance regarding the supply of fuel-cycle services; suspending or renouncing sensitive fuel-cycle activities for a prolonged period of time by all states in the Middle East; assurances against attacks and subversion aiming at regime change; and facilitation of international trade and investment.

Recommendation 8: States should make active use of the IAEA as a forum for exploring various ways to reduce proliferation risks connected with the nuclear fuel cycle, such as proposals for an international fuel bank; internationally safeguarded regional centres offering fuel-cycle services, including spent-fuel repositories; and the creation of a fuel-cycle system built on the concept that a few 'fuel-cycle states' will lease nuclear fuel to states that forgo enrichment and reprocessing activities.

Iran's standoff with the West over its uranium enrichment program has brought the risks associated with the nuclear fuel-cycle to the forefront of the international agenda. The Iran situation underscores a fundamental problem with the NPT, namely its near absolute guarantee on the right to develop nuclear technology. The delicate balance between the rights and obligations

of NPT states parties ultimately limits verification and enforcement of the treaty. This unstable situation has led many to question the efficacy of the safeguards and level of confidence provided by the International Atomic Energy Agency (IAEA).

Weapons of Terror observes that the lack of a standing executive body or secretariat within the NPT framework presents a serious institutional deficit, hampering efforts to enforce nuclear non-proliferation norms.¹ The WMD Commission recognizes that the risks associated with the proliferation of nuclear fuel-cycle technology are not exclusive to the Iran situation, but represent a global problem necessitating a global solution. However, the Commission does not suggest what that solution should be, and goes only as far as advocating that various proposals should be considered within the context of the IAEA.² In our view, the best course is to seek to end the spread of new national nuclear fuel production facilities, and to phase out existing non-international facilities, including in the weapon-possessing states.

The international community faces a situation in which a state has been found to be in non-compliance with requirements of the nuclear non-proliferation regime.³ International inspectors have chronicled an 18 year history of reporting violations and clandestine nuclear activities in Iran related to the development of nuclear fuel-cycle technologies.⁴ For many states these findings have led to an absence of confidence in the exclusively peaceful nature of Iran's nuclear program. Despite these findings and concerns that it is secretly pursuing nuclear weapons, Iran forges ahead with plans to develop a full indigenous nuclear fuel-cycle.⁵ The example of Iran underscores problems inherent in the NPT framework and in the use and spread of nuclear power. Therefore, in order to prevent the inevitable reoccurrence of such crises in the future, the present situation with Iran should be used as impetus toward addressing the shortcomings of the NPT regime in all its aspects, based on the principles of non-discrimination and undiminished physical, energy and economic security for all.

The Inalienable Right to Nuclear Technology

Throughout the latent crisis over its nuclear program, Iran has adamantly asserted that its development of uranium enrichment capabilities is part of its "inalienable right to nuclear technology for peaceful purposes," guaranteed by Article IV of the NPT. The NPT attempts to balance the rights and obligations of non-nuclear-weapons states parties. Article IV.1 provides that:

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.

Article IV is interpreted to allow all states to develop the full nuclear

fuel-cycle without restriction.⁶ It is crucial to note that it is *not* a right *granted* by the NPT, but rather a right inherent in state sovereignty and *recognized* by the NPT, subject to the obligation not to “manufacture” nuclear weapons. The WMD report cautions against selective reinterpretation of Article IV that would restrict or deny the right to the nuclear fuel-cycle. This would create a world split between nuclear “haves” and “have-nots,” a position the Commission notes “would hardly get broad support” from the international community.⁷ As discussed in section 3.1, any civilian nuclear fuel-cycle facility can be also used to produce nuclear material for nuclear weapons. Thus any state pursuing an advanced nuclear fuel-cycle capacity also attains the capacity to produce material for a nuclear arsenal.⁸ However, the strong language in Article IV directly limits the scope of verification and enforcement measures permitted by the treaty, and supports a right to develop an industrial nuclear capacity up to the threshold of nuclear weapons status.

The necessity of maintaining balance between the rights and obligations of states parties presents great difficulty in matters of compliance assessment and enforcement. These concerns translate into an extensive gray area between peaceful and non-peaceful activities in circumstances of safeguards and treaty violations. By the terms of Article IV, for a non-nuclear weapon state party, the right to nuclear technology only becomes forfeit if the state has violated Article II, which prohibits manufacture of nuclear weapons.⁹ The safeguards provided for in Article III, and which form the backbone of verification and compliance assessment under the NPT, only indirectly verify compliance with the Article II obligation. These safeguards deal exclusively with the disposition of nuclear materials, creating obligations beyond barring the acquisition of weapons, applicable only to the non-nuclear weapons states parties. Based on the text of the NPT, it can be and is argued that a state like Iran that violates safeguards requirements in material and ongoing ways by not reporting nuclear activities does not jeopardize its Article IV rights so long as there is no uncertainty about whether nuclear materials have been diverted to weapons programs.

Verifying Article II of the NPT

Article II of the NPT provides:

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

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devices; and not to seek or receive any assistance in the manufacture of nuclear weapons or other nuclear explosive devices.

During the negotiation of the NPT, some parties remarked that the terms “manufacture” and “acquire” suggest a completed nuclear explosive device. If this interpretation were accepted it would allow non-nuclear weapons states to construct all the parts of a nuclear explosive without assembling the finished device, while remaining within the bounds of the treaty.¹ Regardless of the lack of a definitive interpretation of “manufacture,” the prevailing interpretation of Article II is that the many activities a state must undertake to eventually construct a nuclear explosive, thereby indicating non-compliance with Article II, would necessarily involve violation of specific provisions in Article III.²

During the 2005 NPT Review Conference the U.S. delegation noted, “in an extreme case, an NPT party might have manufactured an entire mockup of the non-nuclear shell of a nuclear explosive, while continuing to observe its safeguards obligations on all nuclear material.”³ U.S. representative Jackie Sanders suggested a list of activities of concern which would indicate an “intent” to manufacture a nuclear weapon in violation of Article II. These activities include:

...seeking certain fuel cycle facilities of direct relevance to nuclear weapons, such as enrichment or reprocessing, with no clear economic or peaceful justification; clandestine facilities and procurements; committing safeguards violations and failing to cooperate with the IAEA to remedy them; and using denial and deception tactics to conceal nuclear-related activities.⁴

Despite the reasonable case for the need of criteria to assess compliance with Article II, as discussed in this section, the inherent nature of nuclear energy, the balance of rights and obligations in the NPT, and the particular circumstance and purpose of any given nuclear program are serious obstacles to straightforward compliance assessment. It is conceivable for a state to engage in the activities listed above without necessarily driving toward acquiring nuclear weapons. The same fuel cycle facilities used in a civilian program, which all states are entitled to pursue under the NPT, can be used in a weapons program. The criteria suggested by Sanders appear

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largely geared toward the specific case of Iran and its nuclear program. Thus, these criteria may not represent an attempt to elucidate a definitive and universal interpretation of Article II, but rather an attempt to advance U.S. policy against Iran.

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- 1 Mohamed I. Shaker, *The Nuclear Non-Proliferation Treaty: Origin and Implementation*, Oceana Publications, London, 1980, p. 250.
 - 2 *Id.*, p. 251.
 - 3 Ambassador Jackie W. Sanders, Special Representative of the President for the Nonproliferation of Nuclear Weapons, Statement to the 2005 Review Conference of the Treaty on the Nonproliferation of Nuclear Weapons, New York, May 19, 2005. Online at <http://www.reachingcriticalwill.org/legal/npt/RevCon05/MCI/USA19.pdf>.
 - 4 *Id.*

This argument could be undermined by a broad interpretation of a provision of the Principles and Objectives for Non-Proliferation and Disarmament adopted by NPT states parties in connection with the indefinite extension of the NPT in 1995:

Particular importance should be attached to ensuring the exercise of the inalienable right of all the parties to the Treaty and to develop research, production and use of nuclear energy for peaceful purposes without discrimination and in conformity with articles I, II *as well as III* of the Treaty.¹⁰

The Principles and Objectives are regarded as “political,” not “legal” commitments, but nonetheless provide guidance as to how the NPT should be implemented and interpreted under Article 31 of the Vienna Convention on the Law of Treaties. Furthermore, this provision was reaffirmed in the Final Document of the 2000 NPT Review Conference.¹¹ However, the standing of the Principles and Objectives and the 2000 Final Document has been eroded by the failure of the weapon states, in particular the United States, to fulfill disarmament-related commitments recorded in those same documents. Yet the United States has been the main proponent of the contention that Iran has forfeited Article IV rights due to its violation of safeguards reporting requirements, although without relying on the 1995 and 2000 outcomes.¹²

The Limitations of Compliance Assessment and Enforcement

For each state implementing safeguards the IAEA annually certifies that

no declared nuclear material have been diverted to military use.¹³ The conclusion that no diversion has occurred establishes that the state in question is in compliance with its basic safeguards undertaking to not divert nuclear material to non-peaceful purposes. Such a conclusion further indicates that the state is in compliance with its obligation under Article III of the NPT to apply and follow safeguards procedures. For states that implement the Additional Protocol, the IAEA annually certifies the absence of undeclared nuclear materials or activities.¹⁴ Drawing the conclusion for the first time that there are no undeclared nuclear activities takes a great deal of time for all states in any circumstance, as the IAEA has remarked in its assessments of Iran's safeguards status.¹⁵ As an example, Japan's additional protocol entered into force in 1999, yet the IAEA confirmed the absence of undeclared nuclear activities in Japan for the first time in 2003.¹⁶ As of the latest annual IAEA Safeguards Report, of the 70 states where both the NPT safeguards and the additional protocol are implemented, in only 24 of these states has the IAEA concluded the absence of undeclared nuclear activity.¹⁷

The IAEA safeguards compliance assessment mechanism is diffused and spread out among the various organs of the Agency. If, during the course of their verification activities, the Agency's inspectors determine that nuclear material has been diverted to use in weapons or other unknown use, they are obligated to notify the Director General who in turn submits a report to the Agency's Board of Governors. Per its authority under the Safeguards Agreement, the IAEA Board may report a state to the Security Council only if it finds that, based on the report from the Director General, it cannot be assured that the state has not diverted nuclear material for non-peaceful purposes.¹⁸ This provision makes clear that the only relevant consideration behind a finding of non-compliance, in the context of safeguards, is the diversion of nuclear materials for military purposes. Any other breach of the safeguards agreement can only amount to non-compliance as far as it affects the Board's ability to verify there has been no diversion.

The WMD Commission observes that "the NPT is the weakest of the treaties on WMD in terms of provisions about implementation."¹⁹ Except for the general Article IV stipulation that the rights of states to develop nuclear technology is contingent on their compliance with Articles I and II, measures for effective enforcement are lacking from the NPT, the safeguards system, and the IAEA Statute. The NPT lacks a standing secretariat or any other body with the competence to assess compliance with the treaty's objectives. Furthermore, the Commission notes "the IAEA and its Board of Governors are not the secretariat of the treaty," and its authority is thus limited to overseeing safeguards, not compliance with the NPT.²⁰ As noted, the IAEA Board of Governors does have the limited power of denying states assistance and rights and privileges as members of the IAEA system (*see box*).

The NPT states parties meet only every five years to review the implementation of the treaty. As the WMD Commission notes, "the NPT has no provisions for consultations or special meetings of the parties to consider

cases of possible non-compliance or withdrawal.”²¹ If states could find the means to avoid the usual procedure of consensus, the states parties could condemn non-compliant states and call upon all states to apply sanctions. Although such an approach is not expressly provided for in the NPT, as it is in the Chemical Weapons Convention, it arguably falls within the discretion of NPT states parties acting collectively. However, there have been no such actions to date, nor have there been efforts to take such actions.

Thus, at present it falls to the UN Security Council to take up the issue of compliance enforcement. The Council has the power, granted by the UN Charter, not only to call for sanctions, but to require states to apply them. It can also authorize or direct the use of military force to enforce its decisions. However, the mandate of the Council is traditionally understood to limit its authority to situations that present or may lead to a threat to international peace and security. As further explained in section 1.2, while the Council remains the backstop of the non-proliferation regime, the NPT states parties should develop mechanisms for effectively addressing non-compliance issues. In particular, there is a need for a mechanism to deal with violations that do not rise to the level of a threat to the peace. But the development of such measures will require trust that could only be generated by compliance with disarmament requirements on the part of the world’s most powerful states.

Authority and Limitations of the IAEA Board

On the matter of enforcement the IAEA Board only has very limited authority to proactively respond to actual or suspected cases of non-compliance involving the diversion of nuclear materials. Under the Safeguards Agreement the Board may *call upon* a state to take immediate action, when it deems such steps are necessary to prevent the diversion of nuclear material.¹ Yet, such a call would not be legally binding. If a state fails to heed a such a call, the Board would be left to its own judgment, based upon the report of the Director General, to determine whether or not it is “able to verify that there has been no diversion of nuclear material.”²

If the Board is unable to determine there has been no diversion, in addition to reporting the matter to the UN Security Council, it may *call upon* the state to take corrective measures. If the non-compliant state fails to enact the corrective actions called for, the Board may either suspend any assistance to the state or suspend the state “from the exercise of the privileges and rights of membership” under the IAEA Statute.³

Separately, Article III.B.4 of the Statute provides that “if in connection with the activities of the Agency there should arise ques-

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tions that are within the competence of the Security Council, the Agency shall notify the Security Council, as the organ bearing the main responsibility for the maintenance of international peace and security.” While this provision does not require a finding of non-compliance with safeguards, its proper application would naturally be interpreted in light of the Safeguards Agreement and other provisions of the IAEA Statute. Thus any basis for reporting a matter to the Security Council, other than diversion or uncertainty, would require justification.

As we have seen in the matter of Iran, the Board has some innovative potential to enact coercive measures in response to cases of concern that do not involve diversion of nuclear materials. Specifically, in deciding whether to approve any request made by a member state for a technical cooperation project, the Board may consider any such matter it may deem relevant, a catch-all phrase that in effect leaves the matter entirely to the conceivably arbitrary judgment of the Board.⁴ Though such a mechanism could easily be susceptible to political abuse, it gives the Board some leverage over member states by allowing it to obstruct a key membership privilege, provided it makes some justification that is reasonable enough to secure a majority vote.

In cases where a state has persistently violated the provisions of the Statute or conditions related to a project, but that do not involve diversion, it is also possible for the Board to vote by simple majority to recommend for a state to have its member rights and privileges suspended.⁵ In order to enact the suspension, the General Conference, consisting of the entire membership of the IAEA, which meets only once a year in the fall, would have to approve the measure by a two-thirds vote.

1 INFCIRC/153, paragraph 18.

2 *Id.*, paragraph 19.

3 IAEA Statute, Article XII.C.

4 *Id.*, Article XI.E.7.

5 *Id.*, Article XIX.B.

The Case of Iran

The steady escalation of the Iran nuclear situation began in fall 2005. After two years of ineffectual negotiations between Iran and the E3 (France, Germany, UK) intended to achieve a political solution, Iran broke from the

negotiations and resumed uranium processing work. In September 2005 the IAEA Board responded by adopting a resolution finding “that Iran’s many failures and breaches of its obligations to comply with its NPT Safeguards Agreement, as detailed in [IAEA document] GOV/2003/75, constitute non compliance in the context of Article XII.C of the Agency’s Statute.”²²

Stretching the law and squandering diplomacy. The language of the Board’s finding is not consistent with the IAEA Statute. A finding of non-compliance, as the term is used in Article XII.C, pertains to circumstances when nuclear material provided in an Agency project has been diverted for military purposes, for health and safety violations, or any other condition of an Agency project proscribed by agreement. Although Iran has several ongoing projects with the IAEA, including assistance in preparations for the nuclear power plant at Bushehr, the IAEA has not accused Iran of diverting nuclear material from any project. Nor has it been accused of any safety and health violations or of any other infraction of any condition stipulated in any agreement pertaining to an IAEA project. Therefore, the finding of non-compliance made by the Board is vague and has no basis in the IAEA Statute.

Furthermore, the Board’s finding that Iran’s policy of concealment “resulted in many breaches of its obligation to comply,” with its Safeguards Agreement, based on an 18 year history of safeguards reporting violations by Iran, does not satisfy the criteria in the Safeguards Agreement allowing for the Agency to report the matter to the UN Security Council.²³ Iran’s Safeguards Agreement provides that the Board may report a matter to the Security Council only if it finds that, based on the report from the Director General, “it cannot be assured that Iran has not diverted nuclear material for non-peaceful purpose.”²⁴ In fact, the Director General reported to the Board in November 2004, and again in September 2005, that *all declared nuclear activities and material in Iran had been accounted for and therefore there has been no diversion of material to unknown use or use in weapons.*²⁵

The resolution was on firmer ground in the second reason given as a basis for reporting the matter to the Security Council.²⁶ Using language from Article III of the IAEA Statute, the resolution stated that the Board:

Finds also that the history of concealment of Iran’s nuclear activities referred to in the Director General’s report, the nature of these activities, issues brought to light in the course of the Agency’s verification of declarations made by Iran since September 2002 and the resulting absence of confidence that Iran’s nuclear programme is exclusively for peaceful purposes have given rise to questions that are within the competence of the Security Council, as the organ bearing the main responsibility for the maintenance of international peace and security;²⁷

However, it was the first finding regarding non-compliance, not the second, that has been emphasized as the basis for referring the matter to the

Security Council.

Despite the questions surrounding the “non-compliance” finding, it is clear that, at the very least, Iran’s concealment of activities resulted in violations of its Safeguards Agreement. Absent evidence of a weapons program, which the IAEA has not uncovered to date, and absent the diversion of nuclear materials, it remains difficult to argue that Iran has forfeited its rights under Article IV of the NPT. Nonetheless, when Iran’s pattern of concealment of nuclear activities came to light in 2003 a case could have been made that Iran should have been denied the right to pursue enrichment or reprocessing capabilities until it had regained the trust of the world. The case is strengthened by the commitment made by NPT states parties in 1995, and reaffirmed in 2000, to make the obligation of all states to implement the Article IV rights contingent on compliance with Article III. However, that was not the path taken. Instead the EU undertook negotiations with Iran intended to achieve “objective guarantees that Iran’s nuclear programme is exclusively for peaceful purposes” and to “equally provide firm guarantees on nuclear, technological and economic cooperation and firm commitments on security issues.”²⁸ Iran had agreed to suspend its enrichment and reprocessing activities on a voluntary, non-legally binding basis throughout the duration of the now-defunct negotiations.

For its part Iran had offered to accept an extremely intrusive safeguard and verification regimen, far beyond what is required by the Additional Protocol. Iran’s March 23, 2005 offer to the EU included the continuous on-site presence of IAEA inspectors at its nuclear fuel-cycle sites, ceilings on the level of enrichment, limiting the extent of its fuel-cycle to only the needs of its power reactors, and binding national legislation prohibiting the development of nuclear weapons.²⁹ In Iran’s estimation these provisions would have been sufficient to objectively guarantee the peaceful nature of its nuclear program. However, as a necessary condition to maintain the support for the United States in the negotiating effort, the only objective guarantee acceptable to the E3 states was the complete cessation of all fuel-cycle activities in Iran.

Suspension and sanctions. The on and off negotiations between Iran and the EU continued from the summer of 2005 until September 2006. Balking at Iran’s request to be allowed until August 22, 2006 to respond to an EU proposal put forward on June 6 by the permanent members of the UN Security Council and Germany, in July the Security Council passed resolution 1696 (2006), which *demand*s “that Iran shall suspend all enrichment-related and reprocessing activities, including research and development.”³⁰ The language of this resolution signifies a departure from the traditional means by which the Security Council makes its decisions binding.³¹ Regardless, there is no doubt that the intention of the resolution was to make mandatory Iran’s suspension which had been previously regarded as a voluntary, non-legally binding, confidence building measure.

Nearly four months after Iran failed to heed the UN Security Council demand in resolution 1696 that it suspend its uranium enrichment activities,

on December 23 the Security Council adopted resolution 1737 (2006) imposing limited sanctions on nuclear proliferation-sensitive activities in Iran.³² The thrust of the resolution is to halt Iran's uranium enrichment and heavy water projects.³³ Like the previous resolution targeting Iran's nuclear program, the approach taken in resolution 1767 departs from the norms by which the Security Council traditionally invokes its powers to respond to threats to international peace. Notably, the resolution makes no finding that the Iran situation constitutes a threat to international peace, a requisite for Security Council to either impose sanctions or employ military force. This approach can be seen as precluding any possibility of authorizing the use of force, a reaction to the U.S. abuse of past UN resolutions in justification of its illegal invasion of Iraq. Also, this novel approach allows the Council to avoid making the arguably absurd assertion that Iran's still primitive nuclear fuel-cycle program presently constitutes a threat to the peace.³⁴

The issue of suspension has become somewhat of a red herring, a contentious point around which this situation has been escalated. In the view of the IAEA, a pilot scale enrichment facility in Iran poses an acceptable nuclear weapons proliferation risk. Moreover, Iran remains several years away at best from being in the position to begin constructing an industrial scale enrichment capacity. While the suspension or cessation of fuel-cycle activities might help to reduce international tension on this matter, it is not necessary for the completion of the IAEA investigation into Iran's past nuclear activities or for the IAEA to assess Iran's compliance with its safeguards obligations. As an apparent afterthought, resolution 1737 requires Iran to "provide such access and cooperation as the IAEA requests to be able to ... resolve all outstanding issues."³⁵ However, the primary focus of the Security Council has centered on the issue of suspension, making it the sole condition for which sanctions might be lifted.³⁶

In the April 2006 Safeguards Report on Iran, the IAEA made the unusual effort to stress that "safeguards obligations and confidence building measures are different, distinct and not interchangeable."³⁷ The report further states that "the implementation of confidence building measures," the focus of Security Council action, "is no substitute for the full implementation at all times of safeguards obligations."³⁸ The IAEA thus suggested that the confidence building measures are not as important as the safeguards, the object of which is to prevent the diversion of nuclear materials to military use.

In the same paragraph the IAEA states that "in this context, it is also important to note that the Agency's safeguards judgements and conclusions in the case of Iran, as in all other cases, are based on verifiable information available to the Agency, and are therefore, of necessity, limited to past and present nuclear activities. The Agency cannot make a judgement about, or reach a conclusion on, future compliance or intentions."³⁹ The subtext of this statement is that while Iran can be in full compliance with its safeguards obligations, states can still point to its activities as revealing dubious intentions. Although it is not mentioned, such suspicions are inherent in the

utilization of nuclear energy and the operation of nuclear fuel-cycle facilities. Thus Iran's critics will always be able to say its nuclear program *could* be for weapons, despite whatever conclusions the agency derives. This last point is also true for *every* state that operates nuclear fuel-cycle facilities.

Time for negotiation. There are tendencies, especially in Washington, to regard the Iran situation as extremely urgent. While certainly there are important issues at stake, with respect to Iran and to the non-proliferation regime generally, the urgency is overstated. If Iran were to make the political decision to acquire a nuclear weapon, U.S. governmental and non-governmental analysts believe Iran would need a minimum of three to five years in order to produce sufficient nuclear material for a single weapon.⁴⁰ The Director of U.S. National Intelligence, John Negroponte, recently stated that he believes Iran could develop a nuclear weapon between 2010 and 2015, up to ten years away.⁴¹ There is still time for all sides to work toward a mutually acceptable diplomatic solution.

At such a stage, talk of broad economic sanctions and escalation is premature. Given the non-urgency of the matter one must look skeptically upon those who have forcefully advocated and insisted upon such a course, setting aside and even hindering the process of negotiation. The tools of coercion and pressure have not proven to be reliable in modifying the behavior of states, particularly on issues central to security. The WMD Commission places the emphasis on inducements to persuade Iran not to pursue a nuclear fuel-cycle capability, and makes the innovative suggestion that a regional freeze on enrichment and reprocessing activities, which would also capture Israel's program, could be part of the solution.

As much as the Bush administration adamantly attempts to portray the matter as a dispute between Iran and the international community, underlying this crisis is the long-simmering tension and mistrust between the United States and Iran. Over the course of the nuclear crisis Iran has offered to address a very wide range of mutual social, political, economic and security concerns including all aspects of its nuclear program and its support for so-called terrorist organizations. The time is more than past due for the U.S. to set aside its grandiose regional ambitions, especially in light of the ongoing debacle in Iraq. Progress on these issues requires the U.S. to engage the Iranian regime in direct negotiations and to be willing to set normalization of relations and security assurances on the table in exchange for the policies it presently demands.

The U.S.-North Korea Stalemate

North Korea's test of a nuclear explosive device on October 9, 2006 shocked the world, prompting overdue attention to the challenge posed to the non-proliferation regime by its nuclear program and the longstanding hostile relationship between North Korea and the United States. The history of the North Korea nuclear issue demonstrates that coercion and non-engagement do not constitute viable non-proliferation strategies.

North Korea joined the NPT in 1985, but held off on concluding its mandatory safeguards agreement with the IAEA, due in part to the continued presence of U.S. nuclear weapons stationed in South Korea. The end of the Cold War provided a series of opportunities for the revitalization of relations on the Korean peninsula. In September 1991, the U.S. unilaterally withdrew its nuclear weapons from the South.¹ By early 1992, the two Koreas had signed the Joint Statement for the Denuclearization of the Korean Peninsula, pledging to "not test, manufacture, produce, receive, possess, store, deploy or use nuclear weapons," prohibiting both sides from possessing uranium enrichment and plutonium reprocessing facilities, and agreeing to safeguards.²

Despite these early and strained diplomatic successes, the underlying political relationships between the primary antagonists, the United States and North Korea, remained largely unchanged. Since the 1950s, the two sides have persisted in a state of near-war, with United States maintaining a stance of possible nuclear response to a North Korean *non-nuclear* attack.³ In light of this ongoing political reality, it should have come as no surprise that the illusion of progress was quickly dispelled. In April 1992, nearly five years past the deadline provided for in the NPT, North Korea finally concluded its safeguards agreement with the IAEA, leading almost immediately to the discovery that it had produced and separated more plutonium than it had declared.⁴ The 1994 Agreed Framework, signed by the United States and North Korea, emerged directly out of this safeguards crisis—prompting the involvement of the UN Security Council and the possibility of war—and represents the first attempt to address the underlying political issues in the nuclear context.

Just as the path toward the global elimination of nuclear weapons has been well mapped (*see sections 1.2 and 3.3*), the steps necessary for a permanent solution to the stalemate on the Korean peninsula have been long established. The failure to achieve this has been due to the breakdown in implementation. The Bush administration has

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played the role of the spoiler, immediately working to undermine and abandon the 1994 Agreed Framework, ending diplomatic engagement, and unilaterally ratcheting up pressure on the North Korean economy in the vain hope that isolating the regime—really the entire country—will somehow cause its collapse. This same approach has failed elsewhere and has now resulted in the worst of possible outcomes: a North Korean regime with a proven nuclear weapon capability.

Worse, the Bush administration's belated and sometime incoherent diplomatic overtures have been marred by disassociated, ongoing, and aggressive attempts to isolate North Korea from the international economy. Most notably, a mere four days after the Six-Party Talks resulted in agreement in principle on denuclearization of the Korean peninsula in September 2005,⁵ the administration took action against the North Korean banking sector,⁶ setting back diplomacy on the nuclear issue for more than a year.⁷ Despite the administration's claims that such actions are legal in nature and bear no relation to the nuclear issues or broader policy toward North Korea, it seems highly unlikely these acts have been driven by some newly found respect for upholding international norms on the part of the administration. More plausible explanations include the existence of an internal split within the administration, or more benignly, poor policy coordination. Regardless of the rationale, the move underscores a marked lack of seriousness regarding the diplomatic initiative.

Overcoming the diplomatic impasse, in February 2007 the Six-Party Talks achieved a long sought agreement on the implementation of the 2005 Joint Statement. Largely dealing with issues of the sequencing of the steps required by each of the parties, many commentators have noted the striking similarity between these measures and those contained in the 1994 Agreed Framework. The administration's first step forward toward a diplomatic solution has been to reinvent the same deal it rejected six years earlier. After years of belligerent rhetoric and grudging engagement did little to prevent North Korea's acquisition of nuclear weapons, this agreement represents a clear repudiation of the Bush administration's policies on North Korea since 2001.

Despite this laudable interim achievement, the difficult steps lie ahead. Implementation of the 2005 Joint Statement and the ultimate goal of achieving the denuclearization of the Korean Peninsula are not certain. Moreover, while the statement contains many positive elements, such as requiring North Korea to verifiably dis-

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mantle only its plutonium production capability within 60 days and obligating the U.S. to participate in a bilateral process, leading to the restoration of diplomatic relations and working toward the normalization of relations, it could go farther. The WMD Commission soundly recommends a revival of the 1992 declaration, which would establish the Korean Peninsula in essence as a zone free of nuclear fuel cycle facilities (paralleling the Commission's proposal for a freeze on such activities in the Middle East). Toward achieving lasting regional security, non-governmental organizations in the region have called for a nuclear weapon free zone treaty among Japan, South Korea, and North Korea with assurances against use of nuclear weapons given by the United States, China, and Russia.⁸

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- 1 Hans M. Kristensen, "The Withdrawal of U.S. Nuclear Weapons From South Korea," The Nuclear Information Project, September 28, 2005.
 - 2 Joint Statement for the Denuclearization of the Korean Peninsula, Seoul and Pyongyang, January 20, 1992.
 - 3 Hans M. Kristensen, "U.S. Nuclear Strike Planning Against North Korea," The Nuclear Information Project, September 28, 2005 (updated November 3, 2006).
 - 4 International Atomic Energy Agency, excerpted from: David Fischer, *History of the International Atomic Energy Agency*, IAEA, Vienna, 1997.
 - 5 Joint Statement of the Fourth Round of the Six-Party Talks, Beijing, September 19, 2005.
 - 6 See Selig Harrison, "Is Kim Jong Il ready to provoke a regional crisis? An exclusive account of what Pyongyang really wants," *Newsweek International*, October 16, 2006.
 - 7 Paul Kerr, "No Progress at North Korea Talks," *Arms Control Today*, January/February 2007.
 - 8 "Model Treaty on the Northeast Asia Nuclear Weapon Free-Zone," Peace Depot, July 2004.

Closing the Nuclear Fuel-cycle Loophole

As more countries are anticipated to develop nuclear power sectors, the need for nuclear fuel-cycle services will continue to grow. This will bring with it the likelihood that more states will seek enrichment and reprocessing capabilities, citing state sovereignty and Article IV as justifications. At the present time, while the UN Security Council deliberates on coercive measures intended to bring an end to Iran's nuclear fuel-cycle ambitions,

new commercial scale uranium enrichment projects have been announced in Argentina, Australia, and South Africa. Regarding the unchecked spread of these technologies, the U.S. National Security Strategy states, “the first objective requires closing a loophole in the Non-Proliferation Treaty that permits regimes to produce fissile material that can be used to make nuclear weapons under cover of a civilian nuclear power program.”⁴²

The leaders in the charge to close this “loophole” have been the industrialized powers, notably those who operate nuclear fuel-cycle facilities and either possess nuclear weapons or permit the U.S. to house them on their national territories. Since the first use of nuclear weapons, there have been proposals made with the intent to control the spread of nuclear technology, beginning with the recommendations in the 1946 Acheson-Lilienthal report, calling for international ownership of the means of producing nuclear materials. The report recognized that nuclear weapons and nuclear energy are inextricably linked. It also prophetically predicted that an international system comprised solely of inspections would be insufficient, as detailed above and exemplified through the case of Iran.⁴³ Since the advent of “Atoms for Peace” numerous other proposals have been put forward for multinational control of the nuclear fuel-cycle, and have subsequently languished.

The WMD Commission takes no firm position on addressing the spread of nuclear fuel-cycle technology, calling only for the exploration, through the IAEA, of proposals for international fuel banks, regional fuel-cycle service centers, and restricting fuel production to a few powerful states. There are certainly no easy solutions to these problems. As the Commission indicates, it is not certain how to make fuel banks sufficiently reliable to states that have to plan for changing geopolitical circumstances.⁴⁴ Multilateralizing the fuel-cycle through regional centers still poses the risk of spreading knowledge about the technology. The final proposal, which the Commission surprisingly includes as one deserving consideration, would limit the possession of fuel-cycle facilities to those states that already possess them. Specifically referring to an initiative advanced by the Bush administration and known as the Global Nuclear Energy Partnership (GNEP), this approach would divide the world into “fuel-cycle states” and “user states,” that is, “nuclear haves” and “nuclear have-nots,” not with respect to weapons but rather nuclear fuel production. Regarding the possession of nuclear weapons, the Commission pointedly rejected “the suggestion that nuclear weapons in the hands of some pose no threat, while in the hands of others they place the world in mortal jeopardy,” further noting that “governments possessing nuclear weapons can act responsibly or recklessly” and that “governments may also change over time.”⁴⁵ Logically this argument should naturally extend to the possession of the means to readily manufacture nuclear weapons.

Putting aside specific institutional proposals, the best course would be for states to work toward less reliance on nuclear power for energy generation. Regardless of where these facilities are located they bring with them the fear and possibility of weapons proliferation and ultimately represent a for-

midable roadblock on the path to elimination of nuclear weapons. Preceding any global phase-out of nuclear power, states should seek to end the spread of new nuclear fuel production facilities, not under international control, and to phase-out existing non-international facilities, including in the weapon-possessing states.⁴⁶ Any global scheme that calls for the indefinite retention of the means to produce nuclear weapons by some, but prohibits their development by others, is doomed to fail. Moreover, many developing states, which have been generally more supportive of Iran's position, are wary of accepting additional constraints on the development of nuclear technology, at least absent demonstrable progress on nuclear disarmament issues. The connection between the 60 year failure to secure the nuclear fuel-cycle and the failure of nuclear disarmament initiatives in this context cannot be overstressed.

Recommendations for U.S. Policy

- The United States should engage in direct negotiations with Iran and work toward achieving an agreement addressing the spectrum of political, economic, and security issues. Such negotiations should lead to a process resulting in the end of unilateral U.S. economic sanctions, the provision of credible security assurances by the United States, and preclusion of Iran's acquisition of nuclear weapons, and culminating in the normalization of relations between the two countries.
- The United States should work multilaterally toward cessation of the construction of additional nationally-controlled plutonium reprocessing and uranium enrichment facilities, and support the transfer of existing facilities, including its own, to international control.

Toward Nuclear Abolition

JOHN BURROUGHS

RECOMMENDATIONS OF THE WMD COMMISSION

Accept the principle that nuclear weapons should be outlawed, as are biological and chemical weapons, and explore the political, legal, technical and procedural options for achieving this within a reasonable time. (*Weapons of Terror*, 19)

A key challenge is to dispel the perception that outlawing nuclear weapons is a utopian goal. *A nuclear disarmament treaty is achievable and can be reached through careful, sensible and practical measures.* Benchmarks should be set; definitions agreed; timetables drawn up and agreed upon; and transparency requirements agreed. Disarmament work should be set in motion. (*Weapons of Terror*, 109; emphasis supplied)

Recommendation 19: Russia and the United States, followed by other states possessing nuclear weapons, should publish their aggregate holdings of nuclear weapons on active and reserve status as a baseline for future disarmament efforts. They should also agree to include specific provisions in future disarmament agreements relating to transparency, irreversibility, verification and the physical destruction of nuclear warheads.

Recommendation 30: All states possessing nuclear weapons should commence planning for security without nuclear weapons. They should start preparing for the outlawing of nuclear weapons through joint practical and incremental measures that include definitions, benchmarks and transparency requirements for nuclear disarmament.

For more than a decade, civil society groups have been advocating for a comprehensive approach to the abolition of nuclear weapons. In the mid-1990s, a group of NGOs and experts, coordinated by the Lawyers' Committee on Nuclear Policy, drafted a model convention for the prohibition and elimination of nuclear weapons. It was subsequently circulated by the UN Secretary-General within the United Nations as a discussion document. The concept is analyzed in *Securing our Survival: The Case for a Nuclear Weap-*

ons Convention, which also contains the model treaty.¹ A great virtue of the WMD Commission report is that it is likewise unequivocal about the aim of prohibiting nuclear weapons. It calls for acceptance of “the principle that nuclear weapons should be outlawed,” and states that “a nuclear disarmament treaty is achievable.”² This section explores some of the key issues relating to nuclear abolition: what treaty or treaties are needed; the challenge of verification; and the relationship to general demilitarization.

A Framework Approach or a Convention?

It is not only NGOs and now the WMD Commission that have pointed to the need for a comprehensive approach to the elimination of nuclear weapons. The International Court of Justice evokes such an approach in its statement of the disarmament obligation: “bring to a conclusion negotiations on *nuclear disarmament in all its aspects under strict and effective international control*.”³ An annual General Assembly resolution, following up to the Court’s opinion, calls for commencement of “negotiations leading to the early conclusion of a nuclear weapons convention.”⁴ Every year since 1996 it has been adopted by large majorities but also with abstentions or negative votes from a significant number of states, notably those allied or associated with the Western nuclear weapon states. Also noteworthy is the 2000 resolution “Towards a Nuclear-Weapon-Free World: The Need for a New Agenda.” Among many other provisions, it affirms “that a nuclear-weapon-free world will ultimately require the underpinnings of a universal and multilaterally negotiated legally binding instrument or a framework encompassing a mutually reinforcing set of instruments.”⁵ The resolution is especially significant because it received very wide support, including from the U.S. government, then under the Clinton administration.

The two resolutions reveal a divergence of opinion regarding the legal and institutional means for the abolition of nuclear weapons, the first calling for a “*convention*,” the second referring to an “instrument” (like a convention) or a “*framework*.” A convention on elimination of nuclear weapons is a single, comprehensive, global agreement, like the Chemical Weapons Convention, the most far-reaching disarmament measure adopted to date. A framework as envisaged by the New Agenda resolution would tie together agreements and institutions that now exist as well as ones yet to be created. It could, for example, incorporate some or all of the following:

- the NPT, which already bans possession by 183 countries;
- the Comprehensive Test Ban Treaty, still to enter into force;
- a Fissile Materials Cut-off Treaty, not yet negotiated, but on the present international agenda;
- Security Council resolution 1540;
- bilateral or regional agreements on elimination of nuclear weapons;
- an agreement on elimination among states that possess nuclear

- weapons plus other representative states;
- an agreement providing the IAEA authority and resources to verify nuclear disarmament, or establishing a new agency for this purpose;
- an agreement on governance for the regime.

Advocates of a convention tend to see its negotiation as taking place in the near term. In contrast, the New Agenda framework approach is linked to a long-term process involving many steps and measures. This points to the possibility of finalization by an overarching agreement near the end of the process. The differences should not be artificially magnified. A convention that superseded existing agreements could come at the end of a disarmament process, and a convention that was early in the process could take the form of a framework agreement that incorporates existing agreements and provides for the future negotiation of additional ones.

Verification of a Nuclear-Weapon-Free World

Many tools exist for effective monitoring and verification, especially with respect to declared facilities, warheads, and fissile materials, as shown by studies undertaken this decade by Britain⁶ and the Committee on International Security and Arms Control of the U.S. National Academy of Sciences.⁷ However, achieving confidence in the implementation of the reduction and elimination of arsenals remains challenging, principally due to the possibility of hidden stocks of materials, warheads, or capabilities. The National Academy study found that confidence would increase based on monitoring programs undertaken on an ongoing, long-term basis in an atmosphere of transparency and cooperation.⁸ The implication is that verification and transparency measures need to be implemented beginning *now*, above all regarding U.S. and Russian stocks and reductions (*see section 2.1*). More broadly, all nuclear weapons possessing states must initiate processes to apply the principles of verification, transparency, and irreversibility to reduction and elimination of their arsenals. Declarations of fissile materials contained in military stocks and warheads, as recommended by the International Panel on Fissile Materials, is one of the first steps that could be taken.⁹

The WMD Commission understands the challenges posed by verification of abolition, as comes through in Recommendations 19 and 30. The Commission's choice of the term "outlawing of nuclear weapons" suggests a belief that agreement on the prohibition of nuclear weapons should not be made dependent on certainty that no warheads or stocks of weapons-usable fissile material have escaped elimination or disposition. A similar problem exists to a much greater extent with respect to biological weapons, yet their prohibition by treaty is well accepted.

Comprehensive Demilitarization?

Comprehensive demilitarization and institutionalization of conflict prevention would, as the program statement of Global Action to Prevent War says, “create an environment more conducive to the enduring elimination of all nuclear, chemical, and biological weapons.”¹⁰ *Weapons of Terror* gestures in this direction, in particular by noting in its final section that “the perspective of a world free of WMD must be supplemented by the perspective of a world in which the arsenals of conventional weapons have been reduced drastically.”¹¹ U.S. advances in delivery systems underscore the point; they may cause other states to be reluctant to relinquish their nuclear arsenals (*see section 2.4* and its recommendation of limitations on strategic systems). However, we must be wary of positing achievements in these areas as *preconditions* for the elimination of nuclear weapons, and *Weapons of Terror* rightly does not do so. That position would be seized upon by states determined to maintain their arsenals; the United States already wrongly claims that Article VI codifies such linkages.¹² It is certainly the case that as reduction and elimination of nuclear arsenals proceed, states will adjust their security relationships in other respects. Implementation of conventional disarmament and conflict prevention are necessary to ensure that reliance on nuclear weapons is not replaced by other forms of militarism.

Recommendation for U.S. Policy

- With Russia and other states possessing nuclear weapons, the United States should implement on an ongoing basis verification and transparency measures that make possible the achievement of a nuclear-weapon-free world.