

## ARTICLES

# BRIDLING THE INTERNATIONAL TRADE OF CATASTROPHIC WEAPONRY

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"It is fashionable among industrialized nations to deplore acquisition of high-technology weapons by developing nations, but this moralistic stand is akin to drug pushers shedding tears about the weaknesses of drug addicts."<sup>1</sup>

### TABLE OF CONTENTS

Introduction .....	757
I. Definition of Catastrophic Weaponry .....	759
A. Nuclear Weapons .....	759
B. Chemical Weapons and Toxins .....	762
C. Biological Weapons .....	763
D. Ballistic Missiles .....	764
II. Theories of Nonproliferation .....	767
A. Deterring Nations from Using Weapons or Preventing Weapons Acquisition .....	768
1. Realpolitik .....	768

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1. C. Raja Mohan & K. Subrahmanyam, *High-Technology Weapons in the Developing World*, in *NEW TECHNOLOGIES FOR SECURITY AND ARMS CONTROL: THREATS AND PROMISE* 229, 229-30 (Eric H. Arnett ed., 1989).

2. Regulation . . . . .	770
B. Hegemony Through Alliances or Disarmament Through Regimes . . . . .	771
1. Realpolitik . . . . .	771
2. Regulation . . . . .	773
C. Ad Hoc Diplomacy or Specification of Standards and Enforcement Mechanisms . . . . .	775
1. Realpolitik . . . . .	775
2. Regulation . . . . .	776
III. The Proliferators . . . . .	777
A. China . . . . .	779
1. General weapons export policies . . . . .	779
2. Notable proliferation activities . . . . .	782
B. Germany . . . . .	786
1. Weapons exports to Iraq . . . . .	787
2. Other notable proliferation activities . . . . .	789
C. Brazil . . . . .	791
D. Former Soviet Union . . . . .	794
IV. International Efforts to Control Proliferation . . . . .	799
A. Nuclear Weapons Non-Proliferation . . . . .	801
1. Treaty objectives and proscribed behavior . . . . .	801
2. Verification of compliance . . . . .	802
3. Regulation of nuclear trade . . . . .	805
B. Chemical Weapons Control Under the Chemical Weapons Convention . . . . .	809
1. Treaty objectives and proscribed behavior . . . . .	809
2. Verification of continued nonproduction . . . . .	811
3. Regulation of the international chemicals trade . . . . .	815
C. Biological Weapons Control . . . . .	816
1. The Biological Weapons Convention in general . . . . .	816
2. Confidence-building measures . . . . .	818
3. Regulation of international trade . . . . .	819
D. The Missile Technology Control Regime . . . . .	820
1. In general . . . . .	820
2. Verification measures . . . . .	822
3. Regulation of international trade . . . . .	822
V. Forging a Comprehensive Nonproliferation Regime . . . . .	823
A. Technology Controls . . . . .	825
1. Restrictions on production of essential military technologies . . . . .	825

2. Export restrictions on critical dual-use technologies . . . . .	827
a. Uniform export licensing criteria and evaluation . . . . .	828
b. Special standards to discriminate among end-users . . . . .	829
B. Verification: Reporting Requirements, Monitoring, Intrusive Inspections, and Confidence-Building . . .	830
1. Appraisal of production capabilities and output . . . . .	832
2. Verification of exports: manifests and tagging . . . . .	834
C. International Investigations and Implementing Cooperation of Legal Authorities . . . . .	835
1. Mutual international legal assistance . . . . .	836
2. Establishing national authorities . . . . .	839
D. Enforcement: Incentives and Penalties . . . . .	842
1. Necessity of consistent multilateral enforcement . . . . .	844
2. Necessity of certain and advance delineation of mandatory penalties . . . . .	845
Conclusion . . . . .	845

## INTRODUCTION

Proliferation of catastrophic weaponry<sup>2</sup> threatens peace in our age. At the millennium's end, with the bipolar superpower confrontation fading into memory, dozens of nations have or are pursuing catastrophic weapons.<sup>3</sup> The flow of advanced weapons technology to Iraq and the advent of chemical and ballistic missile programs throughout the Middle East and the Southern Hemisphere warn of impending global violence.<sup>4</sup> Currently, the specter of a North Korean nuclear

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2. This Article focuses on four types of weapons: nuclear, chemical, and biological weapons, and ballistic missiles. Military literature uses various terms to refer to these and other types of weapons. The term "weapons of mass destruction," coined to refer to nuclear, chemical, and biological weapons, is not used here because it generally does not include ballistic missiles and because, to be precise, chemical and biological weapons are lethal but are not nearly as destructive as a wide variety of conventional ordnance. Neither is the term "high technology weapons" appropriate because chemical and biological weapons generally involve far less sophisticated technology than many types of other weapons.

This Article focuses on these four types of weapons because they signify total, as opposed to limited, war. Other weapons can be restricted to battlefield use and are primarily designed to overpower an adversary's military force. If used, these four types of weapons would necessarily devastate civilian populations with catastrophic consequences. Hence the use of the label "catastrophic weaponry."

3. *Proliferation Threats of the 1990's: Hearing Before the Senate Comm. on Governmental Affairs*, 103d Cong., 1st Sess. 51 (1993) (testimony of James Woolsey, Director, Central Intelligence Agency) [hereinafter *Hearing on Proliferation Threats*].

4. See generally *id.* at 51-56 (noting advances in weapons technology and weapons proliferation in various nations). The market for catastrophic weapons is only a subset of the

bomb presents an apparently intractable threat to global security and highlights the limitations of existing nonproliferation efforts.<sup>5</sup> It is time to rethink nonproliferation efforts—it is time to take rigorous legal steps to shut down the international market in catastrophic weapons.<sup>6</sup>

The simple truth is that restricting the international trade in catastrophic weaponry will substantially limit their proliferation. Accordingly, pursuit of strategic security in the coming era should include legal efforts to regulate weapons technology by stipulating penalties for merchants of mass destruction. Perhaps a few nations could acquire a catastrophic weapon if a government willing to sacrifice to such pursuits has domestic access to critical materials and a sophisticated technical elite. But such efforts would be difficult and expensive, and fewer nations would try than would if given ready access to an international marketplace of weapons-making technologies. Closing the weapons market may not end proliferation, and an end to proliferation would most certainly not guarantee strategic security. Nevertheless, the reforms suggested by this Article could make the world a comparatively safer place.

The remainder of this Article contains five Parts. Part I briefly defines “catastrophic weaponry.” Part II sets forth the theoretical underpinnings of two approaches to nonproliferation and compares their relative attributes. In the central argument of this Article, this Part asserts that the “realpolitik” approach to nonproliferation must be replaced by an approach based on legal regulation. Part III describes the recent history of proliferation by analyzing the activities of four important weapons-supplying nations. Part IV analyzes nonproliferation arrangements currently in existence and identifies their strengths and weaknesses. Together, Parts III and IV provide evidentiary support for the proposition that current efforts to control proliferation are more well-intentioned than effective. Part V is intended as this Article’s cardinal contribution to the nonproliferation debate. It takes up the regulatory approach from Part II and recommends far-reaching reforms to establish a comprehensive and

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market for all weapons, which supports the world’s second biggest export industry. FRANK BARNABY, *THE ROLE AND CONTROL OF WEAPONS IN THE 1990s*, at 23 (1992). In total, the world spends approximately \$250 billion per year on weapons. *Id.*

5. See Ted G. Carpenter, *Life After Proliferation, Closing the Nuclear Umbrella*, FOREIGN AFF., Mar. 1994, at 8; see also Patrick E. Tyler, *Living with N. Korea’s Bomb*, N.Y. TIMES, Jan. 23, 1994, at 5.

6. See Defense Department Briefing, *The Administration’s Nonproliferation and Export Control Policy*, Sept. 30, 1993 (announcing Clinton administration plans to control proliferation of nuclear, chemical, and biological weapons). Consequently, the time could not be more propitious for this discussion.

integrated regime that can more capably restrict the proliferation of catastrophic weapons. The Article concludes by advocating a greater reliance on legal institutions and processes to control the international market in weapons.

## I. DEFINITION OF CATASTROPHIC WEAPONRY

### A. *Nuclear Weapons*

An atomic bomb is composed of a core of fissile material<sup>7</sup>—a minimum of either eight kilograms of plutonium (Pu-239) or twenty-five kilograms of uranium (U-235)—surrounded by superfast explosives. When the explosives are detonated, the core is imploded,<sup>8</sup> and the fissionable material instantly achieves critical mass,<sup>9</sup> causing a sustained chain reaction that releases vast quantities of energy. A thermonuclear bomb uses that energy to initiate a fusion reaction whereby hydrogen atoms are fused to form helium, thereby releasing even greater quantities of energy.<sup>10</sup>

The primary difficulty in producing a nuclear weapon lies in obtaining sufficient quantities of fissile material.<sup>11</sup> Neither plutonium nor uranium-235 exists naturally in fissile form. These materials can only be fabricated from uranium-238, which is naturally available but cannot itself sustain a chain reaction.<sup>12</sup> Uranium-238 contains small percentages of uranium-235 that must be separated by enrichment.<sup>13</sup> Although fuel for nuclear reactors (three percent U-235)

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7. An element is *fissile* if the nucleus of its atom can be split as a result of neutron bombardment with a wide range of velocities such that a chain reaction is possible. LEONARD S. SPECTOR, GOING NUCLEAR 333 (1987) [hereinafter SPECTOR, GOING NUCLEAR]. Uranium 235 and plutonium 239 are examples of fissile materials. *Id.* at 356.

8. Two basic designs used to achieve a fission explosion are the implosion technique and the gun assembly technique. See generally *id.* at 333-34 (describing basic nuclear weapon design approaches). The implosion technique uses superfast detonators called krytons to compress a mass of nuclear fuel into a supercritical configuration. *Id.* The gun assembly technique propels two subcritical masses of uranium together to create a supercritical mass. *Id.*

9. *Critical mass* is the minimum amount of material necessary to sustain a chain reaction; *supercritical mass* is an amount in excess of that level. *Id.* at 333.

10. The public record contains no evidence to indicate that any of the alleged proliferating states have the capability of constructing thermonuclear weapons, even with substantial assistance from an industrialized state. Accordingly, if a nonproliferation regime were successful in preventing the spread of atomic devices, there could be no spread of the capability to produce thermonuclear weapons. Thermonuclear weapons are only a proliferation threat because of the possible theft or sale of completed weapons from the arsenals of the former Soviet Union, a problem that the existing nonproliferation regime was not designed to contend with. See *Cold War II: Proliferation*, ECONOMIST, Dec. 11, 1993, at A28, A28.

11. SPECTOR, GOING NUCLEAR, *supra* note 7, at 327-28.

12. SPECTOR, GOING NUCLEAR, *supra* note 7, at 327-28.

13. LEONARD S. SPECTOR, THE UNDECLARED BOMB 447-48 (1988) [hereinafter SPECTOR, THE UNDECLARED BOMB].

also requires enrichment, such fuel is not sufficiently enriched to make a bomb. Making warheads with uranium-235 requires unique equipment and technology to fabricate highly enriched uranium (HEU) composed of at least ninety-three percent U-235.<sup>14</sup> The alternative to U-235 is plutonium, which does not exist in nature but which can be made from uranium.<sup>15</sup> The proliferation problem is that all uranium-fueled nuclear reactors, including those that generate electric power, produce plutonium.<sup>16</sup> Thus, any nation with a peaceful nuclear power fuel cycle that includes reprocessing will acquire significant quantities of plutonium, although serious technical complications attend efforts to use that material for bombs.<sup>17</sup>

Since their cataclysmic debut in Hiroshima nearly a half century ago, the military significance of nuclear weapons has centered more on deterring aggression and attaining a unique status of prominence than on the immediate accomplishment of war-related objectives.<sup>18</sup> The United States and the former Soviet Union deployed nuclear

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14. *Id.* at 447-48. Various enrichment processes are in use such as gaseous diffusion, centrifugation, electromagnetic, or laser isotope separation. Any enrichment technique requires considerable engineering sophistication to achieve the high concentrations needed for nuclear explosives. *Id.* Because uranium enrichment is extremely complex and costly, it is generally considered an unlikely path to proliferation. *Id.* at 448. Nevertheless, South Africa, Argentina, Brazil, India, Pakistan, and Israel have developed uranium-enrichment capabilities. *Id.*

15. See generally SPECTOR, GOING NUCLEAR, *supra* note 7, at 327-32 (explaining basics of nuclear materials production).

16. SPECTOR, THE UNDECLARED BOMB, *supra* note 13, at 449-50. Irradiation of U-238 fuel in a nuclear reactor results in the absorption of a neutron, converting stable U-238 into fissile Pu-239. *Id.* The plutonium can be separated from the uranium through a chemical separation process that is simpler than the isotope separation processes to separate U-235. *Id.* Virtually every nation that has attempted reprocessing of "spent" fuel rods (other than the declared nuclear weapons states), however, has sought outside help from the more technologically advanced nuclear-supplier countries. *Id.* at 450.

17. According to a recent report, scientists at Los Alamos National Laboratory successfully used impure plutonium from civilian reactors to produce bombs. *Uranium, Plutonium, Pandemonium*, ECONOMIST, June 5, 1993, at 98, 98. While such a bomb uses approximately seven times as much plutonium and has a low and unpredictable yield, it would still be devastating. *Id.*

18. "The global public is more impressed by what nuclear weapons can do to cities than by what such weapons might accomplish to reverse the military outcome on potential battlefields." George H. Quester & Victor A. Utgoff, *Deterrence and Proliferation*, WASH. Q., Winter 1993, at 129.

In recent years, the superpowers' possession of nuclear weapons has not successfully deterred non-nuclear nations from acts of localized, conventional aggression because the attackers discounted the possibility of a nuclear response. Iraq attacked Kuwait notwithstanding Kuwait's nuclear-equipped allies; presumably, Saddam Hussein believed that the United States, Britain, and France would not use their nuclear weapons. Similarly, Argentina seized the Falkland Islands despite Britain's possession of nuclear weapons. See generally LEONARD S. SPECTOR, CARNEGIE ENDOWMENT FOR INTERNATIONAL PEACE, NUCLEAR EXPORTS: THE CHALLENGE OF CONTROL (1990) [hereinafter SPECTOR, NUCLEAR EXPORTS]; David S. Yost, *The Delegitimation of Nuclear Deterrence?* 16 ARMED FORCES & SOC'Y 487, 488-89 (1990) (noting focus of significance of nuclear weapons with various countries).

weapons to deter each other's military threat,<sup>19</sup> although the salience of the mutual threat was potentially offset by each nation's second-strike capability.<sup>20</sup> Perversely, as the United States and Russia now agree to slash their nuclear arsenals, the threat that nuclear weapons will be acquired and perhaps used by other nations is growing.<sup>21</sup>

In addition to the five declared nuclear powers,<sup>22</sup> at least a half-dozen nations from the Middle East to the Indian subcontinent to the Korean Peninsula are actively pursuing a nuclear weapons capability and may already possess the basic technology for atomic bombs.<sup>23</sup> For non-superpowers, nuclear weapons offer a mixture of perceived prestige and potential security options.<sup>24</sup> A nation that is engaged in a long-term struggle with an adversary can radically change the rules of that confrontation by acquiring nuclear weapons.<sup>25</sup> Especially where one nation faces superior conventional forces, the acquisition of nuclear weapons may be militarily attractive.<sup>26</sup> Of course, that development also encourages the adversary to acquire nuclear

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19. For an overview of the strategic role of nuclear weapons during the Cold War, see Michael J. Mazarr, *Nuclear Weapons After the Cold War*, WASH. Q., Summer 1992, at 185 (comparing role of nuclear weapons during Cold War with role after Cold War). The military relevance of nuclear weapons to the United Kingdom and France seems to center on maintenance of influence and independence in security matters within NATO. See generally McGeorge Bundy et al., *Nuclear Weapons and the Atlantic Alliance*, 60 FOREIGN AFF. 753 (1982) (discussing relative positions of France, West Germany, United States, and United Kingdom within NATO).

20. See generally Robert S. McNamara, *The Military Role of Nuclear Weapons: Perceptions and Misperceptions*, 62 FOREIGN AFF. 59 (1983) (asserting that potential destructive power of nuclear weapons was so great that neither superpower could reasonably consider using them and that they were thus irrelevant to East-West balance of power).

21. This phenomenon has led at least one commentator to question the continued viability of the regime to prevent nuclear proliferation. See Rodney W. Jones, *Strategic Responses to Nuclear Proliferation*, WASH. Q., Summer 1983, at 89, 92-93 (discussing frictions in "Nonproliferation Regime," including dissension during second Review Conference of Nuclear Non-Proliferation Treaty).

22. Cf. Treaty on the Non-Proliferation of Nuclear Weapons, opened for signature July 1, 1968, art. IX, ¶ 3, 21 U.S.T. 483, 492-93, 729 U.N.T.S. 161, 174 ("For the purposes of this Treaty, a nuclear-weapon State is one which has manufactured and exploded a nuclear weapon or other nuclear explosive device prior to January 1, 1967."). The five nuclear weapon states were the United States, Great Britain, the Soviet Union, China, and France.

23. See George J. Church, *Who Else Will Have the Bomb?*, TIME, Dec. 16, 1991, at 42, 42 (noting numerous nations that have built uranium-enrichment facilities and are attempting to acquire nuclear weapons).

24. See generally BARNABY, *supra* note 4, at 116-18 (1992) (noting various reasons why non-superpowers desire nuclear weapons).

25. For a discussion of the political motivations behind the acquisition of nuclear weapons by Israel, South Africa, and India, see MITCHELL REISS, WITHOUT THE BOMB: THE POLITICS OF NUCLEAR NONPROLIFERATION 255-60 (1988).

26. For example, Israel, China, India, and Pakistan developed nuclear capabilities because each perceived a regional threat to its security as well as a need to enhance its overall military stature. See George H. Quester & Victor A. Utgoff, *U.S. Arms Reductions and Nuclear Nonproliferation: The Counterproductive Possibilities*, WASH. Q., Winter 1993, at 129, 131, 133.

weapons for deterrence.<sup>27</sup> This spread of nuclear capabilities weakens technological constraints on proliferation. Moreover, increasing sources of supply undermine international control efforts and diminish proliferators' vulnerability to possible consequences.

### B. Chemical Weapons and Toxins

At least twenty-five countries have or are developing chemical weapons.<sup>28</sup> Chemical weapons, which typically are nerve agents,<sup>29</sup> are the easiest of all catastrophic weapons to produce. Closely related to nerve agents, toxins are inanimate poisonous substances produced by living organisms that are effectively identical to chemical-warfare agents in purpose and effect,<sup>30</sup> although most toxins cannot penetrate the skin and are not dispersable as a windborne vapor.<sup>31</sup>

While chemical weapons bear the moniker "the poor man's atomic bomb" because producing them is a comparatively cheap way to generate terror,<sup>32</sup> this designation ignores significant technological and military distinctions. In contrast to nuclear weapons, chemical weapons have an extensive history of battlefield use, most notably during World War I.<sup>33</sup> Despite the revulsion caused by that experi-

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27. See George W. Rathjens & Marvin M. Miller, *Nuclear Proliferation After the Cold War*, TECH. REV., Aug. 1991, at 25, 27 ("Iraq's nuclear program was motivated by its desire to end Israel's nuclear monopoly in the Middle East. Had Iraq's nuclear program not been severely damaged as a result of allied bombing, Iran and Syria and perhaps even Egypt would have had strong motivations to move ahead themselves.").

28. States suspected of possessing or developing chemical weapons include Bulgaria, Myanmar, China, Cuba, the Czech Republic, Egypt, Ethiopia, France, Hungary, India, Indonesia, Iran, Israel, Libya, North Korea, Pakistan, Romania, Saudi Arabia, South Africa, South Korea, Syria, Taiwan, Thailand, and Vietnam. *Weapons Proliferation in the New World Order: Hearings Before the Senate Comm. on Governmental Affairs Comm.*, 102d Cong., 2d Sess. 36-41 (1992) (testimony of Robert M. Gates, Director, Central Intelligence Agency) [hereinafter *Hearings on Weapons Proliferation*].

29. Maj. Lawrence E. Rouse, *The Disposition of the Current Stockpile of Chemical Munitions and Agents*, 121 MIL. L. REV. 17, 19 (1988). The U.S. chemical stockpile contains three nerve agents (Tabun, Sarin, and VX) and four types of mustard gases (known simply as H, HD, HT, and Lewisite). *Id.*

30. See Matthew Meselson et al., *Verification of Biological and Toxin Weapons Disarmament*, reprinted in *Biological Weapons Act of 1989; Inter-American Convention on International Commercial Arbitration: Hearings on H.R. 237 and H.R. 4314 Before the Subcomm. on Immigration, Refugees, and International Law of the House Comm. on the Judiciary*, 101st Cong., 2d Sess. 50, 52 (1990) [hereinafter *Hearings on Biological Weapons Act*].

31. See Jonathan B. Tucker, *Gene Wars*, FOREIGN POL'Y, Winter 1984/85, at 58, 65 (discussing limitations on military effectiveness of toxins).

32. See, e.g., R. Jeffrey Smith, *Long-Term Crackdown on Iraq Faces Obstacles; Experts See Political, Economic Problems in Averting Spread of Weapons of Mass Destruction*, WASH. POST, Sept. 20, 1990, at A27; Malcolm W. Browne, *Confrontation in the Gulf; To Baghdad, Poison Gas Is 'Poor Man's A-Bomb'*, N.Y. TIMES, Aug. 9, 1990, at A19; Marie Isabelle Cherrier, *The Poor Man's Atom Bomb*, N.Y. TIMES, Aug. 27, 1989, at G19.

33. See generally Edward Corcoran, *Assessing the Military Utility of Chemical Weapons*, in NEW TECHNOLOGIES FOR SECURITY AND ARMS CONTROL: THREATS AND PROMISE 287, 287-90 (Eric H. Arnett ed., 1989) (discussing chemical weapons use during World War I).



ence, chemical weapons subsequently have been used, most recently by Iraq against the Kurds and in the Iran-Iraq War.<sup>34</sup> A second distinction is that, unlike nuclear weapons, chemical weapons have negligible destructive capability and are wholly unable to demolish hardened military installations or supply sites.<sup>35</sup> Indeed, the primary military utility of chemical weapons lies in their ability to annihilate unequipped adversary populations without harming roads, buildings, or physical infrastructure.<sup>36</sup> Thus, if the military objective is to subjugate a nearby rebellious population, chemical weapons have a sharp advantage over nuclear bombs.

### C. *Biological Weapons*

Biological weapons agents are living organisms that infect attacked victims, causing disease, incapacitation, and often death.<sup>37</sup> Like chemical weapons, the military utility of biological weapons lies in their ability to cause mass death without destroying infrastructure.<sup>38</sup> But biological weapons tend to be "slow-acting, unreliable, indiscriminate, unpredictable in their dispersal and effectiveness, capable of backfiring on the attacker, and likely to cause more damage to nearby civilian populations than to enemy forces."<sup>39</sup> Still, biological weapons have advantages as small-scale, covert terrorist weapons.<sup>40</sup> Their

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34. *Winds of Death: Iraq's Use of Poison Gas Against Its Kurdish Population, in Global Spread of Chemical and Biological Weapons: Hearings Before the Senate Comm. on Governmental Affairs*, 101st Cong., 1st Sess. 657, 663-79 (1989) (report by Physicians for Human Rights) (documenting Iraq's use of chemical weapons).

35. See Graham S. Pearson, *Prospects for Chemical and Biological Arms Control: The Web of Deterrence*, WASH. Q., Spring 1993, at 145, 146-49 (comparing destructive capabilities of nuclear, chemical, and biological weapons).

36. See generally Corcoran, *supra* note 33, at 287-301. Corcoran notes:

Historical experience makes it clear that chemical weapons have high military utility in situations where one side is technologically inferior, particularly when one side lacks protective gear or even an understanding of chemical protection. Between opponents more equally matched, chemical agents, especially nerve gases, can cause significant casualties if surprise or high agent concentrations can be achieved. However, because of the need for carefully coordinated delivery and uncertainties such as target preparedness and weather, chemical weapons cannot be depended upon to provide reliable results.

*Id.* at 300.

37. For an extensive list of biological agents, see Gordon M. Burck, *Biological, Chemical, and Toxin Warfare Agents*, in PREVENTING A BIOLOGICAL ARMS RACE 352, 362-66 (Susan Wright ed., 1990).

38. BAREND TER HAAR, *THE FUTURE OF BIOLOGICAL WEAPONS* xxi (1991). Because biological agents reproduce themselves, they do not require large quantities of precursors. Whereas the definition of militarily relevant quantities of chemical warfare agents ranges from 80 to 1000 tons, U.S. experts have concluded that less than one kilogram per square kilometer of biological agents would be sufficient to cause more than 60% casualties. *Id.* at 82.

39. Tucker, *supra* note 31, at 61.

40. See Richard Novick & Seth Shulman, *New Forms of Biological Warfare?*, in PREVENTING A BIOLOGICAL ARMS RACE, *supra* note 37, at 103, 117 (noting possibility of biological weapons

slow-acting effects resemble natural maladies, making it difficult for the victim to attribute damage to an enemy.<sup>41</sup>

Developing and producing reliable weapons based on infectious agents requires commitments of large technical resources and poses serious performance drawbacks. Bacterial agents decompose rapidly, and viral agents can be damaged by exposure to sunlight.<sup>42</sup> In addition, biological weapons used in a regional conflict may infect the attacker or its civilian population.<sup>43</sup> Despite these problems, many nations could produce crude biological weapons with low reliability.<sup>44</sup> A well-equipped microbiological laboratory comparable to those in many modern hospitals can produce large quantities of agents from infectious strains of microorganisms.<sup>45</sup> Gene splicing, which uses recombinant-DNA technology, might lead to the production of vaccines that would enable a country to immunize its troops or population in preparation for a biological offensive.<sup>46</sup>

#### D. Ballistic Missiles

Ballistic missiles<sup>47</sup> rapidly deliver immense firepower over long distances and with little warning. Twenty countries have or are developing operational ballistic missiles.<sup>48</sup> Compared to other

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employed for covert or terrorist uses).

41. KATHLEEN C. BAILEY, *DOOMSDAY WEAPONS IN THE HANDS OF MANY: THE ARMS CONTROL CHALLENGE OF THE 90's*, at 84-85 (1991).

42. See *id.* at 87-90 (discussing technical problems with development and use of biological weapons).

43. But see Graham S. Pearson, *Prospects for Chemical and Biological Arms Control: The Web of Deterrence*, WASH. Q., Spring 1993, at 145, 147. "Although the use of biological weapons in conflict has not been so unequivocally demonstrated, it is known that in conflicts involving conventional weapons more casualties result from disease than from the use of conventional weapons. In addition, past offensive biological programs have demonstrated the utility of such weapons by all means short of their actual use in war." *Id.*

44. See Meselson et al., *supra* note 30, at 51 (stating that "rudimentary but highly dangerous biological weapons of lower reliability could be produced with much less effort and expense [than nuclear weapons], using widely available technology").

45. See Tucker, *supra* note 31, at 66 (noting that facilities can be set up without large-scale financial investment). Moreover, the necessary scientific expertise is readily accessible through scientific literature. *Id.*

46. See Tucker, *supra* note 31, at 62-63 (noting potential use of recombinant-DNA technology in conjunction with use of biological weapons).

47. A ballistic missile is technically distinguishable from an unguided artillery rocket by the ballistic missile's guidance and control system—the most expensive and technologically advanced subsystem in a ballistic missile. Moreover, guided missiles may be multistaged, enabling them to attain considerably longer ranges. Azriel Lorber, *Tactical Missiles: Anyone Can Play*, BULL. OF ATOM. SCIENTISTS, Mar. 1992, at 38; see also Barbara Starr, *Ballistic Missile Proliferation: A Basis for Control*, 23 INT'L DEF. REV. 265, 266 (1990) (describing missile capabilities of various countries in Africa, Asia, Middle East, and South America).

48. See BARNABY, *supra* note 4, at 28 (listing Algeria, Argentina, Brazil, Egypt, Greece, India, Iran, Iraq, Israel, Kuwait, Libya, North Korea, Pakistan, Saudi Arabia, South Africa, South Korea, South Yemen, Syria, Taiwan, and Turkey as countries with active ballistic missile programs); see

delivery systems, ballistic missiles have distinctive traits that cause great concern about their proliferation, notably the speed at which they travel and their ability to elude air defenses.<sup>49</sup> While aircraft can carry far greater payloads, usually for greater distances, and can be reused, the cost of even a basic plane exceeds the estimated cost of a ballistic missile at least twentyfold, not including the possible cost of losing a trained pilot.<sup>50</sup>

A nuclear-tipped ballistic missile presents fearsome possibilities. Because a nuclear warhead packs extraordinary explosive force, the missile would not have to be especially accurate to destroy civilian targets.<sup>51</sup> Chemical warheads atop missiles could also devastate civilian targets. Ten of the states developing a ballistic missile capability are also developing chemical warfare capabilities.<sup>52</sup> That fact notwithstanding, a ballistic missile can be a calamitous weapon even when fitted with a conventional warhead.<sup>53</sup>

To pose a serious ballistic missile threat, a state must have three distinct technological capabilities: a propulsion system;<sup>54</sup> missile design, including booster and reentry vehicle; and guidance and control systems.<sup>55</sup> A growing list of developing countries are developing and testing launch vehicles.<sup>56</sup> To be accurate, "[a]

also *Hearing on Proliferation Threats*, *supra* note 3, at 51-56 (testimony of James Woolsey, Director, Central Intelligence Agency) (stating that increasing number of nations have operational ballistic missiles and missile-development programs).

49. See generally JANNE E. NOLAN, TRAPPINGS OF POWER: BALLISTIC MISSILES IN THE THIRD WORLD 64-73 (1991) (comparing and contrasting ballistic missile and manned aircraft delivery systems).

50. Steven Zaloga, *Ballistic Missiles in the Third World: Scud and Beyond*, 21 INT'L DEF. REV. 1423, 1425 (1988). Not all experts, however, are alarmed by the threat of missile proliferation. See NOLAN, *supra* note 49, at 64-73 (arguing that ballistic missiles without sophisticated and highly destructive warheads are no more militarily decisive than manned aircraft).

51. Mark D. Mandeles, *Between a Rock and a Hard Place: Implications for the U.S. of Third World Nuclear Weapon and Ballistic Missile Proliferation*, 1 SECURITY STUD. 235, 239 (1991).

52. See *supra* note 48 (identifying countries with operational ballistic missile programs); see also *National Defense Act for Fiscal Year 1990—H.R. 2461 and Oversight of Previously Authorized Programs: Hearings Before the Subcomm. on Seapower and Strategic and Critical Materials of the House Comm. on Armed Services*, 101st Cong., 1st Sess. 39-40 (1989) (statement of Rear Admiral Thomas A. Brooks, Director of Naval Intelligence) (noting various countries developing or possessing chemical weapons capabilities).

53. With increased missile accuracies, the threat from proliferating conventional munitions, such as fuel-air explosives or cluster munitions, increases with devastating implications. See Dennis M. Gormley, *Emerging Attack Options in Soviet Theater Strategy*, in SWORDS AND SHIELDS: NATO, THE USSR, AND NEW CHOICES FOR LONG-RANGE OFFENSE AND DEFENSE 87, 108-113 (Fred S. Hoffman et al. eds., 1987). Indeed, during the height of the Cold War, NATO viewed Soviet theater missiles armed with advanced conventional warheads as a major threat and responded by developing theater missile defenses during the 1980s. *Id.*

54. See BAILEY, *supra* note 41, at 97-101.

55. See BAILEY, *supra* note 41, at 101-02.

56. See BAKER SPRING, HERITAGE FOUND., SPACE WEAPON SYSTEMS: A LOOMING PROLIFERATION THREAT 6-7 (1992) (noting that India, Iraq, and Israel have demonstrated launch vehicles, and that Argentina, Brazil, Ecuador, Indonesia, South Africa, and South Korea are widely

ballistic missile must be placed very precisely at a given point in space, angled exactly so as to enter a specific orbit, and travel at a precise velocity. A tiny error in any of these variables can result in significant degradation of accuracy.<sup>57</sup> To be practical, missiles must be able to change velocity or injection angle in order to hit different targets at various ranges.<sup>58</sup> For this reason, almost all developing countries that produce missiles for explicit military purposes have imported guidance systems from suppliers in the industrialized world or converted inertial navigation systems used in conventional aircraft for missile use.<sup>59</sup> In addition, establishing a ballistic missile force involves an operational capability to deploy missiles in a basing mode, commanded by a central command network.<sup>60</sup> Understandably, therefore, states that are seeking missile capabilities have recently purchased data from observation satellites.<sup>61</sup>

Besides ballistic missiles, the proliferation of cruise missiles is a growing concern. Cruise missiles are far simpler to produce, especially for nations that have sufficient technological capability to build small aircraft.<sup>62</sup> "Adapting an aircraft navigation system to make a cruise missile is a much simpler task than converting it for ballistic missile guidance."<sup>63</sup> The major complexity is guiding the unmanned missile. Cruise missile guidance systems now can use the Global Positioning System (GPS), a series of satellite markers that emit signals for navigation, to achieve remarkable accuracy.<sup>64</sup>

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regarded as working on similar capabilities).

57. BAILEY, *supra* note 41, at 101.

58. See BAILEY, *supra* note 41, at 101-02. These capabilities require sophisticated accelerometers and gyroscopes, which make up the inertial navigation system. Fabrication of these parts is complex, requiring near-perfect construction by state-of-the-art equipment. *Id.*

59. See NOLAN, *supra* note 49, at 34 (discussing manner in which developing countries acquire guidance systems). Concerned about the commercial availability of such dual-use guidance systems, the United States has imposed controls on the export of inertial navigation and associated technologies under the Missile Technology Control Regime. See Agreement on Guidelines for the Transfer of Equipment and Technology Related to Missiles, Apr. 26, 1987, 26 I.L.M. 599.

60. See Thomas G. Mahnken, *The Arrow and the Shield: U.S. Responses to Ballistic Missile Proliferation*, 14 WASH. Q., 189, 194-95 (1991) (discussing steps required to establish ballistic missile force beyond development and testing of prototype missiles).

61. See Michael Krepon, *Spying from Space*, FOREIGN POL'Y, Summer 1989, at 92, 92. Two enterprises that make satellite images available on global commercial markets are Earth Observation Satellite Corporation in the United States and SPOT Image Corporation in France. *Id.* at 93-94; SPRING, *supra* note 56, at 12.

62. See generally *The Cruise Missile Issue*, HERITAGE FOUND. NAT'L SECURITY REC., Aug. 1, 1988, at 1.

63. BAILEY, *supra* note 41, at 103.

64. See generally BAILEY, *supra* note 41, at 103-04 (describing GPS and discussing relative ease of GPS utilization to guide cruise missiles to within 100 meters of their projected targets).

## II. THEORIES OF NONPROLIFERATION

There are two approaches to problems of catastrophic weapons proliferation: realpolitik and legal regulation. These approaches are not mutually exclusive; indeed, neither can succeed in the total absence of the other. Yet, the extent to which nonproliferation policy stresses one approach over the other has profound implications. This Part argues that while the realpolitik approach has dominated strategic thinking for most of the postwar era, it has become ensnared in conflicts between neo-cold warriors and so-called progressives.<sup>65</sup> Today, the chief contribution of the realpolitik approach is the genesis of a new synthesis that is embodied in the regulatory approach.

The choice of a proliferation policy essentially revolves around three questions to which the realpolitik and regulatory approaches give pivotally different answers. First, what is the proliferation problem that must be addressed—what is the core cause of that problem and at whom or what, therefore, should policy be directed? Second, what is the ultimate security goal that nonproliferation policy should strive to achieve, and through what framework should that policy seek to achieve its objectives? And third, what standards and modalities should that policy adopt, especially concerning means of enforcement and sanctioning proliferators?

In brief, the central concern of the realpolitik approach is to prevent the *use* of certain types of weapons; policy thus should be aimed at acquirors of weapons to deter their use. According to this approach, the ultimate objective of nonproliferation policy is to preserve and promote hegemony and security, a goal that is best accomplished through a web of strategic alliances. These alliances vary from nation to nation, from time to time, and with regard to what types of interests may be involved. Consequently, standards of conduct, the means of their enforcement, and the consequences for noncompliance are unclear and not preestablished. Instead, political leaders address these issues on an ad hoc basis.

In contrast, the central concern of the regulatory approach is to

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65. See Lewis A. Dunn, *Rethinking the Nuclear Equation: The United States and the New Nuclear Powers*, WASH. Q., Winter 1994, at 2. This debate is not new to the Clinton administration. Indeed, a decade ago, Rodney W. Jones of the Center for Strategic and International Studies identified the underlying similarities of the approaches taken by the Carter administration and the initial Reagan administration: "The Reagan team . . . appears to be more inclined to emphasize the carrot than the stick in the field of international nuclear cooperation, while the Carter administration was less inhibited about using the stick and also less generous in offering the carrot." Rodney W. Jones, *Strategic Responses to Nuclear Proliferation*, WASH. Q., Summer 1983, at 89, 93.

deny *access* to certain types of weapons technologies; policy thus should aim at suppliers of weapons to control their availability. According to this approach, nonproliferation policy ultimately should deflate the international trade in catastrophic weaponry by establishing international regimes. These regimes should remove proliferation issues from the vagaries of political decisionmaking by specifying strict standards of conduct and prescribing the means of their enforcement with clearly stipulated consequences for noncompliance.

The remainder of this Part highlights the differences between the two approaches and suggests that the regulatory approach is superior to the *realpolitik* approach. In the final analysis, advocacy of a regulatory approach carries with it an obligation to demonstrate its meaning. The remaining three Parts of this Article attempt to do that by examining how the regulatory approach would analyze and respond to catastrophic weapons proliferation in the mid-1990s.

#### A. *Deterring Nations from Using Weapons or Preventing Weapons Acquisition*

##### 1. *Realpolitik*

The *realpolitik* approach begins with the assertion that the central focus of weapons control is to prevent the *use* of certain types of weapons.<sup>66</sup> What weapons a nation possesses is less determinative than its government's stability and whether it is a friend or an adversary; a stable ally may be less likely to use catastrophic weapons.<sup>67</sup> A logical corollary to this approach is that the best way to achieve security against nations that might use catastrophic weapons is to deploy sufficient military capability to deter attack.<sup>68</sup>

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66. Seth Cropsey, *Life After Proliferation; The Only Credible Deterrent*, FOREIGN AFF., Mar. 1994, at 14. See also John M. Deutch, *The New Nuclear Threat*, FOREIGN AFF., Fall 1992, at 120, 120 ("The ultimate objective is to assure that there is no nuclear use."). Some commentators have argued that because nuclear weapons engendered prudence between the superpowers during the Cold War, the same logic should hold that the spread of nuclear weapons to other nations could create peaceful regional nuclear balances. See generally KENNETH WALTZ, *THE SPREAD OF NUCLEAR WEAPONS: MORE MAY BE BETTER* (1981) (arguing that nonproliferation policy is wrong). But see Joseph S. Nye, Jr., *The Cause for Concern: Is Non-Proliferation Policy Mistaken?*, 14 HARV. INT'L REV. 8 (1992) (rejecting logic of regional deterrence and arguing for nonproliferation).

67. Cf. BAKER SPRING, HERITAGE FOUND., *FOUR PRINCIPLES FOR CURTAILING THE PROLIFERATION OF BIOLOGICAL AND CHEMICAL ARMS* 1-2 (1991) ("Another problem with arms control agreements attempting to eliminate biological and chemical weapons is that they treat non-aggressive and aggressive nations alike. This implies that the arms themselves, and not their users, threaten the peace. But all nations are not equally aggressors.").

68. *Id.* at 10. Spring notes:

Deterrence means convincing a potential adversary that the cost of resorting to force is too high. It also means convincing an enemy that the use of weapons of mass

Accordingly, a nonproliferation policy should encourage the forging of friendships with governments where possible and bolster the stability of those that exhibit signs of friendship.<sup>69</sup> Allies of the United States should possess the military capability to deter attack from unfriendly states.<sup>70</sup> Conversely, states that are unfriendly to the United States should be militarily (and perhaps economically) weakened if possible, and, in extreme cases, their military capabilities should be destroyed.<sup>71</sup> Judgments as to other nations' intentions are thus decisive in weapons exports determinations.

Unlike the regulatory approach, realpolitik does not focus on international suppliers of weapons. Rather, international suppliers of military capability are as commendable or culpable as the customers with whom they deal. To the extent that these suppliers sell only to allies, they provide a beneficial service; but if they sell to adversaries, their efforts are deplored. Arms suppliers thus are merely ancillary implements to the central task of strengthening allies and weakening adversaries.

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destruction, will bring swift retaliation in kind. . . . America does not require a massive chemical weapons arsenal. It does need, however, at least some of these arms to threaten retaliation. It also needs a strong research and development program to remain abreast of technological developments.

*Id.*; see also Walter B. Slocombe, *The Continued Need for Extended Deterrence*, WASH. Q., Autumn 1991, at 157, 172. Slocombe writes:

Nuclear weapons will retain their fundamental role for many years, even in an optimistic scenario, because there will be an overhanging possibility not merely of transient ups and downs in Soviet progress but of fundamental Soviet relapse, an event that would again require active nuclear deterrence for world stability and U.S. security.

*Id.* One author warns that efforts to control the dissemination of knowledge necessary to construct catastrophic weapons are doomed and suggests that the United States reevaluate its nonproliferation strategy. Ronald F. Lehman II, *Arms Control: Passing the Torch as Time Runs Out*, WASH. Q., Summer 1993, at 37, 42-47.

69. Lehman, *supra* note 68, at 42. Lehman argues:

In time, efforts to control the spread of technology and materials that would permit construction of weapons of mass destruction are doomed. . . . U.S. nonproliferation strategy must be designed to ensure that [nations capable of establishing catastrophic weapons programs] do not feel compelled to change their policy. For close U.S. allies and for many other nations around the world, stability tacked by the confidence that the United States will continue its strong diplomatic and military leadership is the key to continued forbearance in the acquisition of weapons of mass destruction.

*Id.*

70. For example, former National Security Council staff member Richard Haas suggested that the United States "work with both Pakistan and India to 'enhance their command and control systems . . . [and] even selectively enhance nuclear capabilities to strengthen retaliatory potential and, thus, reinforce mutual deterrence.'" John Glenn, *At a Crossroads: An Examination of U.S. Nuclear Non-Proliferation Policy*, 14 HARV. INT'L REV. 18, 19 (1992).

71. See SPRING, *supra* note 67, at 12 ("An effective defense policy for countering biological and chemical weapons must include the capability to destroy the weapons' production facilities and stockpiles and the aircraft, artillery, and other systems used to deliver the biological and chemical agents against American troops.").

## 2. *Regulation*

The regulatory approach takes sharp issue with these realpolitik arguments, relying instead on the premise that the *possession* of weapons, in and of itself, is deplorable for at least three reasons. First, even an ally that is a responsible member of the world community might, in the event of a crisis, be tempted to use its military capability despite having promised to forbear in less critical times.<sup>72</sup> That use, even if against an adversary of the United States, could have unpredictable and uncontrollable repercussions apt to destabilize international security.<sup>73</sup> Second, the responsible ally that possesses catastrophic weapons may experience an abrupt change of government, leaving sophisticated weaponry in far less reliable hands. The experience of arming the Shah of Iran during the 1970s, only to find those weapons in the hands of the Ayatollah Khomeini, demonstrates the danger of assuming that an ally will remain in power perpetually.

Third and most important, a nation that produces and possesses catastrophic weapons, even though it has no intent to use them, heightens anxiety among its neighbors and adversaries, and raises the probability of violent confrontation for preemptive or other purposes.<sup>74</sup> The United States could respond to this dilemma by supplying its allies with defensive mechanisms, such as anti-tactical ballistic missile capabilities. Access to such technologies, however, can assist states in developing offensive missiles.<sup>75</sup>

Ultimately, the concept of deterrence contains the elements of its antithesis: a weapons-development program intended to increase a

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72. See generally Barend ter Haar & Peit de Klerk, *Verification of Non-Production: Chemical Weapons and Nuclear Weapons Compared*, 8 ARMS CONTROL 197, 197-200 (1987) (noting that policy prior to World War II was to prevent use of certain weapons, whereas current strategy is to prevent development and stockpiling).

73. Janne E. Nolan, *The Conventional Arms Market After Iraq: Prospects for Control*, 14 DISARMAMENT 10, 18 (1991).

74. See Robert J. Lieber, *Existential Realism After the Cold War*, WASH. Q., Winter 1993, at 155, 157. Lieber states:

[I]n an anarchic international environment, states tend to arm themselves for self-protection. This has the effect of stimulating others to do likewise and thus causing all states to be potentially threatened.

Even when a state has no desire to attack another, the other state cannot be sure that its intentions are peaceful, or will remain so; hence each must accumulate power for defense. Because no state can know that the power accumulation of others is defensively motivated, each must assume that it might be intended to be offensive. Consequently, each state matches the other's power increments, and neither winds up any more secure than when the vicious cycle began; the economic and social costs incurred in acquiring and maintaining military power punctuate the futility of the arms race.

*Id.*

75. Nolan, *supra* note 73, at 17.



nation's destructive capability necessarily jeopardizes an adversary, thereby inducing that adversary to increase its capabilities, which in turn generates the need for a response by the first actor, *ad nauseam*.<sup>76</sup> The result is the arms race that has characterized international affairs for decades. At some point, arguably reached long ago, the logic of deterrence begins to undermine the accomplishment of deterrence—the accumulation of enormous arsenals of incredible destructiveness raises the risks of war through accident, terrorism, or national bankruptcy. The fundamental thesis of military security through deterrence, while arguably accurate during the Cold War,<sup>77</sup> must give way to a new strategic approach.

The regulatory approach's great virtue is its attempt to be nondiscriminatory. It is also far more objectively enforceable because it proposes a basis for evaluating a nation's conduct rather than its intent. Thus, the possession of catastrophic weapons, not the inclination of a government to use them, is the offensive activity. A corollary proposition holds that because suppliers of catastrophic weaponry are, by definition, culpable violators of world order, their activities must be corralled regardless of who their clients are. Rather than being ancillary to client governments, weapons suppliers should be the central focus of policy because they furnish the market that accelerates the demand for more sophisticated weapons.

### *B. Hegemony Through Alliances or Disarmament Through Regimes*

#### *1. Realpolitik*

The realpolitik approach views nonproliferation as one method among many to advance a wide set of national and international interests.<sup>78</sup> As already stated, its ultimate goal is keeping reliable allies heading stable governments throughout the world. Reliability and stability can be fostered through a combination of economic

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76. See generally PHILIP BOBBITT, *DEMOCRACY AND DETERRENCE* (1988) (examining assumptions and concepts surrounding nuclear deterrence in international relations); ROBERT JERVIS ET AL., *PSYCHOLOGY AND DETERRENCE* (1989) (noting importance of determining other side's intentions and underscoring need for states to develop policies that can both deter and reassure).

77. See Jack Mendelsohn, *Dismantling the Arsenals*, 10 BROOKINGS REV. 34, 39 (1992) ("Ironically, the problem [with proliferation] is largely the result of the developed world's own policies during the Cold War, when arming the enemy of one's enemy was considered to be the height of sophisticated geopolitics.").

78. See Lehman, *supra* note 68, at 37-38. Nonproliferation is but one of five interrelated arms control tasks, including sustaining new democracies, easing regional and ethnic conflict, strengthening international norms against political oppression, and ensuring continuing international leadership by the United States. *Id.*

development and increased democratization.<sup>79</sup> If affording access to militarily critical technologies is necessary to those efforts, on balance it may be preferable to tolerate a marginal increase in proliferation.<sup>80</sup> This is not to say that nonproliferation is necessarily a low priority, but rather that, among all the priorities that diplomats must consider, nonproliferation has no preordained primacy. Every decision that could implicate nonproliferation must be evaluated according to a myriad of considerations on an essentially ad hoc basis.<sup>81</sup>

Compounding this view of ad hoc decisionmaking is a strong commitment to the concept of state sovereignty. Each nation is an entirely free actor in world affairs, constrained only by the self-interested realization that its activities may incur the wrath of other nations to its detriment. The anarchy resulting from the absence of a central authority to resolve disputes or provide security requires that each state promote its interests through force (military, economic, cultural, or otherwise) rather than through the rule of law.<sup>82</sup> Again, the exigencies of the moment in the context of shifting local, regional, and global power allocations demand that even the best intentioned nonproliferation efforts be evaluated with many other interests on a case-by-case basis.

In the midst of this anarchic environment, the need for stability is

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79. See Lehman, *supra* note 68, at 50-51. Lehman writes:

[T]he spread of democracy, human rights, and the rule of law remains the most effective means of implementing arms control. Flexibility and imagination in U.S. arms-control efforts have already helped promote political reform even as they have helped manage the risks that are the inevitable result of change even when a shift in the political winds is welcome.

Arms control alone, however, will not create stability or improved relations. Nor can it replace solid defense policies and budgets.

*Id.*

80. See Peter Montgomery, *Re-Arm the World*, COMMON CAUSE, May/June 1991, at 25, 29 ("Arms transfers, judiciously used, can help to deter aggression; strengthen mutual security relationships; and foster internal and regional stability. Military assistance gives the United States some influence over how its weapons are used, influence that disappears if the buyer shops elsewhere.").

81. See generally Ernest Graves, *Foreign Assistance After the Cold War*, WASH. Q., Summer 1991, at 47, 56 (stating that military aid and arms sales will remain important in establishing regional support for U.S. crisis operations, but noting that major regional crises will require collaboration among Western powers, with regard to both restriction of regional militarization and power projection).

82. See Lieber, *supra* note 74, at 152. Lieber writes:

As a consequence of the anarchy problem, states find that they dwell in a kind of self-help system. They either must be prepared to defend their own interests and those of other people, or to see means of doing so through alliances. These realities of existential realism do not yield iron laws, but they do create a series of propensities shaping state behavior.

*Id.*

achieved through alliances.<sup>83</sup> Alliances have historically served important strategic purposes by allowing nations to spread the burden of deterrence for their mutual security.<sup>84</sup> Alliances are essentially collective security contracts among sovereigns.<sup>85</sup> By joining an alliance, a nation agrees to limits on its absolute freedom of action but sacrifices none of its sovereign prerogatives. In an alliance, one nation may have more power than another, but no nation or other entity has any legal authority over another. Each nation participates to the extent that its own self-interests dictate; like any contract, it can be breached at will, albeit with possible consequences imposed by other parties. Alliances are thus exclusively horizontal, or two-dimensional, arrangements that facilitate the execution of the myriad interests that allied states must pursue and in which nonproliferation efforts are only one ingredient.<sup>86</sup> Indeed, in alliances where arms sales are the recognized currency of diplomacy and indicate friendship and sustain goodwill, nonproliferation efforts may actually undermine the relationship's stability.<sup>87</sup>

## 2. Regulation

The regulatory approach again differs both as to the premise and the conclusion of the argument. Undeniably, nonproliferation is not the only or even the supreme interest of international relations, but

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83. An alliance may be defined as "formal associations of states for the use (or non-use) of military force, intended for the security or the aggrandizement of their members, against specific other states, whether or not these others are explicitly identified." Glenn Snyder, *Alliance Theory: A Neorealist First Cut*, 44 J. INT'L AFF. 103, 104 (1990); see also STEPHEN M. WALT, *THE ORIGINS OF ALLIANCES* 17 (Robert J. Art & Robert Jarvis eds., 1987) (suggesting that when states are confronted by significant external threats, they either *balance*, which is defined as "allying with others against the prevailing threat," or *bandwagon*, which "refers to alignment with the source of danger").

84. John Simpson, *Trends in the Proliferation of Sophisticated Weapons and Missile Technology and Their Implications for International and Regional Security*, 14 DISARMAMENT 40, 49 (1991) ("An alliance is a traditional method of increasing the military capabilities of a State, and this arrangement has become so institutionalized . . . that any other way of approaching security appears unthinkable.").

85. See generally ASHTON B. CARTER ET AL., BROOKINGS INST., *A NEW CONCEPT OF COOPERATIVE SECURITY* 7 (1992) (suggesting that purpose of cooperative security arrangements is to prevent war and ensure that organized aggression cannot start on any large scale).

86. See Graves, *supra* note 81, at 47. Graves states:

In such arrangements the supply of arms and training is aimed at deterring aggression and enabling the recipients to resist any incursion at least until the other member states can join in engaging the aggressor. . . . The supply and acceptance of arms are presumed by the parties to be tangible quid pro quos in their relations that afford each government some influence with the other.

*Id.*

87. See Nolan, *supra* note 73, at 11 (noting that conventional arms transfer restraint has never proven to be effective for international diplomacy, as compared to regulation of nuclear or chemical weapons).

the regulatory approach asserts that nonproliferation should be pursued as an end in itself rather than as a means to a broader and less definable pursuit of national security.<sup>88</sup> Accordingly, there is merit in efforts to reduce the quantity and distribution of catastrophic weapons without regard to whether such reduction strengthens stability, economic development, or democratization.

The concept of state sovereignty has a more sophisticated meaning under the regulatory approach than under *realpolitik*. While each state clearly has a zone of interests within which it must operate free from outside interference, the global community also has interests to which each state must defer, at least if that state chooses to participate in global trade and politics. According to the regulatory approach, governments should not be absolutely free to stockpile or trade catastrophic weaponry any more than they should be free to abuse the basic human rights of their own citizens or endanger the environment.<sup>89</sup> While nations once may have had ungoverned power to respond to changing needs and conditions at will, such a notion is simply out of date at the beginning of the third millennium.

Proliferation should be viewed, therefore, as a problem of the global commons. One nation's offensive conduct not only affects itself but threatens other nations and, in fact, has ramifications throughout significant segments of the international community. Furthermore, to correct that nation's offensive conduct necessarily means imposing similar controls on all other nations that might be tempted to fill a market or strategic void if the target nation alone were disciplined. Nonproliferation policy should strive to develop criteria and standards that guide policy across nations and over time in a consistent and uniform manner.<sup>90</sup> Indeed, formulation of

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88. For an in-depth presentation of the arguments against viewing nonproliferation as an end in itself and responses to those arguments, see Glenn, *supra* note 70, at 18, 21 ("Our goal should not be limited to keeping the bombs of covert proliferation in the basement, but should include efforts designed to prevent the acquisition of such weapons in the first place.").

89. See *Missile Proliferation: The Need for Controls (Missile Technology Control Regime): Hearing Before the Subcomm. on Arms Control, International Security and Science and the Subcomm. on International Economic Policy and Trade of the House Comm. on Foreign Affairs*, 101st Cong., 1st Sess. 199-200 (1989) [hereinafter *MTCR Hearing*]. Congressman Dante Fascell asserted this point in the context of ballistic missile control:

Eventually, human rights came out of the arena of private diplomacy and into the arena of public diplomacy. Human rights became a matter of open and frank discussion on the platter of every international meeting that ever took place.

Now, I don't see any difference, frankly, with respect to ballistic missile control. There are no secrets, Mr. Clarke, there is no such thing as working privately with your friends. There is no covert action.

*Id.*

90. See Brad Roberts, *Arms Control and the End of the Cold War*, WASH. Q., Autumn 1992, at 39, 43. International norms engender multilateral consensus, which in turn fosters international

consistent and uniform responses to the spread of catastrophic weaponry independent of the manifold political matters that characterize realpolitik is the hallmark of the regulatory approach to nonproliferation.

Where realpolitik focuses on alliances, the regulatory approach focuses on international legal regimes.<sup>91</sup> This is more than a semantic distinction. An alliance has no standards in advance of the participants' decision to agree, but a regime propounds standards of conduct to which state parties must accede. While each nation retains the option to join a regime, it has little freedom to adapt a regime to its particular interests and must accept the uniform standards that apply to every other participant. Most important, a regime establishes an authority, separate from any of its members, that can apply those standards objectively. Typically, a regime incorporates an organ to resolve disputes that has legitimacy separate and distinct from the power exercised by any single state. A regime is three-dimensional, involving not only the relationships among the participating states but also the relationship between each state and the central authority. A nonproliferation regime differs from a strategic alliance, therefore, in the singularity of its mission and in its structural capability to pursue that mission.

### *C. Ad Hoc Diplomacy or Specification of Standards and Enforcement Mechanisms*

#### *1. Realpolitik*

Remarkably little can be said about the standards and modalities of nonproliferation offered by the realpolitik approach except that each situation must be evaluated, and responses formulated, on an ad hoc basis in light of all relevant considerations. Indeed, to the extent that concepts of standards and modalities suggest a preconceived set of responses to categories of controversies, such efforts are fundamentally misplaced, according to the realpolitik view, because they restrict the unfettered flexibility that policymakers must have with regard to

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stability:

Those who see the world in realpolitik terms decry the role of norms in politics, arguing correctly that norms are irrelevant to those determined to act with contempt for the standards of others. But policy realists too often miss the importance of norms in generating the political consensus necessary to punish behavior not consistent with those norms.

*Id.*

91. For a thorough discussion of regime analysis in the context of international arms control, see THOMAS BERNAUER, *THE CHEMISTRY OF REGIME FORMATION: EXPLAINING INTERNATIONAL COOPERATION FOR A COMPREHENSIVE BAN ON CHEMICAL WEAPONS* (1993).

nonproliferation or any other policy.

The corollary to the absence of standards and modalities is the investiture of power in heads of governments.<sup>92</sup> Under *realpolitik*, a nation's chief executive must retain unfettered discretion to manage foreign policies effectively. Nonproliferation is but one interest to be balanced among many national interests in an anarchic array of alliances.<sup>93</sup> Thus, only the head of each state has the authority sufficient to decide that nation's appropriate response to the threat of catastrophic weapons at any particular time or in any particular situation.<sup>94</sup>

## 2. Regulation

As the term "regulation" suggests, the promulgation of specific standards and modalities is essential to the regulatory approach. Regulation strives to define the items subject to control, specify the rules to which those items will be subject, verify compliance with those rules, and provide penalties in the event of noncompliance. That nuances of situations may differ does not materially detract from the need for uniform application of standards in order to promote the objectives of a coherent nonproliferation strategy. Declaring such standards in advance will encourage parties to comply with those

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92. In the context of discussing who should have final authority to make nonproliferation policy, the former director of the Arms Control and Disarmament Agency has expressed full support for this approach:

Too often, consideration of ACDA's role is caught up in the rhetorical question of who is the arms-control or non-proliferation czar. There can be only one answer to that question: the president. Arms control inevitably involves trades between State Department concerns over bilateral and multilateral relations, Defense Department concerns over military forces and programs, intelligence community concerns about sources, methods, and estimates, Commerce Department concerns about trade, and even White House concerns about politics. Arms-control and nonproliferation decisions are inherently interagency and the arms-control perspective is not always the most important. In the end, the president must make the tough calls.

Lehman, *supra* note 68, at 51.

93. See *MTCR Hearing*, *supra* note 89, at 146-47 (testimony of Richard A. Clarke, Assistant Secretary of State for Politico-Military Affairs) (noting that nonproliferation is only part of foreign policy).

94. See *MTCR Hearing*, *supra* note 89, at 146-47 (testimony of Richard A. Clarke, Assistant Secretary of State for Politico-Military Affairs). The State Department fully adheres to this view in the context of ballistic missile control:

The President must retain the flexibility to determine what actions are best calculated to produce the results we seek. We have had success with diplomatic pressure and persuasion that might not have occurred with inflexible sanctions. Mandatory sanctions would make it impossible to differentiate between serious violations—in which case the President could impose sanctions under existing authority—and relatively minor infractions. Missile non-proliferation is only one element of foreign policy, and the President must have the flexibility to weigh competing interests.

*Id.*

standards, thereby precluding many potential problems.

Accordingly, the regulatory approach minimizes the importance of discretionary diplomacy. Instead of secretly pounding out deals that trade off nonproliferation concerns with a boundless array of other national interests, the regulatory approach favors using an open legal process that can justly allocate accountability for proliferation activities. Again, the foreknowledge that a government's efforts to supply or purchase catastrophic weaponry will be subject to international scrutiny tends to deter such activities. In addition, by stipulating mandatory sanctions on those nations found to violate international standards of conduct, all members of the world community would understand the serious consequences and the lack of acceptable excuses for contributing to or engaging in proliferation. The declaration of mandatory sanctions sends a clear message that the pursuit of weapons capabilities will invoke inescapable penalties far worse than a mere diplomatic rebuke.

### III. THE PROLIFERATORS

The abundance of sources for weapons-related materials and technology, combined with the growth of sophisticated industrial and engineering capabilities in developing states, has created a perceptible shift in concerns about proliferation. A cardinal feature of this new focus is the role played by new suppliers who offer a variety of materials, equipment, and services that cover a sweeping span of the weapons-production cycle.

The vast majority of nations that have acquired catastrophic weapons relied on active support from foreign suppliers.<sup>95</sup> A few nations claim to have developed an entirely indigenous capability to manufacture and deploy sophisticated weaponry,<sup>96</sup> but these programs would likely have failed without considerable backing from the industrialized West.<sup>97</sup> These pursuits are often aided by foreign

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95. See *MTCR Hearing*, *supra* note 89, at 49-50 (testimony of Norman A. Wulf, Deputy Assistant Director, Bureau of Nuclear Weapons Control, U.S. Arms Control and Disarmament Agency) (noting that most developing nations were able to develop ballistic missile technology only with external assistance).

96. Mandeles, *supra* note 51, at 237 (observing that India and Israel developed nuclear and ballistic missile capabilities without substantial foreign assistance).

97. See W. SETH CARUS, *BALLISTIC MISSILES IN THE THIRD WORLD* 64 (1990). Chemical weapons are a case in point. Although the production of highly toxic chemicals is not unduly complicated, it is difficult to produce these weapons without considerable risk. It makes sense, therefore, for a developing nation that is anxious to obtain a weapons capability to safeguard against such catastrophic accident by employing sophisticated technology that is available in the international marketplace. Foreign suppliers helped to construct the chemical weapons facilities of Iraq, Iran, Syria, and Libya and provided precursor chemicals and production equipment.

materials and expertise from so-called "emerging suppliers" who themselves are attempting to cover the high costs of their weapons production by trading internationally.<sup>98</sup>

This Part discusses the proliferation activities of China, Germany, Brazil, and the former Soviet Union.<sup>99</sup> Although the countries examined here differ in many important respects, at least four behavioral similarities are worth noting.

First, none of these proliferating countries supplies weapons with much ideological consistency or with a high priority to maintaining strategic security. Put simply, most proliferation is done for profit.<sup>100</sup> To the extent that there is a military justification for supplying catastrophic weaponry, it is to gain sufficient funds to support high levels of defense spending.<sup>101</sup>

Second, in each of these nations, weapons exports apparently are the indirect result of the absence of rigorous political control over weapons policy rather than the execution of an overt commitment to proliferate. None of these nations has had rigorous nonproliferation laws. Only Germany has taken steps to rectify that situation.

Third, these nations are not international "pariahs." Every nation examined here, as well as nearly every other major proliferator in the world, is on friendly terms with the United States and shares open and mutually beneficial trade relations.

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*Chemical and Biological Weapons Proliferation: Hearings Before the Subcomm. on International Finance and Monetary Policy of the Senate Comm. on Banking, Housing, and Urban Affairs, 101st Cong., 1st Sess. 59 (1989) (statement of Elisa Harris, guest scholar, Brookings Institution).*

98. See William C. Potter, *The Behavior of the Emerging Nuclear Suppliers: Sources and Policy Implications*, in INTERNATIONAL NUCLEAR TRADE AND NONPROLIFERATION: THE CHALLENGE OF EMERGING SUPPLIERS 411, 411 (William C. Potter ed., 1990) (stating that typical emerging suppliers differ in such areas as level of economic development, technical capability, and domestic, political, and economic structure).

99. All of the following information concerning the activities of these four nations comes from unclassified sources; the author has no access to sources not in the public domain. While considerable effort went to confirm assertions, citation must be to sources reporting on proliferation, as cited herein, rather than to official governmental sources.

100. At least one observer, while recognizing that suppliers of weapons-critical items pursue traditional economic incentives, contends that such activities have not as yet produced substantial economic returns. See William C. Potter, *The New Nuclear Suppliers*, ORBIS, Spring 1992, at 199, 201 (recognizing that nuclear exports have not in general yielded substantial economic returns for most emerging suppliers and noting that this marketing difficulty "results from a combination of factors including the depressed international nuclear market, the economic ill health of most of the prospective importers in the developing world, constraints on long-term financing, and the lack of a proven record of reliable and safe exports").

101. BARNABY, *supra* note 4, at 25-26. Barnaby explains:

[T]he major powers can afford to buy appropriate quantities of major weapons for their own arsenals only if they achieve the economies of scale to be had from long production-runs. By selling weapons abroad countries reduce the costs of those same weapons for their own armed forces. Maintaining and increasing arms sales is, therefore, crucially important for the governments of the major exporters of weapons.

*Id.*



Finally, each of these nations has responded positively to U.S. threats to restrict trade as a consequence of their permissive proliferation policies. While such threats have been sporadic and have not been coordinated with other trading powers, their beneficial results suggest that systematic imposition of restrictions could be a powerful control mechanism.

### A. *China*

With its hundreds of nuclear warheads and a formidable array of delivery systems, including ballistic missiles and nuclear submarines, the People's Republic of China (PRC) has extensive experience in weapons production and boasts a sophisticated set of resource, engineering, and manufacturing capabilities. China has pursued its vital interests through weapons exports to nations far and near, including India and Pakistan, whose own weapons programs directly affect the PRC's security.

#### 1. *General weapons export policies*

China's proliferation activities have paralleled and supplemented its role as a leading supplier of conventional weaponry. During the 1980s, China became a leading arms supplier to the developing world, signing agreements between 1983 and 1990 worth more than sixteen billion dollars.<sup>102</sup> During the 1980s, China exported between ten and twenty percent of its total arms production,<sup>103</sup> accounting for seventy-three percent of arms exports from East Asia and 5.8% of all sales of major conventional arms to the Asia/Pacific region.<sup>104</sup> During this period, the PRC ranked fourth among the top fifteen exporters of major conventional arms to the developing world.<sup>105</sup> Of the PRC's total export of major conventional weapons during the period from 1987 to 1991, forty-five percent went to Asian and Pacific states.<sup>106</sup> The rest, and by far the largest percentage of the growth

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102. William C. Triplett II, *China's Weapons Mafia: As the "Families" Get Richer, the World Gets a Lot More Dangerous*, WASH. POST, Oct. 27, 1991, at C3.

103. See KEITH KRAUSE, *ARMS AND THE STATE: PATTERNS OF MILITARY PRODUCTION AND TRADE* 164 (1992) (estimating that during 1980s China had total arms production of between \$5 and \$10 billion, of which it exported \$1 to \$1.5 billion).

104. Gerald Segal, *Managing New Arms Races in the Asia/Pacific*, WASH. Q., Summer 1992, at 83, 92. The rise of East Asian countries as arms exporters is a recent phenomenon. Even today, only North Korea has joined China among the top 15 exporters of major conventional arms to the developing world. *Id.*

105. *Id.*

106. *Id.* at 83. In 1991, the Asia/Pacific region accounted for 35% of all imports of major weapons, more than any other region, including Europe. In 1990, developing countries in the Asia/Pacific region accounted for 44% of imports of major arms by all developing states, down

in PRC arms exports in the late 1980s, went to the Middle East.<sup>107</sup>

The primary motivation for China's aggressive arms export policy is to earn hard currency to finance a rapid buildup of its own military forces.<sup>108</sup> During the 1980s, China substantially overhauled its military by reducing its troop strengths and accelerating development of high-technology defense capabilities.<sup>109</sup> Increasing arms exports financed these changes and enabled the military to exercise decisionmaking autonomy that sometimes infringed on the nation's foreign policy pursuits.<sup>110</sup> Arms exports rose in tandem with the acquisition of Western high technology<sup>111</sup> and, more recently, weapons from the former Soviet Union.<sup>112</sup> In February 1992, Beijing launched a concentrated effort to improve the technological base of its defense industries,<sup>113</sup> appropriating 7.6 billion yuan for the importation of technologies for aircraft, missile, and warship production, most of which was to be paid for by profits from weapons exports.<sup>114</sup>

Most weapons sales are made through about two dozen government-owned or controlled export companies operating under the direction of either the People's Liberation Army or the defense-related ministries controlled by the State Council.<sup>115</sup> The Commission on Science, Technology, and Industry for National Defense coordinates all of these activities.<sup>116</sup> Until recently, the Bank of

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from 59% in 1989. *Id.*

107. *Id.* at 92. The PRC did particularly well during the Iran-Iraq War; when that war ended, Chinese arms sales dropped sharply from \$1.9 billion in 1988 to \$1.1 billion in 1991. *Id.* at 93. But as a percentage of the overall market, the PRC's share only fell from 6.3% to 5.1%. *Id.*

108. See Triplett, *supra* note 102, at C3 (noting that China sold 50 nuclear-capable CSS-2 ballistic missiles to Saudi Arabia at profit of \$2 billion).

109. See Nazir Kamal, *China's Arms Export Policy and Responses to Multilateral Restraints*, 14 CONTEMP. SOUTHEAST ASIA 112, 113 (1992) (stating that arms sales during 1980s resulted from shifts in China's national priorities away from defense spending under "four modernizations" program launched by Deng Xiaoping in late 1970s).

110. *Id.* at 113-14 (indicating that fewer restrictions were placed on Chinese military's arms export activities in light of hard currency shortages and domestic political considerations).

111. See *id.* at 114. China had weapons acquisition contracts with American firms worth over \$1 billion, but these were canceled in 1990 when the United States imposed an arms embargo on China after the Tiananmen Square massacre. *Id.*

112. See Yoseff Bodansky, *The People's Republic of China Once Again Seeks Military Options*, DEF. & FOREIGN AFF. STRATEGIC POL'Y, April 1992, at 8; see also Bruce Stokes, *Challenging China*, 24 NAT'L J. 2106, 2106 (1992) (noting that Beijing has rushed to rearm with advanced Soviet weaponry that is increasingly available at "bargain-basement prices").

113. See Barber B. Conable, Jr. & David M. Lampton, *China: The Coming Power*, FOREIGN AFF., Winter 1992, at 133, 136 (citing DIRECTORATE OF INTELLIGENCE, CENTRAL INTELLIGENCE AGENCY, *THE CHINESE ECONOMY IN 1991 AND 1992: PRESSURE TO REVISIT REFORM MOUNTS* 11 (1992) (reporting that PRC increased defense spending by 22% from 1988 to 1991)).

114. See Bodansky, *supra* note 112, at 8.

115. See Michael Brenner, *The People's Republic of China*, in INTERNATIONAL NUCLEAR TRADE AND PROLIFERATION 247, 247 (1970); Triplett, *supra* note 102, at C3.

116. Triplett, *supra* note 102, at C3.

Credit and Commerce International (BCCI), which operated in Beijing, the Shenzhen Special Economic Zone, and Hong Kong, was the bank of choice for arms exporters.<sup>117</sup>

Although there is little evidence to suggest that China has proliferated chemical or biological weapons,<sup>118</sup> the PRC has been a major supplier of equipment and materials necessary for nuclear bomb and missile production. China's role in this regard is noteworthy; by marketing whole systems and supplying comprehensive production assistance and technology, China has provided recipient nations with the know-how and capability to operate on their own.<sup>119</sup>

The PRC has been the center of nuclear proliferation concern since the early 1980s. China is probably the world's most aggressive exporter of nuclear technology and materials, with clients in Latin America, Africa, the Middle East, and Asia.<sup>120</sup> Of the five declared nuclear powers, it has been the most reluctant to prevent North Korea and others from developing a nuclear bomb.<sup>121</sup> China's missile sales program, like its efforts to sell dual-use nuclear technologies, has tended to involve the creation of missile production capabilities, despite its pledges not to sell medium-range missiles in the Middle East nor to deliver any militarily significant technology to the developing world.<sup>122</sup> Indeed, with a notable record of supplying both sides of various regional disputes, China's weapons exports do not appear to follow any ideological pattern.<sup>123</sup>

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117. Triplett, *supra* note 102, at C3. Of a reported \$400 million deposited in BCCI accounts, several million reportedly belonged to the Ministry of Aerospace Industry, the parent of the ballistic-missile-producing Chinese Precision Machinery Import-Export Corp. *Id.*

118. See BARNABY, *supra* note 4, at 98 (stating that virtually nothing is known about China's proliferation of biological weapons). But see R. Jeffrey Smith, *China May Have Revived Germ Weapons Program, U.S. Officials Say*, WASH. POST, Feb. 24, 1993, at A4 (indicating that recent reports suggest that China has significantly expanded its biological weapons program, despite agreeing to eliminate it in 1984).

119. See Tony Walker et al., *Middle East: Weapons Deals Hit Prospects for Mideast Stability*, FIN. TIMES, May 11, 1992, at 7 (noting that China has world's most comprehensive program for providing missile know-how to developing states).

120. See Brenner, *supra* note 115, at 265 (indicating that China has exported nuclear technology and materials to Argentina, Pakistan, and South Africa, among others); see also *infra* notes 124-63 and accompanying text (providing overview of China's proliferation activities in various countries).

121. Andrew Higgins, *The Bomb-Makers of Asia*, INDEPENDENT, Nov. 21, 1991, at 29.

122. See Kamal, *supra* note 109, at 119-20 (noting that China's drive in mid-1980s to export arms extended to ballistic missiles and space rockets which, along with technology transfers, enabled local manufacture by recipient countries).

123. See Kamal, *supra* note 109, at 115 (stating that China devoted nearly 50% of its arms sales during 1983-90 period to Iran and Iraq during Iran-Iraq War). In addition, China supplied resistance groups in both Afghanistan and Cambodia with Chinese weapons. *Id.* at 119.

## 2. *Notable proliferation activities*

The most egregious expression of China's uninhibited nuclear export policy involved the assistance China provided to Pakistan's nuclear weapons program in the early 1980s. China provided technical assistance during the construction of Pakistan's Kahuta centrifuge enrichment facility, trained Pakistani officials on how to handle uranium fuels, and, perhaps, gave Pakistan the complete design of a tested nuclear weapon with a yield of about twenty-five kilotons.<sup>124</sup> United States officials have confirmed that China also gave Pakistan enough weapons-grade uranium to fuel two nuclear weapons.<sup>125</sup> With the Chinese design, Pakistan has been able to make and test nuclear weapon parts and to test the whole design with a dummy nuclear core.<sup>126</sup> Most experts believe that Pakistan now has a workable bomb.<sup>127</sup>

In addition to receiving nuclear materials, Pakistan has been a primary recipient of Chinese missiles. In 1991, U.S. intelligence sources discovered that China was secretly selling Pakistan the M-11 missile which can carry a nuclear warhead about 185 miles.<sup>128</sup> Indeed, the Clinton administration recently imposed economic sanctions against China as punishment for its missile proliferation activities.<sup>129</sup>

Simultaneously, China secretly sold sensitive nuclear material to India, including at least 130 to 150 tons of "heavy water,"<sup>130</sup> through a West German broker, Alfred Hempel.<sup>131</sup> Chinese heavy water sales continued until 1987, enabling India to import enough to start at

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124. Brenner, *supra* note 115, at 266-68.

125. Gary Milhollin & Gerald White, *A New China Syndrome: Beijing's Atomic Bazaar*, WASH. POST, May 12, 1991, at C1 [hereinafter Milhollin & White, *Beijing's Atomic Bazaar*].

126. *Id.* at C4. Chinese scientists were reportedly seen at Pakistan's secret Kahuta complex, apparently helping Pakistan produce weapons-grade uranium with gas centrifuges. According to West German officials, China also sold Pakistan tritium, the fuel for the fusion reaction in a hydrogen bomb. *Id.*

127. See, e.g., Milhollin & White, *Beijing's Atomic Bazaar*, *supra* note 125, at C1, C4 (indicating that Pakistan has workable bomb weighing only 400 pounds); SPECTOR, THE UNDECLARED BOMB, *supra* note 13, at 143 (noting that U.S. officials believe that Pakistan began to produce weapons-grade uranium in 1986, producing enough annually for two or three weapons).

128. Milhollin & White, *Beijing's Atomic Bazaar*, *supra* note 125, at C1. The United States recently blocked the sale of a supercomputer to China and threatened further sanctions over allegations that China continued to sell M-11 missiles and longer range M-9 missiles to Pakistan. Michael Chugani, *U.S. Acts over China Arms Sales*, S. CHIN. MORN. POST, Dec. 6, 1992, at 1.

129. Steven Greenhouse, *\$1 Billion in Sales of High-Tech Items to China Blocked*, N.Y. TIMES, Aug. 26, 1993, at A1 (reporting that Clinton administration banned one billion dollars worth of high-technology exports to China).

130. Heavy water is used as a moderating element in certain types of reactors, including some capable of producing weapons-grade plutonium.

131. See Milhollin & White, *Beijing's Atomic Bazaar*, *supra* note 125, at C4.

least two and possibly three reactors.<sup>132</sup> Running at full capacity, these reactors can make enough plutonium for as many as forty atomic bombs per year.<sup>133</sup>

During the early 1980s, Hempel also funneled tons of Chinese heavy water and highly enriched uranium to Argentina.<sup>134</sup> Allegedly, both items were also supplied to South Africa, enabling the Pretoria government to triple its production of weapons-grade uranium at its Valindaba enrichment plant.<sup>135</sup> In 1984, China supplied Brazil, Argentina's neighbor and adversary, with enriched uranium and agreed to provide liquid-fuel technology and missile guidance in return for solid-fuel rocket technology.<sup>136</sup>

Further, China supplied significant nuclear technology to both Iraq and Iran. China offered Iraq shipments of lithium hydride, a compound used in the manufacture of hydrogen bombs,<sup>137</sup> and samarium cobalt magnets, used to hold enrichment centrifuges in place.<sup>138</sup> At the same time, it also supplied calutron equipment, which could be used to enrich uranium, to Iran.<sup>139</sup>

In 1991, U.S. intelligence revealed that China was secretly building a heavy water reactor in Algeria.<sup>140</sup> With an announced power of fifteen megawatts, the reactor's sole purpose seems to be to make enough nuclear weapons material for about two bombs every three years.<sup>141</sup> The Algeria reactor is suspicious because of the absence of electrical power lines leading from the plant, the possible existence of a uranium reprocessing installation, its desert location, and the extraordinary military security measures taken to protect it.<sup>142</sup>

China's sales of missiles and missile technology also have raised considerable concern among Western observers. Not only has it actively pursued sales to customers in the Middle East and elsewhere that face imminent hostilities, but China likely sold missile technology

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132. Milhollin & White, *Beijing's Atomic Bazaar*, *supra* note 125, at C4.

133. Milhollin & White, *Beijing's Atomic Bazaar*, *supra* note 125, at C4.

134. Higgins, *supra* note 121, at 29. At the time, Argentina had no known use for the uranium, suggesting that the reason for the sale was to support Argentina's effort to develop nuclear weapons. *Id.*

135. Brenner, *supra* note 115, at 253.

136. Milhollin & White, *Beijing's Atomic Bazaar*, *supra* note 125, at C1.

137. Higgins, *supra* note 121, at 29.

138. SPECTOR, NUCLEAR EXPORTS, *supra* note 18, at 23-24.

139. See Kamal, *supra* note 109, at 123. While China claimed that its sales to Iran were exclusively for peaceful purposes, Iranian Deputy President Ayatollah Mohajerani provoked concern by stating that Muslim states had a right to develop nuclear weapons because Israel had that capability. *Id.*

140. Triplett, *supra* note 102, at C3.

141. Triplett, *supra* note 102, at C3.

142. Elaine Sciolino & Eric Schmitt, *Algerian Reactor Came from China*, N.Y. TIMES, Nov. 15, 1991, at A1, A12.

to North Korea.<sup>143</sup> Like its nuclear technology exports, China's missile exports have raised special concern because they seem to be directed at promoting an indigenous capability. For example, China transferred technology to improve Iran's missile guidance system and constructed a missile testing range near Qum.<sup>144</sup> In addition, the United States banned the export of high-speed computers and satellite components to China after concluding that China had supplied missile guidance components to Pakistan.<sup>145</sup>

In July 1988, China apparently agreed to sell Syria the M-9 missile<sup>146</sup> and Transporter/Erector/Launcher equipment, a modern, fully mobile missile system designed to carry a nuclear warhead about 375 miles.<sup>147</sup> The deal may be worth \$200 million.<sup>148</sup> Syria also has taken delivery of North Korean Scud missiles produced with Chinese assistance.<sup>149</sup> To help Syria develop an indigenous capability, China shipped as much as ninety tons of chemicals used to produce solid fuel for missiles and sent technicians to establish production facilities for ballistic missiles at Hama and Aleppo.<sup>150</sup> Recent reports that Syria is now negotiating with China to acquire a nuclear reactor have raised substantial concerns among U.S. officials.<sup>151</sup>

While China has supplied the technology for the construction of its Long March II rockets to Brazil,<sup>152</sup> China has sent most of its missiles to the Middle East. The Chinese sold 1600-mile-range CSS-2

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143. See Kamal, *supra* note 109, at 121 (stating that China has been suspected of assisting North Korea to modify Soviet Scud-B missile for sale to Iran).

144. Kamal, *supra* note 109, at 120.

145. See Kamal, *supra* note 109, at 121 (suggesting that China had been suspected of assisting Pakistan's missile development since 1989, when Pakistan first test-fired its Hatf II missile).

146. See generally Hua Di, *The Arms Trade and Proliferation of Ballistic Missiles in China*, in AAAS SCIENCE AND SECURITY COLLOQUIUM: ARMS SALES VERSUS NONPROLIFERATION: ECONOMIC AND POLITICAL CONSIDERATIONS OF SUPPLY, DEMAND, AND CONTROL 3 (1991) (observing that China started M-9 program in 1984, intending it primarily as export product).

147. Triplett, *supra* note 102, at C3. International pressure may have persuaded China to defer shipments of the M-9 missile under a 1987 contract with Syria, but there is no sign that the Chinese have abandoned plans to supply the missile. Walker et al., *supra* note 119, at 7. Indeed, reports that China had shipped Syria chemicals suitable for production of solid-fuel missiles, together with reported sightings of M-9 missile launchers in Syria, prompted speculation that the M-9 transfer is proceeding despite international pressure. *Id.*

148. See Kamal, *supra* note 109, at 118; Triplett, *supra* note 102, at C3.

149. Milhollin & White, *Beijing's Atomic Bazaar*, *supra* note 125, at C4.

150. See Kamal, *supra* note 109, at 120.

151. *Hearings on Weapons Proliferation*, *supra* note 28, at 36, 40 (testimony of Robert Gates, former Director, Central Intelligence Agency).

152. *Ballistic and Cruise Missile Proliferation in the Third World: Hearings Before the Subcomm. on Defense Industry and Technology of the Senate Comm. on Armed Services*, 101st Cong., 1st Sess. 42, 49 (1989) [hereinafter *Missile Proliferation Hearings*] (statement of W. Seth Carus, Fellow, Washington Institute for Near East Policy).

missiles to Saudi Arabia in 1988.<sup>153</sup> Similarly, the Iranian missile program appears to rely heavily on Chinese technical expertise.<sup>154</sup> Beijing became Tehran's biggest weapons supplier during the Iran-Iraq War, selling \$4.8 billion in weapons and munitions to Iran,<sup>155</sup> including Silkworm missiles that were used against merchant shipping in the Persian Gulf.<sup>156</sup> Recently, China has adapted secretly acquired Patriot air defense missile technology to develop ballistic missile reentry vehicles that can foil U.S.-made defensive systems.<sup>157</sup> Iran is the most likely customer for this technology.<sup>158</sup>

It is noteworthy that sporadic U.S. pressure on China to control proliferation has had some success, despite China's claims that its activities already exhibit cautious efforts to secure foreign currency. China eventually accepted Missile Technology Control Regime guidelines, which attempt to limit the diffusion of technologies that can be applied to nuclear-capable ballistic missile systems,<sup>159</sup> in return for the lifting of an embargo on U.S. satellite components and high-speed computers imposed on China because of its transfers of missile components to Pakistan.<sup>160</sup> This change in policy, however, immediately preceded a vote in Congress on whether to terminate China's most-favored-nation status that would have threatened its \$19 billion export market.<sup>161</sup> China is apparently willing to accept further restrictions on arms exports if they are worked out "through overall and equal consultations among all countries" under U.N. auspices.<sup>162</sup> Moreover, under heavy international pressure, China became the last declared nuclear weapons state to accede to the

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153. See *MTCR Hearing*, *supra* note 89, at 17, 21 (statement of Jim E. Hines, Deputy Assistant Secretary for Negotiations Policy, Department of Defense).

154. See Kamal, *supra* note 109, at 121 ("China's involvement in Iran's missile development took place in the wider context of the latter's efforts to enlarge its indigenous defence production base.").

155. Triplett, *supra* note 102, at C3.

156. See Kamal, *supra* note 109, at 116 (noting that Iran fired Silkworm missiles on numerous merchant ships in Persian Gulf during Iran-Iraq War, including one U.S.-flagged Kuwaiti oil tanker in October 1987).

157. See David A. Fulghum, *China Exploiting U.S. Patriot Secrets*, 138 AVIATION WK. & SPACE TECH. 20, 20 (1993).

158. *Id.*

159. KRAUSE, *supra* note 103, at 105; see also *infra* part IV.D (discussing MTCR in detail).

160. See Kamal, *supra* note 109, at 126 (discussing 1991 U.S. ban on high-tech exports to China after PRC transferred M-11 missile components to Pakistan).

161. See Kamal, *supra* note 109, at 127 (noting that U.S. market accounts for 25% of China's global exports and that China has \$13 billion trade surplus with United States).

162. See Kamal, *supra* note 109, at 12; Hua Di, *Ballistic Missile Exports Will Continue*, ASIA-PAC. DEF. REP., Sept. 1991, at 14-15, cited in Nazir Kamal, *China's Arms Export Policy and Responses to Multilateral Restraints*, 14 CONTEMP. SOUTHEAST ASIA 112, 127 (1992).

Nuclear Non-Proliferation Treaty in March 1992.<sup>163</sup>

### B. Germany

Official exports of major weapons systems by Germany have not contributed significantly to the international arms race.<sup>164</sup> From 1981 to 1990, West Germany delivered approximately \$12.5 billion worth of arms, of which nearly half went to Argentina, Turkey, and the Netherlands.<sup>165</sup> Less than one-half of one percent of this total represents exports to Iraq, Iran, and Libya.<sup>166</sup> Including conventional arms, Germany accounts for between 2.2% and 3.4% of the worldwide weapons trade.<sup>167</sup>

The real story of Germany's proliferation activities, however, involves the unofficial sale of dual-use items by private German companies.<sup>168</sup> German aerospace firms played critical roles in helping Egypt, Iraq, Libya, Argentina, and Brazil develop medium-range ballistic missiles.<sup>169</sup> In addition, German companies have been the key technology suppliers for nuclear programs in India, Pakistan, Iraq, Libya, and North Korea.<sup>170</sup> Germany's economic dependence on exports, which account for sixty percent of its gross domestic product, has led one U.S. official to comment that German industry has always operated on the "assumption that you can sell

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163. See Kamal, *supra* note 109, at 130 (noting that after France declared intention to adhere to NPT in 1991, China was last declared nuclear power not under NPT).

164. See Dan Petreanu, *The Business That Backfired*, JERUSALEM POST, Jan. 27, 1989, at 4 (citing Dr. Ze'ev Eytan of Jaffee Institute, who explained that because of its sensitivity to its history, Germany has strong policy of not being main arms supplier for any one country nor of selling complete major weapons systems).

165. See Herbert Wulf, *The Federal Republic of Germany*, in ARMS EXPORT REGULATIONS 72, 85 tbl. 10.1 (Ian Anthony ed., 1991); see also Rolf Soderlind, *Tough Export Laws Hamper German Defence Industry*, REUTER LIB. REP., Feb. 7, 1993, available in LEXIS, Nexis Library, Wires File (stating that weapons exports accounted for only 0.3% of German exports in 1990).

166. Wulf, *supra* note 165, at 85.

167. KRAUSE, *supra* note 103, at 134. Because a high proportion of German production is conducted jointly with other European partners, however, these figures probably understate German participation in the export market. *Id.* at 134-35.

168. Before unification, these companies were, of course, West German. Unification has extended former West German regulatory laws to former East German activities, but the immediate post-unification practice of German firms did not manifest an appreciable change of policy in regard to weapons proliferation. See generally Thomas Kielinger & Max Otte, *Germany: The Pressured Power*, FOREIGN POL'Y, June 22, 1993, at 44.

169. Robert Gillette, *3rd World Missiles Linked to German, Italian Firms*, L.A. TIMES, Feb. 8, 1989, at 1; see Lally Weymouth, *Third-World Nukes: The German Connection*, WASH. POST, Dec. 13, 1991, at A29 (quoting nuclear proliferation expert Gary Milhollin describing Germany as world's leading exporter of missile technology and key supplier of parts and know-how to Brazil, Argentina, Iraq, India, and Libya).

170. Weymouth, *supra* note 169, at A29; see also SPECTOR, NUCLEAR EXPORTS, *supra* note 18, at 10-12 (stating that India received more than 250 metric tons of nuclear materials from West German brokers).



anything not specifically prohibited."<sup>171</sup> The German Government long contended that its laws do not permit interference with private commercial firms.<sup>172</sup> Despite more than five years of protests by the U.S. Government, Germany opposed efforts to tighten export controls on the grounds that the government lacks legal authority to interfere with the export decisions of private German firms.<sup>173</sup>

### 1. *Weapons exports to Iraq*

Most observers agree that German commercial exports were more responsible for Iraq's acquisition of chemical weapons and ballistic missiles than any other nation's official or private efforts.<sup>174</sup> From 1986 to 1990, more than 100 German companies supplied Iraq with nearly \$200 million in dual-use items.<sup>175</sup> According to former Secretary of Defense Les Aspin, approximately eighty percent of Iraq's technology came from Germany.<sup>176</sup> Indeed, a German company even built Saddam Hussein's personal bunker under the presidential guest house in Baghdad.<sup>177</sup>

German firms contributed to Iraq's nuclear program through front companies controlled by the Iraqi Secret Service Organization that dealt directly with German producers.<sup>178</sup> The more noteworthy supplies included vacuum furnaces, an electronic beam welder, and centrifuge technology.<sup>179</sup> A half-dozen firms sold uranium enrich-

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171. R. Jeffrey Smith & Marc Fisher, *Sending Equipment to Iraq: Anatomy of a Deal*, WASH. POST, July 23, 1992, at A1, A26.

172. See *id.* at A26 (citing German authors as stating that German exports are subject to mandatory licensing only in exceptional cases).

173. *Id.*

174. See Gary Milhollin, *Building Saddam Hussein's Bomb*, N.Y. TIMES, Mar. 8, 1992, at 30, 34. Milhollin, who directs the University of Wisconsin's Project on Nuclear Arms Control, has claimed that "Germany supplied more of Iraq's mass destruction weaponry than all other countries combined." *Id.*; see also Igor Reichlin & Mark Maremont, *Iraq's Silent Allies in Its Quest for the Bomb*, BUS. WK., Jan. 14, 1991, at 50, 51 ("Saddam owes much of the progress he has made so far to German Companies.").

175. Smith & Fisher, *supra* note 171, at A1. A number of these firms are the pillars of German industry, including Gildemeister machine tool company, prime contractor for the \$1 billion Iraqi weapons research center at Mosul, and aerospace company Messerschmitt-Bolkow-Blohm, which produced helicopters and key components of about 10,000 Iraqi antitank and antiaircraft missiles. Tyler Marshall, *Germany Was Hub of Iraq Arms Network in Europe*, L.A. TIMES, Feb. 15, 1991, at A1, A16. Siemens, another prominent German firm, supplied two x-ray diffraction systems capable of analyzing weapons-grade uranium during production. Milhollin, *supra* note 174, at 30, 32.

176. Smith & Fisher, *supra* note 171, at A26.

177. Marshall, *supra* note 175, at A16.

178. See RACHEL SCHMIDT, RAND CORP., *GLOBAL ARMS EXPORTS TO IRAQ, 1960-1990*, at 37 (1991).

179. Weymouth, *supra* note 169, at A29. Iraq has obtained classified designs for a centrifuge and ring magnets; the centrifuge design is similar to one developed by MAN Technologie, and the magnets, used to stabilize centrifuge rotors, were supplied by Inwako. Reichlin & Maremont, *supra* note 174, at 50-51.

ment equipment including sophisticated lathes and presses.<sup>180</sup> Besides nuclear weapons, German firms helped design plants for producing chemical weapons and provided equipment that enabled Iraq to fill chemical rockets.<sup>181</sup> One firm, Karl Kolb GmbH, allegedly delivered six nerve-gas plants to the Samarra complex.<sup>182</sup> Six other firms supplied equipment for Iraq's biological weapons program, including devices to grow pathogens in laboratories, concentrate pathogens, and protect workers from contamination.<sup>183</sup>

A consortium of German companies helped Iraq put together the Saad 16 complex,<sup>184</sup> which has enabled Iraq to convert existing inventories of inaccurate 300-kilometer-range Scud-B missiles into the 650-kilometer-range Al-Husayn and 900-kilometer-range Al-Abbas missiles that landed in Tel Aviv and Riyadh.<sup>185</sup> Consen, a German company affiliated with German arms giant Messerschmitt-Bolkow-Blohm, organized the Iraqi-sponsored development of the Condor II, a medium-range missile, while numerous German firms provided technical assistance.<sup>186</sup> Even after the embargo against Iraq was in force, over 100 German companies continued to provide Iraq with military equipment and know-how.<sup>187</sup> Sixteen firms supplied equipment for ballistic missiles; eleven firms earned roughly fifty million dollars for equipment and advice used to extend the range and improve the accuracy of Scud missiles.<sup>188</sup>

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180. Smith & Fisher, *supra* note 171, at A26. Specialty metals were supplied by Sairstahl and exported by Export-Union. Reichlin & Maremont, *supra* note 174, at 50-51.

181. Smith & Fisher, *supra* note 171, at A26.

182. Marshall, *supra* note 175, at A16.

183. Smith & Fisher, *supra* note 171, at A26.

184. See generally Marshall, *supra* note 175, at A16 (describing Saad 16 project at Mosul, 175 miles north of Baghdad, as most ambitious weapons testing and research center in Arab world).

185. See Smith & Fisher, *supra* note 171, at A26 (stating that U.N. Documents revealed 11 German companies that earned approximately \$50 million for helping Iraq increase range and accuracy of Scud missiles).

186. Gillette, *supra* note 169, at 9; see also Milhollin, *supra* note 174, at 34 (stating that Condor II missile has range and configuration similar to that of American Pershing).

187. See Administration Report on Participation by German Companies in Arms Supply and the Export of Technologies Pertaining to Armaments to Iraq, 137 CONG. REC. S1028-29 (daily ed. Jan. 22, 1991) (reporting that in response to international pressure over role of German enterprises in arming Hussein, German Government enacted tighter export control laws).

188. Smith & Fisher, *supra* note 171, at A26. A notable example was H&H Metalfarm, a toolmaking firm, which sold Iraq materials for chemical weapons and rockets, and lathes to mill centrifuge parts for uranium enrichment. *Id.* While H&H has maintained that it did not know that its equipment would be used for weapons, U.N. inspectors concluded that H&H knew that Iraq's claim that the equipment would be put to peaceful uses was false. *Id.* Furthermore, H&H played a key role in providing technical assistance; indeed, agents of H&H reportedly installed the equipment. *Id.* German authorities approved all of H&H's exports to Iraq. *Id.* As of late 1992, H&H was in liquidation and two managing directors were in jail for export violations. Mark Hibbs, *German Expert Wanted by Authorities for Giving Iraq Carbon Centrifuge Rotors*, NUCLEARFUEL, Nov. 9, 1992, at 1, 14.

While these sales were unofficial, recent reports indicate that they were accomplished at least through the silent acquiescence of responsible authorities.<sup>189</sup> Iraq's procurement efforts throughout Europe were headquartered in Iraq's embassy in Bonn, which forwarded the orders to a network of companies willing to supply needed technology.<sup>190</sup> While U.S. intelligence had suspected German involvement in Iraqi chemical weapons projects as early as 1984, it was not until 1990, when a Swiss technical consultant confirmed those suspicions, that Bonn took any corrective action.<sup>191</sup>

## 2. Other notable proliferation activities

Next to supplying Iraq, the most serious example of German proliferation was the involvement of the Imhausen Company<sup>192</sup> in the construction of a plant to produce chemical warfare agents near Rabta, Libya.<sup>193</sup> The ability of German firms to evade German export control laws,<sup>194</sup> and thereby foster a strategic threat against nearby allies, was a profound embarrassment to the Kohl government.<sup>195</sup> According to recent reports, the Rabta plant was capable of producing tactical missiles, bombs, mortars, grenades, and the

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189. See Marshall, *supra* note 175, at A16 (reporting that senior officials at German Federal Economic Authority in Eschborn believe some of country's most respected companies knowingly falsified information on export license applications); see also Reichlin & Maremont, *supra* note 174, at 51 (stating that Federal Export Office generally sided with German companies in granting export permits).

190. Smith & Fisher, *supra* note 171, at A26.

191. Smith & Fisher, *supra* note 171, at A26.

192. John Templeman & Dinah Lee, *How Qaddafi Built His Deadly Chemical Plant*, BUS. WK., Jan. 23, 1989, at 50 (stating that in addition to Imhausen, as many as 40 German companies, including Preussag and Dreieich, have been implicated in providing key equipment to Libya).

193. *Chemical and Biological Weapons Threat: The Urgent Need for Remedies: Hearings of the Senate Comm. on Foreign Relations*, 101st Cong., 1st Sess. 32 (1989) (testimony of Hon. William H. Webster, Director, Central Intelligence Agency) [hereinafter *Chemical & Biological Weapons Threat*]. CIA Director Webster stated:

When this site is fully operational, it may be the single largest chemical warfare agent production plant in the Third World.

....

It would have been virtually impossible for Libya to harness the technologies necessary to build and operate such facilities without the assistance of foreign companies and personnel from several West European and Asian countries.

West German assistance has been extensive at the CW production plant.

*Id.*

194. See Templeman & Lee, *supra* note 192, at 50. Apparently, Imhausen established a dummy company, called Pen-Tsao-Materia-Medica-Center Ltd., based in Hong Kong but operated out of Hamburg, Germany. It acquired materials from Imhausen's German factories and purportedly exported them to a Chinese customer via Hong Kong. Rather than going to China, Imhausen equipment was shipped from Hong Kong to Singapore and finally to Libya.

*Id.*

195. See Petreanu, *supra* note 164, at 4.

nerve gas sarin.<sup>196</sup> Compounding the problem were revelations that a German company, Intec, helped Libya develop the capacity to extend the range of its aircraft in order to target Israel.<sup>197</sup> Despite being damaged by fire in March 1990, the Rabta plant is still considered by U.S. officials to be the largest chemical weapons complex in the developing world.<sup>198</sup>

Under international political pressure, Germany enacted new laws to control exports.<sup>199</sup> Companies now need government approval to export dual-use items,<sup>200</sup> although how exacting the approval process is may be questioned.<sup>201</sup> Despite the enactment of these

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196. Nick Rufford et al., *Gaddafi Builds Huge Poison Gas Arsenal at Rabta Plant*, SUNDAY TIMES, Apr. 5, 1992, at 1, 26.

197. See Petreanu, *supra* note 164, at 4.

198. Douglas Jehl, *U.S. Says That Libya Is Building a 2d Plant to Make Poison Gas*, N.Y. TIMES, Feb. 18, 1993, at A7. Allegedly, Libya has stockpiled as much as 100 tons of chemical agents at the Rabta facility. *Weapons Proliferation in the New World Order: Hearings Before the Senate Governmental Affairs Comm.*, 102d Cong., 2d Sess. 47 (1992) (statement of Robert Gates, Director, Central Intelligence Agency).

199. A German initiative to improve their export control laws was first announced on January 10, 1989. See *Chemical and Biological Weapons Threat*, *supra* note 193, at 224-26 (statement of Dr. Wolfgang Schäuble, Federal Minister for Special Tasks and Chief of Federal Chancellery). Previously, the law required proof of intentional violation of the export license requirement or an intentional falsification of destination or end use in export documents. David Goodhart, *W. Germany Tightens Rein on Its Exporters*, FIN. TIMES, Feb. 15, 1989, at 3. If the government brought charges against individuals suspected of violations, and those charges were disproved, then the government officials bringing the action and halting shipments could be liable for personal damages, even if they had taken the action in good faith. *Global Spread of Chemical and Biological Weapons: Hearings Before the Senate Comm. on Governmental Affairs and the Permanent Subcomm. on Investigations*, 101st Cong., 1st Sess. 166 (1992) (testimony of Richard Perle, Resident Scholar, American Enterprise Institute, and Paul Freedenberg, Trade Consultant, Baker & Botts).

The Zollkriminalamt (Customs Criminalistic Institute or ZKI), a unit of the Federal Ministry of Finance (MOF), is in charge of investigating and prosecuting violations of export laws, such as the Foreign Trade and Payments Act. *Chemical and Biological Weapons Threat*, *supra* note 193, at 218. In order to use the criminal provisions of the Act, the ZKI had to have uncontestable legal proof of illegal action (the existence of "initial suspicion, founded on concrete facts"). *Id.* at 223.

New export controls passed in 1992 empower the ZKI to use wiretaps and open the mail of individuals suspected of violating export laws. See Mark Hibbs, *Germany's New Export Law Isn't Tough Enough*, *Watchdogs Say*, NUCLEARFUEL, Feb. 3, 1992, at 5. Any action taken requires a legal justification, but is based on a case-by-case approach. *Id.* In the event of a conviction, profits from illegal arms sales can be confiscated. Soderlind, *supra* note 165. In addition, jail terms and heavy fines can be imposed on firms that illegally export to sensitive regions like the Middle East. *Id.*

200. See Hibbs, *supra* note 199, at 5. All exports of nuclear, chemical, or biological weapons specifically listed in the Foreign Trade and Payments Act of 1961 must first be approved through the Office of Economics, which decides whether the case is routine. Wulf, *supra* note 165, at 79. Only the export of listed items must be licensed. *Chemical and Biological Weapons Threat*, *supra* note 193, at 218. Any non-routine case, *i.e.*, one not having precedent, must be sent for approval to other ministries, such as the Ministries of Defense or Foreign Affairs. Wulf, *supra* note 165, at 79.

201. Only six German corporate officials have received prison sentences for helping Libya build the Rabta plant; as of the beginning of 1993, four of those convictions were on appeal. *Former German Executive Gets 15 Months' Jail for Libyan Poison-Gas Plant*, AGENCE FRANCE PRESSE, Jan. 18, 1993, available in LEXIS, Nexis Library, Wires File. For an incisive discussion of how

new laws, and U.S. intelligence estimates warning that Iran is pursuing chemical, biological, and nuclear weapons, the German Government has approved more than two hundred applications to deliver sensitive dual-use technology to Iran.<sup>202</sup> And most recently, a number of German companies have allegedly helped Libya build another underground chemical weapons plant near Tarhunah, east of Rabta.<sup>203</sup> While German spokesmen have once again claimed that the companies in question did not know the purpose of the facility, U.S. intelligence officials claim that technicians visiting the site should have known how the equipment was being used.<sup>204</sup>

### C. Brazil

Brazil's export of catastrophic weaponry is a by-product of its efforts to expand its industrial base.<sup>205</sup> Because Brazil spends less than one percent of its gross domestic product on its military, its weapons producers depend on the export market.<sup>206</sup> The logical concomitant of the limited local demand for arms and the pressure to expand production is that Brazil has exported up to seventy percent of its weapons production.<sup>207</sup> Between 1981 and 1990, Brazil ranked eleventh among exporters of major conventional weapons.<sup>208</sup>

Of the world's major weapons suppliers, Brazil is probably the most dependent on the participation of foreign firms to provide key technologies. Brazil has exhibited little concern for the destination of the weapons it produces.<sup>209</sup> This combination has made Brazil a willing participant in many of the last decade's joint proliferation

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strict export control laws may have had a perverse effect in stimulating German arms exports, see KRAUSE, *supra* note 103, at 146-47.

202. Steve Coll, *German Exports Helping Iran Rebuild, Rearm*, WASH. POST, Dec. 6, 1992, at A33, A37.

203. Jehl, *supra* note 198, at A7.

204. Bill Gertz, *Europeans Suspected of Aiding Libya's Chemical Arms Program*, WASH. TIMES, Feb. 19, 1993, at A3.

205. Etel Solingen, *Brazil: Technology, Countertrade, and Nuclear Exports*, in INTERNATIONAL NUCLEAR TRADE AND NONPROLIFERATION, *supra* note 98, at 111, 114-15. Brazil is a large exporter in general. In 1988, it had a trade surplus of \$19 billion, the world's third largest. *Id.* Trade balances out Brazil's need for foreign currency to pay a foreign debt that was \$117 billion in 1988, the highest in the developing world. *Id.*

206. Agnès C. Allebeck, *Brazil*, in ARMS EXPORT REGULATIONS, *supra* note 165, at 37.

207. KRAUSE, *supra* note 103, at 169.

208. Allebeck, *supra* note 206, at 37. Weapons exports totaled \$2.6 billion for this period, with the largest recipients being Iraq, Libya, and Egypt. *Id.* at 42. Iraq alone received almost \$1 billion in major weapons from Brazil. *See id.*

209. *See* Allebeck, *supra* note 206, at 41 (reporting that Brazil avoids trade alliances and offers its products to world market without catering to political interests of superpowers).

efforts with China, Germany, and others.<sup>210</sup>

Brazil probably has not proliferated chemical or biological weapons. Indeed, Brazil, Chile, and Argentina have declared a chemical and biological weapons-free zone among themselves.<sup>211</sup> Despite the fact that it has recently agreed to submit to International Atomic Energy Agency safeguards,<sup>212</sup> Brazil's contribution to proliferation has involved nuclear materials and, most significant, ballistic missile technologies.

Brazil possesses the fifth-largest uranium reserve in the world, comprising eight percent of world reserves, enough to produce 3600 tons of uranium concentrate, known as yellowcake, per year; it also has the world's largest thorium and niobium reserves.<sup>213</sup> As a nonsignatory to the Nuclear Non-Proliferation Treaty, Brazil has been able to sell yellowcake to many countries, including Turkey, Britain, France, China, and Libya, without incurring an obligation to report.<sup>214</sup> It was Brazil's Hugo Piva, a retired air force general, who in 1981 supervised shipment of yellowcake uranium to Iraq's nuclear program at Osirak.<sup>215</sup> In addition, Brazil has actively promoted enrichment technologies as well as the design of nuclear facilities.<sup>216</sup>

Brazil's most pronounced role as a proliferator has been to supply critical equipment and materials for ballistic missiles. Brazil is widely regarded as among the most advanced developing nations in military

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210. See Solingen, *supra* note 205, at 130-31. With major assistance and agreements from Germany, particularly the firm Kraftwerk Union, Brazil has set up nuclear power plant production, which is linked to its export of yellowcake uranium and other nuclear materials. *Id.* at 112; see also SPECTOR, NUCLEAR EXPORTS, *supra* note 18, at 19-20 (discussing 1975 Brazil-West German nuclear trade agreement). Besides Germany, Brazil has been involved in extensive joint ventures with China, Nigeria, Algeria, and Venezuela. Solingen, *supra* note 205, at 137. See generally *Strengthening the Export Licensing System, Report of the House Comm. on Government Operations*, H.R. REP. NO. 137, 102d Cong., 1st Sess. 26-30 (1991).

211. Patricia B. McFate, *Where Do We Go from Here? Verifying Future Arms-Control Agreements*, WASH. Q., Autumn 1992, at 75, 83.

212. See *id.* at 83 (reporting that Brazil and Argentina signed agreement in December 1991 placing all nuclear sites under IAEA safeguards); see also Eugene Robinson, *S. America Steps Back from Atomic Brink*, WASH. POST, Jan. 26, 1992, at A24 (stating that under recent agreement signed by Brazil and Argentina, both nations would abandon nuclear weapons programs and open each other's facilities to inspection, despite fact that Brazil remains nonsignatory to Nuclear Non-Proliferation Treaty). See generally JOHN R. REDICK, NUCLEAR CONTROL INST., ARGENTINA AND BRAZIL'S NEW ARRANGEMENT FOR MUTUAL INSPECTIONS AND IAEA SAFEGUARDS (1992).

213. Solingen, *supra* note 205, at 122. Thorium has been used as fuel for "fast breeder" nuclear reactors. See *id.* Niobium is a superconductor mineral that is used to transmit nuclear energy. *Id.* at 122 n.34.

214. Solingen, *supra* note 205, at 122.

215. Mark Hibbs, *Gulf War Will Shift IAEA Safeguards Priorities—By How Much?*, NUCLEONICS WK., Feb. 20, 1992, at 12. Iraq purchased 27 tons of yellowcake. *Id.*

216. See Solingen, *supra* note 205, at 123-24. Heavy equipment for the nuclear process is also high on Brazil's export capabilities, with manufacturers such as Confab, Cobrasma, Bardella, and Jaguare contributing. *Id.*; see also *id.* at 125, tbl. 7.2 (listing firms, discussing their technical capabilities, and explaining from where they obtain assistance).

applications of satellite technology and communications systems.<sup>217</sup> Brazil developed its first three space rockets, the Sonda I, II, and III, into surface-to-surface missiles and sold them directly to Iraq, Libya, and Saudi Arabia.<sup>218</sup> Libya agreed to pay Brazil as much as three billion dollars over a five-year period to develop a new family of ballistic missiles beginning with a range of 100 to 150 kilometers but increasing to as much as 1000 kilometers.<sup>219</sup> In conjunction with China, with whom it has an extensive space cooperation arrangement that includes sharing satellite technology, Brazil is planning to build its first strategic missile, projected to have a 2000-mile range.<sup>220</sup>

Brazil was the fourth-largest supplier of weapons to Iraq in the 1980s, behind the Soviet Union, Germany, and China.<sup>221</sup> Leading Brazilian concerns transferred propulsion and guidance systems and uranium-enrichment technology to Iraq through a well-developed network of Latin American arms traffickers.<sup>222</sup> Brazil exported Astros II battlefield missiles for use in the Iran-Iraq War and shared ballistic missile technology with Iraq in exchange for Iraqi oil as well as financing for several of Brazil's missile programs.<sup>223</sup> The firm Avibras, which, together with three other firms, accounted for over ninety-five percent of Brazilian arms exports between 1980 and 1985,<sup>224</sup> secretly helped Iraq extend the range of its Soviet Scud missiles to enable them to hit Teheran.<sup>225</sup> In another supporting effort that may have been directly linked to the Brazilian Government, a team of two dozen aerospace engineers was in Iraq from 1989 to 1990, led by Major Brigadier Hugo de Oliveira Piva, who had been in charge of converting Brazil's Sonda IV space rocket into a nuclear missile and who may also have been involved in efforts to enrich uranium for nuclear bombs.<sup>226</sup>

It is noteworthy that while Brazil's export control laws are in some

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217. SPRING, *supra* note 56, at 6-7.

218. Gary Milhollin & Gerard White, *Explosive Disunion: The Trade in Soviet Nuclear Know-How*, WASH. POST, Dec. 8, 1991, at C4 [hereinafter Milhollin & White, *Explosive Disunion*].

219. CARUS, *supra* note 97, at 18.

220. Milhollin & White, *Beijing's Atomic Bazaar*, *supra* note 125, at C1.

221. See generally ARMS EXPORT REGULATIONS, *supra* note 165.

222. See Eric Ehrmann & Christopher Barton, *Who Helped Arm Saddam?*, CHRISTIAN SCI. MON., Jan. 29, 1991, at 18. This network also included the Chilean weapons manufacturer Carlos Cardoen, who sold cluster bombs to Iraq for nearly a decade and helped Iraq develop fuel-air explosives. *Id.*

223. H.R. REP. NO. 137, *supra* note 210, at 28.

224. See SCHMIDT, *supra* note 178, at 18. With the failure of the Iraqi Government to pay for some of the sales as well as the precipitous decline in new orders, Avibras filed for bankruptcy in 1990. *Id.*

225. H.R. REP. NO. 137, *supra* note 210, at 28.

226. See Thomas Kamm, *Brazilian Arms Expert Said to Upgrade Iraq's Missiles*, WALL ST. J., Aug. 30, 1990, at A5.

ways lenient—for example, exporters of nuclear materials need not prove that the recipients agree not to retransfer such material to a third country—they are quite comprehensive.<sup>227</sup> Accordingly, the proliferation activities of Brazilian firms were most likely conducted with the knowledge and approval of the Brazilian Government. All applications for nonnuclear exports are forwarded to the Ministry of the Army, which seeks the advice of the Secretariat for National Defense.<sup>228</sup> Nuclear exports are regulated by the Nuclear Energy Commission with the advice of the Secretariat for National Defense.<sup>229</sup>

#### D. Former Soviet Union

For obvious historical reasons, the proliferation threat posed by the republics of the former Soviet Union differs somewhat from that posed by China, Germany, or Brazil. Even with its superpower strength greatly diminished, Russia and its confederated republics still retain more weapons, militarily critical equipment and technology, and human expertise than any country other than the United States.<sup>230</sup> The traditional concerns about proliferation pale in comparison to the possible spread of unaccounted-for Soviet weapons, tons of fissionable materials, and thousands of highly skilled technicians.<sup>231</sup>

The former Soviet Union's record as a proliferator was mixed at best. The U.S.S.R. protected its nuclear and chemical weapons,<sup>232</sup> but, with the exception of Israel and NATO members, every nation

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227. See generally Allebeck, *supra* note 206, at 39-40 (discussing scope of Brazil's export laws).

228. See Allebeck, *supra* note 206, at 39-40. If the export is approved, the CACEX (Foreign Trade Department of the Bank of Brazil, which controls financial aspects of each transaction) scrutinizes the authorization. *Id.* at 40.

229. Solingen, *supra* note 205, at 128.

230. See generally Igor Levin, *Where Have All the Weapons Gone? The Commonwealth of Independent States' Struggle to Stop the Proliferation of Nuclear Weapons and the New Role of the International Atomic Energy Agency*, 24 N.Y.U. J. INT'L L. & POL'Y 957 (1992) (stating that former Soviet Union possessed estimated 30,000 nuclear warheads at time of breakup).

231. For thorough discussions of the proliferation threat posed by the breakup of the Soviet Union, see William C. Potter, *Exodus: Containing the Spread of Soviet Nuclear Capabilities*, 14 HARV. INT'L REV. 26 (1992), and William Walker, *Nuclear Weapons and the Former Soviet Republics*, 68 INT'L AFF. 255 (1992).

232. Paul Freedenberg & Igor Khripunov, *Arms Control Is Global Mission*, DEF. NEWS, Jan. 27, 1992, at 28, 28. Freedenberg and Khripunov write:

Although in the past the Soviets exported a vast arsenal of military hardware worldwide for ideological reasons, recent surveys indicate that weapons of mass destruction were never traded or shared. While Scud missiles were sold to a number of countries, there has been no substantiated claim that tied the former Soviet Union in the spread of nuclear, chemical or biological weapons, even during the worst period of the Cold War.

*Id.*



that has or is developing ballistic missiles has received Soviet assistance.<sup>233</sup> In the quarter century prior to its dissolution, the U.S.S.R. was the preeminent proliferator of ballistic missiles to the states whose programs are now causing great concern, especially those in South Asia and Africa.<sup>234</sup> The Soviet Union sold chemical- and nuclear-capable missiles to Afghanistan, Algeria, Egypt, Iraq, Kuwait, Libya, South Yemen, and Syria.<sup>235</sup> During the 1980s, North Korea, a leading candidate for next entrant into the nuclear club, purchased nearly three billion dollars worth of arms from the Soviet Union.<sup>236</sup>

The disintegration of the Soviet Union has substantially diminished its superpower capabilities, but the threat of proliferation has grown in inverse proportion. As of 1990, the Soviet Union possessed more than 26,000 nuclear warheads, located in four republics.<sup>237</sup> In addition, chemical weapons,<sup>238</sup> missiles, biological agents,<sup>239</sup> and,

233. CARUS, *supra* note 97, at 14-16.

234. John McCain, *Controlling Arms Sales to the Third World*, WASH. Q., Spring 1991, at 79, 80-82. Including conventional arms, the Soviet Union was the largest weapons seller during the 1980s. From 1982 to 1989, it exported \$129 billion worth of arms, representing over 20% of its total exports. *Id.* Major recipients of Soviet arms included Cuba, North Korea, Vietnam, Afghanistan, Iran, Syria, and Libya. *Id.* See generally KRAUSE, *supra* note 103, at 112-24 (1992) (discussing evolution of Soviet arms transfers).

235. Milhollin & White, *Explosive Disunion*, *supra* note 218, at C4. The FROG-7, SS-21, and SCUD-B were the most potent missiles sold to these countries. Harvey J. McGeorge, *Bugs, Gas and Missiles*, DEF. & FOREIGN AFF., May/June 1990, at 14, 14. Afghanistan received 500 SCUD-B missiles. *Id.* Egypt and Algeria have several Soviet FROG-7s; Kuwait did as well until the Gulf War. *Id.* The Soviets supplied Iraq with FROG-7s and SCUD-Bs in the early 1970s, and SS-21s during the war with Iran. *Id.* Libya, South Yemen, and Syria still have large numbers of FROG-7s, SCUD-Bs, and SS-21s in their arsenals.

236. McCain, *supra* note 234, at 81.

237. John M. Broder & Stanley Meisler, *Terrifying Quest for A-Arms*, L.A. TIMES, Jan. 19, 1992, at A1, A18. The following table sets forth the distribution of nuclear weapons in the former Soviet Union:

TYPE	Russia	Ukraine	Khazakstan	Belarus	TOTAL
Strategic	9650	1300	1150	100	12,200
Tactical	9350	2700	650	1150	13,850
TOTAL	19,000	4000	1800	1250	26,050

*Id.*

238. Harvey J. McGeorge, *Chemical Addiction*, DEF. & FOREIGN AFF., Apr. 1989, at 16, 16. At the time it dissolved, the Soviet Union was reported to have the world's largest and most modern chemical warfare capability, with 10 production facilities and nearly 40 storage sites. *Id.* Whether this stockpile was produced after former President Gorbachev claimed in 1987 that the Soviet Union had ceased manufacturing chemical weapons, or was merely the remnants of earlier production is the subject of considerable dispute. See generally BBC SUMMARY OF WORLD BROADCASTS, 'Izvestiya' Publishes Documents on Soviet Ignorance of CW Proliferation, Nov. 23, 1992, at C2/1 (reporting that top-secret memoranda from then-President Gorbachev and then-Soviet Foreign Minister Shevardnadze in 1989 indicate that even highest levels of Soviet Government did not know extent of country's production of chemical weapons).

of course, all of the precursors and equipment necessary to make such weapons, remain in the former Soviet republics in huge quantities. To date, no documented evidence indicates either that any of the former Soviet Union's nuclear weapons have been stolen or lost or that any weapons-grade uranium or plutonium has entered foreign hands.<sup>240</sup> Yet, the threat posed by the possible loss of control of the 500 to 1000 tons of highly enriched uranium remaining in over three thousand warheads left after the START II Treaty has extremely serious ramifications.<sup>241</sup>

The possibility that only slightly less critical nuclear materials and technologies may be exported still raises substantial concern.<sup>242</sup> This concern is amplified by the fact that the Soviet Union's former weapons customers in Eastern Europe now have little demand for sophisticated weapons, and that nations aligned with the West prefer the sophisticated technology of Western weapons and the reliability of European or American suppliers. Thus, the market for Russian and Ukrainian weapons has tended to concentrate among states, notably Brazil, Syria, India, and Iran, that are closed to alternative supply sources.<sup>243</sup> In addition to the concern over Soviet hardware, the potential emigration of missile engineers threatens a spread of dangerous capabilities.<sup>244</sup>

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239. See Joseph Fitchett, *Russia Germ-Weapon Pledge*, INT'L HERALD TRIB., Sept. 15, 1992, at 8 (stating that in early 1992, President Yeltsin acknowledged Russian violations of Biological Weapons Convention). See also, e.g., John Barry, *Planning a Plague*, NEWSWEEK, Feb. 1, 1993, at 40, 40-41 (stating that Russian official from Leningrad's Institute of Especially Pure Biopreparations who had defected to United States during summer of 1992 claimed that biological weapons production continued inside Bioprepat system even after President Yeltsin's edict banning germ-warfare testing in April of that same year); Steve Connor, *How the Russians Poisoned Their Own*, INDEPENDENT, Mar. 29, 1993, at 17 (reporting that Russian and American scientists have uncovered evidence that outbreak of anthrax 900 miles east of Moscow in 1972 was caused by accident at biological weapons plant); Sergei Leskov, *Plague and the Bomb*, IZVESTIA, June 26, 1993, at 15 (charging that military bacteriological programs in Russia and United States are currently being developed utilizing diseases of "high combat efficiency" including tularemia, Venezuelan encephalomyelitis, and anthrax).

240. William C. Potter, *Nuclear Exports From the Former Soviet Union: What's New, What's True*, ARMS CONTROL TODAY, Jan./Feb. 1993, at 3, 3. See generally David C. Morrison, *To Arms*, NAT'L J., Jan. 2, 1993, at 14, 15 (reporting that while transfers of ex-Soviet arms continue throughout world, they consist primarily of light armored vehicles and small arms).

241. See *Current Developments in the Former Soviet Union: Hearings Before the Senate Comm. on Armed Services*, 103d Cong., 1st Sess. 137, 139 (1993) (testimony of Maj. Gen. William F. Burns, U.S. Delegation on Safe and Secure Dismantlement of Nuclear Weapons, Department of State).

242. See Bill Gertz, *Sensitive Technology Leaks Blamed on Soviet Breakup*, WASH. TIMES, Feb. 25, 1993, at A5 (noting that CIA Director R. James Woolsey has reported that sensitive technology has been transferred out of former Soviet Union).

243. See Morrison, *supra* note 240, at 14 (stating that Moscow has been forced to sell arms to nations, like Iran, which cannot buy from West). See also Steven Erlanger, *Moscow Insists It Must Sell the Instruments of War to Pay the Costs of Peace*, N.Y. TIMES, Feb. 3, 1993, at A6.

244. See Erlanger, *supra* note 243, at A6 (reporting that group of 64 missile engineers was detained at Moscow airport in late 1992 while en route to North Korea).

At the same time, the motivation for exporting weapons has also changed. During the Cold War, the Soviets provided armaments to client states primarily for political and strategic reasons.<sup>245</sup> The fall of communism, however, has left the pursuit of foreign currency as the primary justification for weapons sales.<sup>246</sup> The entire Russian aerospace industry has become more export- and market-oriented with the formation of the missile-production consortium Spetztekhnika, which is overtly marketing sophisticated missile weaponry.<sup>247</sup> The motivation to promote advanced weapons sales is primarily to maintain employment levels in what remains of the former Soviet weapons industry.<sup>248</sup>

Until recently, India received nearly seventy-five percent of its arms, including technology to make weapons-grade plutonium, from the Soviet Union.<sup>249</sup> During the 1980s, the Soviet Union sold India at least eighty tons of heavy water, enough to produce about six bombs per year.<sup>250</sup> Of great concern has been the recent agreement to sell advanced rocket engines involving third-stage liquid-fueled cryogenic rocket engine technology to India.<sup>251</sup> Russian officials claim that they developed the rocket for putting civilian satellites into geostationary orbit, and that it cannot be used for military purposes, and that Russia would not provide any production equipment for the manufacture of the rocket.<sup>252</sup> American officials claim, however, that the technology could help India develop long-range ballistic missiles.<sup>253</sup> Under the threat of U.S. economic sanctions, Russia has recently agreed to halt these sales.<sup>254</sup>

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245. See, e.g., MARTIN SICKER, *THE STRATEGY OF SOVIET IMPERIALISM: EXPANSION IN EURASIA* 126-28 (1988) (explaining that Soviet Union tightened its relationship with Syria in early 1980s by providing "large quantities of top-of-the-line" military equipment in effort to secure foothold in Persian Gulf).

246. Erlanger, *supra* note 243, at A6 (stating that Russian arms sales are currently based on generating hard currency and preserving jobs, not on ideology).

247. David R. Markov, *The Fire Sale on Russian Missiles*, A.F. MAG., Dec. 1992, at 60, available in LEXIS, Nexis Library, Magazines File.

248. See Morrison, *supra* note 240, at 14. In Russia, 25% of the industrial work force, about 5.4 million people, works in arms-related jobs. *Id.* In Ukraine, 17% of industrial workers work in weapons plants. *Id.* By some estimates, nearly 400,000 Russians were laid off from defense industries in 1992 and 1993, with another 300,000 transferred to civilian jobs. Jim Mann, *Russia Boosting China's Arsenal*, L.A. TIMES, Nov. 30, 1992, at A1, A9.

249. McCain, *supra* note 234, at 85.

250. Milhollin & White, *Explosive Disunion*, *supra* note 218, at C4.

251. See Sergei Stokan, *Space Contract Comes Under Pressure from Washington*, MOSCOW NEWS, Apr. 29, 1992, available in LEXIS, Nexis Library, News File. If a proposed plant to mass produce missiles in India is in fact built, India could supply missiles to other countries. Milhollin & White, *Explosive Disunion*, *supra* note 218, at C4.

252. Stokan, *supra* note 251.

253. Sanjoy Hazarika, *Despite U.S., Yeltsin Backs Rocket Deal with India*, N.Y. TIMES, Jan. 30, 1993, at A2.

254. Elaine Sciolino, *Russia Is Halting Arms-Linked Sale*, N.Y. TIMES, July 17, 1993, at A4.

With the fall of the Soviet regime, China made concerted attempts to acquire Soviet materials and technology with which to build catastrophic weapons. In early 1992, the PRC officially approached Ukraine with an offer to purchase the Kuznetsov-class nuclear aircraft carrier Varyag.<sup>255</sup> Recently, China negotiated the purchase of Russian S-300 missiles which are similar to the U.S. Patriot missile.<sup>256</sup> Of potentially greatest concern is the transfer of expert personnel and technology that could greatly enhance China's ability to make weapons-grade nuclear fuel but would not bring either Russia or China into violation of proliferation-control treaties.<sup>257</sup>

The former Soviet parliament never regulated arms exports through legislation.<sup>258</sup> The Ministry of Foreign Economic Relations, in consultation with the Ministry of Defense and the Foreign Ministry, orchestrated the export of military equipment during the Soviet era.<sup>259</sup> Recently, each of the republics with access to catastrophic weapons has begun to establish a materials control and accountability system and to tighten its export controls.<sup>260</sup> Only the Russian system currently meets the standards established by the Nuclear Non-Proliferation Treaty,<sup>261</sup> and recent reports indicate that even that system has fallen victim to the disorder that pervades Russian regulation.<sup>262</sup> Most ominously, Russian officials fear the development of an organized criminal effort to export critical materials.<sup>263</sup>

In an effort to demonstrate its commitment to nonproliferation, the Russian Foreign Intelligence Service (formerly the KGB) recently released a comprehensive document detailing the spread of nuclear,

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255. Gary Klintworth, *China's Naval Ambitions Stir Up Fears in Region*, THE STRAITS TIMES, Aug. 1, 1992, available in LEXIS, Nexis Library, Newspapers File.

256. Nicholas D. Kristof, *China Builds Its Military Muscle, Making Some Neighbors Nervous*, N.Y. TIMES, Jan. 11, 1993, at A1, A8.

257. Mann, *supra* note 248, at A1, A9.

258. Herbert Wulf, *The Union of Soviet Socialist Republics*, in ARMS EXPORT REGULATIONS, *supra* note 165, at 165, 167.

259. *Id.* at 170.

260. See Orlov, *The World Is About to Take Another Step into the Nuclear Proliferation Void*, MOSCOW NEWS, May 26, 1993, available in LEXIS, Nexis Library, News File (reporting that Ukraine and Kazakhstan were only beginning to establish control over strategic and nuclear materials and that other republics had not seriously faced task).

261. See generally BBC Summary of World Broadcasts, *Decree on Nuclear Material Export Controls*, Feb. 12, 1993.

262. Steve Coll, *Nuclear Goods Trade in Post-Soviet Bazaar; Export Controls Lacking on Russia's Rim*, WASH. POST, May 15, 1993, at A1 ("Formerly, there was a rigid system of export control. . . . In a period of a year and a half, the system has disappeared.") (quoting Deputy Assistant Secretary of State Michael Newlin).

263. Orlov, *supra* note 260 (quoting Gennady Yevstafyev, Director of Russian Foreign Intelligence Service: "Attempts are being made to smuggle out not components of nuclear ammunition but slightly enriched materials used for industrial purposes. All such attempts seem amateurish but the Intelligence has already registered a tendency towards organization of reliable channels for such exports.").

chemical, and biological weapons.<sup>264</sup> The report confirms the possession of nuclear weapons by India, Pakistan, and Israel, the possession of biological agents by Egypt and North Korea, and widespread stockpiling of chemical agents and ballistic missiles.<sup>265</sup> It does not, however, analyze the extent of Soviet responsibility for such proliferation.

#### IV. INTERNATIONAL EFFORTS TO CONTROL PROLIFERATION

Why, in light of the obvious dangers of catastrophic weapons proliferation, has this vast market been permitted to swell to such proportions? The end of the Cold War's balance of terror has brought new leaders to both Russia and the United States. Why, then, is more not being done to bridle the masters of war?

This Part offers an answer to these questions. The four separate "arrangements" to control the four categories of catastrophic weapons, the Nuclear Non-Proliferation Treaty (NPT),<sup>266</sup> the Chemical Weapons Convention (CWC),<sup>267</sup> the Biological Weapons Convention (BWC),<sup>268</sup> and the Missile Technology Control Regime (MTCR),<sup>269</sup> are well-intentioned, but inevitably they provide only a patchwork quilt of controls. Unlike the "regime" described in Part V, each of these arrangements is fragmentary.

Even a casual review of the arrangements to control catastrophic weapons reveals startling omissions. For example, the arrangements to control biological weapons and ballistic missiles utterly lack verification mechanisms to detect violations. Most important, each lacks stipulated penalties for violators. Reflecting the realpolitik approach, each of these arrangements relies on the implicit threat of undefined diplomatic censure to coerce compliance, counting on the good faith of state parties to comply with their terms.

The fact that four separate arrangements with different memberships, organizational structures, objectives, and standards monitor the

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264. Patrick Cockburn, *KGB Lifts Lid on the World's Dirty Weapons*, INDEPENDENT, Feb. 28, 1993, at 12.

265. *Id.*

266. Treaty on the Non-Proliferation of Nuclear Weapons, *opened for signature* July 1, 1968, 21 U.S.T. 483, 729 U.N.T.S. 161 [hereinafter NPT].

267. The Convention on the Prohibition, Production, Stockpiling, and Use of Chemical Weapons, *opened for signature* Jan. 13, 1993, U.N. GAOR, 47th Sess., Supp. No. 27, U.N. Doc. A/47/27/Appendix 1 (1992) [hereinafter CWC].

268. Convention on the Prohibition of the Development, Production, and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, *opened for signature* Apr. 10, 1972, 26 U.S.T. 583, 1015 U.N.T.S. 163 [hereinafter BWC].

269. Agreement on Guidelines for the Transfer of Equipment and Technology Related to Missiles, Apr. 26, 1987, 26 I.L.M. 599 (1987) [hereinafter MTCR Guidelines].

four categories of catastrophic weapons suggests a fundamental weakness. The arrangements regulate the supply of questionable materials only according to each treaty's specific application. Nowhere on Earth does an institution or office possess overarching authority to regulate the entire market for materials and equipment that could destroy civilizations. There is not even a pretense of formal cooperation among the four arrangements, nor do the state parties to them share a concerted nonproliferation strategy.

At a minimum, multilateral cooperation among these arrangements would allow suspicious activity regarding one weapon system to provoke investigatory efforts regarding other weapons. For example, the fact that a nation is aggressively developing a ballistic missile capability may, on that evidence alone, make that country a questionable customer of chemicals that can be made into a warhead. The organization of controls that concentrates on a single weapons system reflects a Cold War preoccupation with parity of forces, but a supplier of one class of dangerous technologies may also supply different weapons technologies, enabling it to become a primary contributor to another nation's overall weapons capability.

Despite their many limitations, these arrangements seek to prevent nations that lack a weapon from acquiring one, while simultaneously facilitating access to peaceful commercial technologies.<sup>270</sup> All four classes of catastrophic weapons consist of materials and technologies that have innocent commercial applications. Except perhaps at the final stage of assembly, when components are combined into an unmistakably deadly unit, distinguishing weapons production from legitimate industrial activity is difficult. Each arrangement squarely confronts this problem of dual-use technology,<sup>271</sup> although their solutions vary considerably. Undeniably, these arrangements have slowed proliferation. The world is clearly safer than it might have been in their absence.

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270. Sergei B. Batsanov, *Proliferation of Weapons Systems and Disarmament Issues with Particular Reference to Prohibition of Biological, Chemical and Other Weapons of Mass Destruction*, 14 DISARMAMENT 1, 6 (1991). Batsanov states:

The problem of non-proliferation is always a problem of the relationship between peaceful and military applications of relevant technologies. If, in establishing a regime to prevent the proliferation of this or that type of weapon, we also limit the peaceful economic and technological development of States, we will create a regime that can hardly endure.

*Id.*

271. See Smith & Fisher, *supra* note 171, at A1 (defining "dual-use" items as having both theoretical civilian and military uses).

### A. Nuclear Weapons Non-proliferation

The Treaty on the Non-Proliferation of Nuclear Weapons<sup>272</sup> is the basis of the oldest and most important international arrangement outlawing the transfer or acquisition of catastrophic weaponry.<sup>273</sup> The NPT has had considerable success, attracting over 160 adherents with no withdrawals.<sup>274</sup> Prior to discovery of the Iraqi and North Korean nuclear programs,<sup>275</sup> no material breaches of the NPT had been recorded.<sup>276</sup> The NPT's ultimate goal of total nuclear disarmament, however, remains a distant hope.

#### 1. Treaty objectives and proscribed behavior

The NPT is designed to prevent the declared nuclear weapon states from assisting nonnuclear weapon states in developing a nuclear weapons program.<sup>277</sup> The treaty is also designed to promote both nuclear disarmament<sup>278</sup> and the peaceful use of nuclear technologies and materials.<sup>279</sup> Pursuit of these goals is premised on the fact that the vast majority of nations do not possess nuclear weapons

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272. See NPT, *supra* note 266.

273. D.M. Edwards, *International Legal Aspects of Safeguards and the Non-Proliferation of Nuclear Weapons*, 33 INT'L & COMP. L.Q. 1, 1 (1984). The nonproliferation arrangement also includes ancillary agreements among supplier states to restrict their nuclear exports, NPT, *supra* note 266, art. I, 21 U.S.T. at 487, 729 U.N.T.S. at 165, regional nuclear weapons-free zones, *id.* art. III, 21 U.S.T. at 487, 729 U.N.T.S. at 165, and, most important, verification arrangements applied by the International Atomic Energy Agency. *Id.* art. VII, 21 U.S.T. at 491, 729 U.N.T.S. at 169.

274. See generally Testimony of Norman A. Wulf, Acting Assistant Director Nonproliferation and Regional Arms Control, Arms Control & Disarmament Agency, Before the House Comm. on Foreign Affairs, Nov. 10, 1993, available in LEXIS, News Library, Script File.

In addition, regional agreements supplement the NPT. For example, the Treaty for the Prohibition of Nuclear Weapons in Latin America, opened for signature Feb. 14, 1967, 634 U.N.T.S. 281, establishes a nuclear-weapons-free zone in the region. *Id.* at 330. Parties to the treaty agree not to manufacture, test, or acquire nuclear weapons or to accept other countries' deployment of weapons on their territory. *Id.* To verify these pledges, members agree to accept IAEA safeguards and inspection measures. *Id.* at 340-42. Moreover, the treaty establishes the Agency for the Prohibition of Nuclear Weapons in Latin America (OPANAL), which may undertake special inspections at the request of members who have reason to believe that another party is engaging in prohibited activity. *Id.* at 334.

275. See *Hearing on Proliferation Threats*, *supra* note 3, at 57 (reporting that NPT has not prevented Iraq and North Korea, both signatories to NPT, from engaging in efforts to create nuclear weapons).

276. See Goldblat, *The Non-Proliferation Treaty: Status of Implementation and the Threatening Developments*, in NUCLEAR NON-PROLIFERATION AND THE NON-PROLIFERATION TREATY 2 (M.P. Fry et al. eds., 1990) (noting that this record of compliance is unprecedented for arms control agreement).

277. See NPT, *supra* note 266, art. III, 21 U.S.T. at 488, 729 U.N.T.S. at 166 (obligating nuclear-weapon states party to treaty to refrain from providing any supplies that could be used for nonpeaceful purposes to nonnuclear states).

278. See NPT, *supra* note 266, art. VI, 21 U.S.T. at 490, 729 U.N.T.S. at 168 (requiring treaty signatories to pursue agreements to end arms race and to disarm nuclear weapons).

279. See NPT, *supra* note 266, art. V, 21 U.S.T. at 490, 729 U.N.T.S. at 168 (noting that parties agree to share all technology regarding beneficial uses of nuclear materials for peaceful means).

technology and that indigenous development of such technology would be extremely difficult.<sup>280</sup> Accordingly, the NPT divides nations into two groups: the five declared nuclear weapon states, each of which had tested a nuclear device prior to 1967,<sup>281</sup> and all others.

The difficulty inherent in producing nuclear weapons is the key to proliferation control. Each party to the NPT must obey limits on the spread of nuclear weapons and other nuclear explosive devices.<sup>282</sup> Nevertheless, the treaty encourages the distribution of the materials, technology, and industrial base essential to a commercial nuclear energy program, but which could indirectly increase a state's capacity to produce nuclear bombs.<sup>283</sup> The essential nonproliferation task is to assist, or even encourage, the development of nuclear energy capabilities while severely restricting access to the unique technologies necessary to bomb-making capability.

## 2. *Verification of compliance*

The centerpiece of nonproliferation verification is the accounting of nuclear material produced at each declared facility to detect and prevent any diversion of such materials to illegitimate weapons programs.<sup>284</sup> Article III of the NPT requires each signatory nation, or state party, to negotiate safeguard agreements<sup>285</sup> with the Interna-

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280. See generally NPT, *supra* note 266, arts. I, II, 21 U.S.T. at 487, 729 U.N.T.S. at 165 (declaring that cessation of nuclear arms race will be promoted by prohibiting nuclear weapons states from exporting or assisting in nuclear weapons development and nonnuclear-weapons states from receiving weapons or technology intended to be used for offensive purposes).

281. See NPT, *supra* note 266, art. IX, 21 U.S.T. at 493, 729 U.N.T.S. at 171 (creating distinction between nuclear-weapons states and nonnuclear weapons states, defining former as those which had manufactured and exploded nuclear weapons before January 1, 1967).

282. See NPT, *supra* note 266, art. I, 21 U.S.T. at 487, 729 U.N.T.S. at 165 (prohibiting parties to agreement from exporting nuclear weapons).

283. See Joseph Pilat, *The Major Suppliers*, in INTERNATIONAL NUCLEAR TRADE AND NONPROLIFERATION, *supra* note 98, at 39, 40 (noting that notwithstanding its commitment to limit further proliferation of nuclear weapons, NPT allows for distribution of materials that could have indirect effect).

284. See Deutch, *supra* note 66, at 122 (establishing that sole aim of verification inspections is to account for amounts and whereabouts of nuclear material produced at individual facilities).

285. NPT, *supra* note 266, art. III, 21 U.S.T. at 488, 729 U.N.T.S. at 166. As of January 1989, 168 safeguards agreements were in force among 101 states. Michael J. Wilmschurst, *The Adequacy of IAEA Safeguards for the 1990s*, in NUCLEAR NON-PROLIFERATION AND THE NON-PROLIFERATION TREATY, *supra* note 276, at 13, 13. Voluntary-offer safeguards agreements were in force among all five of the nuclear weapons states. In total, 923 installations in 57 states were under safeguards or contained safeguarded material. *Id.* The approximate amount of nuclear material under IAEA safeguards included 10.8 tons of separated plutonium outside reactor cores, one-half ton of recycled plutonium in fuel elements in reactor cores, 254.4 tons of plutonium contained in irradiated fuel, 13.1 tons of highly enriched uranium, 31,704 tons of low-enriched uranium. *Id.* In addition, safeguards apply to 1454 tons of heavy water in those countries where safeguards apply to nonnuclear as well as nuclear material. *Id.*



tional Atomic Energy Agency (IAEA) that will apply to all of that nation's peaceful nuclear activities.<sup>286</sup> The safeguards that each nonnuclear state party to the NPT must accept are not specified by the NPT itself, but are left to be worked out between each state party and the IAEA.<sup>287</sup> While the NPT does not require that safeguards be applied to any activities in the nuclear weapon states,<sup>288</sup> all five have offered voluntarily to place certain nuclear activities under IAEA safeguards.<sup>289</sup>

Safeguards<sup>290</sup> enable the IAEA to detect diversion of significant quantities of nuclear material from peaceful activities to the manufacture of nuclear explosive devices; the likelihood of timely detection thus deters diversion.<sup>291</sup> The safeguards also engender confidence as to the nature of each state's nuclear activity and expedite international cooperation concerning nuclear energy development.<sup>292</sup> Safeguards on materials within a country consist of three basic elements: (1) a system of material accountancy to record every transfer into or out of a "material balance area" (MBA)<sup>293</sup> so that the state and the IAEA should be aware, at any given moment, of the

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286. NPT, *supra* note 266, art. III, 21 U.S.T. at 488, 729 U.N.T.S. at 166; Statute of the International Atomic Energy Agency (IAEA), *opened for signature* October 26, 1956, 8 U.S.T. 1093, 276 U.N.T.S. 3 [hereinafter IAEA Statute]. Article II of the IAEA statute establishes the general principles on safeguards. *Id.*, 8 U.S.T. at 1095, 276 U.N.T.S. at 5. Subsequent to the creation of IAEA, "safeguards documents" were adopted in 1961. See *Agency's Safeguards System*, IAEA Doc. INFCIRC/66/Rev.2 (Sept. 16, 1968) and IAEA Doc. GC(V)INF/39 (Aug. 28, 1961) (incorporating safeguards documents into "Agency's Safeguards System" to establish compliance with statutory obligations).

287. See NPT, *supra* note 266, art. III, 21 U.S.T. at 488, 729 U.N.T.S. at 166. Article III was supplemented by the Convention on the Physical Protection of Nuclear Material, I.A.E.A. Doc. INFCIRC/274/Rev. 1 (May 1980) (later implemented by United States at 18 U.S.C. § 831 (1988)), which obligates parties to protect nuclear material during international transport across their territory or on ships or aircraft within their jurisdiction.

288. See NPT, *supra* note 266, art. III, 21 U.S.T. at 488, 729 U.N.T.S. at 166 (mandating that nonnuclear weapon states accept safeguards without requiring acceptance by nuclear weapon states); see also Edwards, *supra* note 273, at 12-13 (noting that although they are under no obligation to do so because they are all nuclear weapon states, United States, United Kingdom, and France have negotiated safeguard agreements).

289. See Wilmshurst, *supra* note 285, at 13 (explaining that by 1989, safeguards agreements were in force with four of five nuclear weapon states and concluded with fifth).

290. Safeguards may be divided into two basic types: those applicable to all nuclear material in a country, and those applicable to specific nuclear equipment or nuclear material in international trade. Wilmshurst, *supra* note 285, at 14.

291. Edwards, *supra* note 273, at 10. For an extensive discussion of IAEA/NPT safeguards, see Paul C. Szasz, *International Atomic Energy Agency Safeguards*, in *INTERNATIONAL SAFEGUARDS AND NUCLEAR INDUSTRY* 73 (Mason Willrich ed., 1973).

292. Lawrence Scheinman, *Nuclear Safeguards and Non-Proliferation in a Changing World Order*, 23 *SECURITY DIALOGUE* 37, 37-38 (1992).

293. A "material balance area" is a referral to the away-from-facility location where fissile material is held under safeguards. Mark Hibbs, *Gulf War Will Shift IAEA Safeguards Priorities—By How Much?*, *NUCLEONICS WEEK*, Feb. 20, 1992, at 12, 15.

quantity, location, and movement of nuclear materials;<sup>294</sup> (2) installation of containment and surveillance devices in MBA's, including locks, cameras, and seals to prevent covert diversion;<sup>295</sup> and (3) monitoring of relevant facilities by both human and instrumental observation.<sup>296</sup>

The safeguards system presumes that states will declare all their nuclear material at designated sites. Because the purpose of safeguards is to account for the nuclear material in a facility, the frequency of inspections increases with the size of the material inventory to be verified.<sup>297</sup> The advanced industrial states with vast nuclear programs consume a large percentage of IAEA inspection efforts.<sup>298</sup> The IAEA is not authorized to judge the credibility of a state's nonproliferation commitment or to increase its inspection activity because it suspects noncompliance.<sup>299</sup> As both Iraq and North Korea have demonstrated, the NPT verification system is not explicitly designed to detect undeclared or clandestine nuclear facilities so long as *declared* nuclear material is properly accounted for.<sup>300</sup> Consequently, these two nations have nearly acquired a

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294. I NUCLEAR ENERGY AGENCY, ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, THE REGULATION OF NUCLEAR TRADE 53 (1988) [hereinafter REGULATION OF NUCLEAR TRADE].

295. *Id.* at 54. In 1989, the IAEA installed 278 electronic and photographic surveillance systems to expand its physical plant inspections. Eric Wemple, *Preventing the Proliferation of Nuclear Weapons*, EXPORT CONTROL NEWS, Mar. 26, 1991, at 1, 3. In addition, inspectors place special seals on nuclear materials to confirm their use for peaceful purposes. *Id.*

296. See REGULATION OF NUCLEAR TRADE, *supra* note 294, at 54 (noting use of trained inspectors in addition to surveillance equipment). According to the IAEA 1989 Annual Report, agency staff completed 2196 inspections of 922 facilities in the 101 countries that have signed safeguard agreements. *The Annual Report for 1989*, IAEA Doc. GOV/2440 (Apr. 27, 1990); see also Wemple, *supra* note 295, at 3. Although most IAEA inspections focus on the activities of nonnuclear weapons states, the agency also carries out routine checks on facilities in nuclear weapons states. Wemple, *supra* note 295, at 3.

297. Scheinman, *supra* note 292, at 41. "[T]he safeguards system is 'facility oriented.' The system assesses each plant (specifically, each 'material balance area' or MBA) rather than the total nuclear picture of a state. It is the amount in each MBA that determines the frequency of inspection, and this can produce anomalies." David A.V. Fischer, *The International Atomic Energy Agency and Nuclear Safeguards*, in DARRYL HOWLETT & JOHN SIMPSON, NUCLEAR NON-PROLIFERATION: A REFERENCE HANDBOOK 37, 39 (1992).

298. See Fischer, *supra* note 297, at 39 ("Seventy per cent of the IAEA's safeguards budget is now absorbed in applying safeguards in three states, Canada, Germany and Japan, and another sizable share in states that have relatively large nuclear programmes, such as Belgium, Sweden and Spain.").

299. See Scheinman, *supra* note 292, at 40 (stating that refraining from political judgments about state's commitment to nonproliferation is key principle underlying inspection scheme). Scheinman notes that "IAEA safeguards are not an intelligence or policing mechanism. Agency inspectors cannot roam the countryside of states in search of undeclared nuclear material or facilities. . . . [T]he capability to do so would have been seen by key interested parties as contravening the objective of minimizing intrusiveness." *Id.* at 41.

300. William Schneider, Jr., *The Emerging Pattern of Arms Export Controls Affecting Advanced Technology*, 14 CONTEMP. SOUTHEAST ASIA 47, 53 (1992) ("The IAEA's inspections supporting the NPT have proved to be almost wholly ineffective in their current form to detect covert nuclear

nuclear weapons capability without timely detection.

The IAEA is empowered to conduct "special inspections"<sup>301</sup> if an inspected state reports a loss of nuclear material.<sup>302</sup> This power has been limited to expanding the scope of an inspection *within* a declared facility.<sup>303</sup> In response to fears of an Iraqi nuclear program, the 1990 NPT Review Conference recommended that the IAEA conduct special inspections at additional undeclared facilities, and that information from other sources, including national intelligence information, be used by the IAEA in deciding whether to conduct these inspections.<sup>304</sup> Nonetheless, the NPT contains no formal mechanism to provide the IAEA with systematic intelligence concerning the operation of clandestine nuclear facilities. Furthermore, neither the NPT nor the IAEA statute provides any penalties for noncompliance. In the event that a violation is discovered, the IAEA must report the noncompliance to the United Nations Security Council and General Assembly.<sup>305</sup> The Security Council, however, does not generally enforce treaties, and it is not likely to respond to allegations of noncompliance short of a threat to international peace and security.<sup>306</sup>

### 3. *Regulation of nuclear trade*

The nuclear weapon states may not transfer "to any recipient whatsoever" nuclear weapons or other nuclear explosive devices nor "assist, encourage, or induce" any nonnuclear weapon state to manufacture or acquire such weapons.<sup>307</sup> Nonnuclear weapon states may not receive, manufacture, or receive assistance in the manufacture of nuclear explosives.<sup>308</sup> Yet, the treaty does not restrict trade

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weapons programmes.").

301. See *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, ¶ 73 (1983) [hereinafter *Agreement Between Agency and States*] (empowering IAEA to make special inspections to verify information in state reports).

302. See NPT, *supra* note 266, art. III (providing that state parties will accept safeguards arranged at by International Atomic Energy Agency).

303. See *Agreement Between Agency and States*, *supra* note 301, INFCIRC/153, ¶ 71 (noting ad hoc inspections may only be conducted at facilities under Agreement).

304. See Scheinman, *supra* note 292, at 43 (discussing NPT Review Conference's recommendation that IAEA take full advantage of inspection rights).

305. IAEA Statute, *supra* note 286, art. XII, 8 U.S.T. at 1107, 276 U.N.T.S. at 17.

306. See Harald Muller, *The Future of the NPT: Modifications to the Nuclear Non-Proliferation Treaty Regime*, 14 HARV. INT'L REV. 10, 12 (1992) (suggesting that in future, United Nations should respond to threats to peace even from non-NPT states); see also U.N. CHARTER art. 39 ("The Security Council shall determine the existence of any threat to the peace, breach of the peace or act of aggression, and shall make recommendations, or decide what measures shall be taken . . . to maintain or restore international peace and security.").

307. NPT, *supra* note 266, art. I, 21 U.S.T. at 487, 729 U.N.T.S. at 165.

308. NPT, *supra* note 266, art. II, 21 U.S.T. at 487, 729 U.N.T.S. at 165.

promoting the peaceful uses of nuclear energy. Considerable tension arises from these policies to facilitate access to nuclear technology while preventing the proliferation of nuclear explosive devices.<sup>309</sup>

Article III(2) of the NPT regulates the international trade of nuclear materials by applying IAEA safeguards to exports of nuclear materials.<sup>310</sup> Accordingly, no state party may provide to a nonnuclear weapon state, including nonparties to the treaty,<sup>311</sup> any special fissionable material or equipment or material specially designed for processing or producing special fissionable material, unless that material or equipment is subject to IAEA safeguards.<sup>312</sup> These restrictions require exporters of nuclear material or equipment to confirm that their exports do not abet weapons activities.<sup>313</sup> Exporters, however, are not obliged to report the transfer of dual-use nuclear equipment.<sup>314</sup>

Soon after the NPT entered into force, supplier states became concerned that, without criteria, the burden of complying with Article III(2) might disadvantage the nuclear industries of certain states.<sup>315</sup> Accordingly, in 1971, ten governments informed the IAEA of their intentions to require safeguards on a uniform set of nuclear exports.<sup>316</sup> This group, known as the Zangger Committee,<sup>317</sup> created a "trigger list" of materials and items of equipment that could be

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309. See Wemple, *supra* note 295, at 3 (noting that conflicting interests between nuclear and nonnuclear states creates difficulty for export controls).

310. See NPT, *supra* note 266, art. III, 21 U.S.T. at 488, 729 U.N.T.S. at 166 (prescribing Treaty safeguards for all nuclear exports to nonnuclear weapons states).

311. States that have not entered the NPT may receive nuclear materials if they have concluded a safeguard agreement with the IAEA governing specific projects or facilities, but not their entire program. Muller, *supra* note 306, at 11; see also *The Agency's Safeguards System*, IAEA Doc. INFCIRC/66/Rev.2 (Sept. 16, 1968) (outlining circumstances under which nuclear materials become subject to safeguards). This provision potentially discriminates in favor of nonmember states because nonnuclear weapon state parties must accept safeguards on all of their peaceful nuclear activities. Muller, *supra* note 306, at 12 (observing that to avoid sanctions, proliferator could terminate its membership or not join in first place and thereby not have to be concerned with having acceptable program).

312. IAEA Statute, *supra* note 286, art. III, ¶ 2, 8 U.S.T. at 1095, 276 U.N.T.S. at 17.

313. See IAEA Statute, *supra* note 286, art. III, ¶ 2, 8 U.S.T. at 1095, 276 U.N.T.S. at 17 (noting that safeguards require exporters to confirm that material be used solely for peaceful purposes).

314. See Muller, *supra* note 306, at 11 (pointing out that major weakness in lists is failure to include equipment that can be used for both nuclear and nonnuclear activities).

315. See Harald Muller, *The Nuclear Trade Regime: A Case for Strengthening the Rules*, in NUCLEAR NON-PROLIFERATION AND THE NON-PROLIFERATION TREATY, *supra* note 274, at 19, 21 (recognizing allegations that nonproliferation is means of denying technology to nonnuclear or developing states).

316. The ten nations included Australia, Denmark, Canada, Finland, West Germany, the Netherlands, Norway, the Soviet Union, the United Kingdom, and the United States. Subsequently, Austria, Czechoslovakia, East Germany, Ireland, Japan, Luxembourg, Poland, and Sweden sent similar memoranda.

317. Wemple, *supra* note 295, at 3.

exported only under such safeguards.<sup>318</sup> This "trigger list" includes only components, equipment, and materials necessary for the nuclear fuel cycle, but does not ban the transfer of sensitive technologies such as enrichment and reprocessing.<sup>319</sup> The shipment of any item on the list to a nonnuclear weapons state "triggers" the requirement of IAEA safeguards.<sup>320</sup>

In order to export nuclear material or equipment to nonnuclear weapon states that are not parties to the NPT, supplier states must certify that trigger-list items will not be diverted to nuclear weapons production and that the recipient state has negotiated a safeguards agreement with the IAEA.<sup>321</sup> Furthermore, suppliers must seek assurances from recipient states that no trigger-list items will be reexported to a third state unless safeguards are effectively applied in that state.<sup>322</sup>

For fear of discrediting the NPT, the Zangger countries cannot target strict nuclear controls toward certain nations with questionable proliferation credentials. The NPT binds them to assist nonnuclear weapon states with peaceful atomic energy projects.<sup>323</sup> Until recently, the Zangger Committee was weakened by the absence of France and China. To rectify these shortcomings, it was thought necessary to establish another organization, nominally separate from the NPT, that would allow member states a degree of flexibility and latitude in controlling items to nonnuclear weapon states but also enlist the cooperation of all supplier states.<sup>324</sup>

This new organization, called the Nuclear Suppliers Group (NSG or London Club), was formed in the 1970s to draw up a list of materials, equipment, and technology more comprehensive than the Zangger Committee's trigger list.<sup>325</sup> Under this new list, a nation would trigger IAEA safeguards when it exported listed items to

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318. IAEA Doc. INFCIRC/209 (Sept. 1974). See generally Frans Berkhout, *The NPT and Nuclear Export Controls*, in HOWLETT & SIMPSON, *supra* note 297, at 45.

319. See Pilat, *supra* note 283, at 41 (observing that list does not provide prohibition on exporting nuclear technologies). In recent years, the Zangger Committee has completed talks on trigger list equipment and supplies for gas centrifuge enrichment, gaseous diffusion enrichment, and reprocessing. Wemple, *supra* note 295, at 3. The State Department reports that the United States is leading an effort among supplier states to specifically include other questionable technologies on the list. *Id.*

320. Wemple, *supra* note 295, at 3.

321. Wemple, *supra* note 295, at 3.

322. See Goldblat, *supra* note 274, at 5 (pointing out IAEA safeguards must be in place when trigger list items are retransferred).

323. Wemple, *supra* note 295, at 3.

324. Wemple, *supra* note 295, at 3.

325. Pilat, *supra* note 283, at 40-41 (noting that NSG "trigger list" includes fissionable material, nuclear reactors, and certain nonnuclear materials needed to support reactors, and enrichment and reprocessing equipment).

nonnuclear weapon states not party to the NPT.<sup>326</sup> The NSG's Guidelines for Nuclear Transfers<sup>327</sup> require the recipients of the trigger-list items to provide effective physical protection for these items and to pledge not to use them for the manufacture of nuclear explosives.<sup>328</sup> In the event of the diversion of materials or a violation of the supplier/recipient understandings, NSG members would consult promptly on possible common action.<sup>329</sup> Recently, NSG members agreed to a broader list of dual-use technologies and materials having "legitimate non-nuclear uses, but if diverted, could make a major contribution to nuclear explosive and unsafeguarded nuclear fuel-cycle activities."<sup>330</sup>

Despite criticism that it has served to retain oligopolistic control over nuclear technology among a small group of highly industrialized states while denying technology to developing countries,<sup>331</sup> the nuclear trade restriction system has been a qualified success.<sup>332</sup> By itself, the trade restriction system does not establish a discriminatory policy as much as it carries that policy into the area of export controls. It is important to note in this context that only nonsignatories to the NPT have been denied access to technology, most prominently Pakistan, South Africa, and Israel. No faithful and credible NPT adherent has been denied access to nuclear technology.<sup>333</sup>

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326. Pilat, *supra* note 283, at 41.

327. IAEA Doc. INFCIRC/254 (Feb. 1978).

328. See Pilat, *supra* note 283, at 41 (pointing out that recipients must also comply with IAEA safeguard agreements). See generally Berkhout, *supra* note 318, at 46 (noting that one of two conditions attached to export of nuclear items was that physical protection of these materials would be agreed on between governments).

329. IAEA Doc. INFCIRC/254 (Feb. 1978).

330. Berkhout, *supra* note 318, at 45, 46.

331. See Pilat, *supra* note 283, at 39 (observing that since mid-1970s nuclear "have-nots" have opposed trade restrictions they argue allow nuclear "haves" to monopolize power).

332. See Muller, *supra* note 315, at 19-20 (discussing situations in which trade restrictions presented exportation of listed items). There are five well-known cases of transfer restrictions imposed on developing countries party to the NPT. The United States dissuaded France from supplying reprocessing technology to South Korea in the mid-1970s. *Id.* France canceled the sale only after seeing evidence that South Korea was seriously considering a military nuclear option. *Id.* at 20. The United States dissuaded reprocessing in Taiwan in the 1970s and 1980s due to the projects' unambiguously military nature. *Id.* The United States denied Iran fuel for a research reactor, and West Germany refused to allow Kraftwerk Union to complete the Bushehr reactor, a construction site that was left uncompleted in 1979 and bombed by Iraq in 1987, as long as the Iran/Iraq War continued. *Id.* Iraq was unable to obtain an exact replication of the Osirak nuclear reactor that was destroyed by an Israeli air strike in 1981. *Id.* Libya did not get power reactors or other basic nuclear support from either the Soviets or Western countries. *Id.*

333. See Muller, *supra* note 315, at 19-20 (observing that denial of technology to faithful NPT adherent has yet to happen).

*B. Chemical Weapons Control Under the Chemical Weapons Convention*

Efforts to control the proliferation of chemical weapons differ from the NPT's approach to nuclear proliferation. First, chemical weapons typically are comprised of substances that can be acquired from legitimate commercial facilities.<sup>334</sup> Whereas efforts to control nuclear proliferation are based on a tight accounting of the world's fissile materials, chemical weapons control cannot successfully adopt a similar strategy because the chemical industry is too vast.<sup>335</sup> Second, while nuclear weapons control has been balanced with efforts to promote the development of peaceful nuclear energy,<sup>336</sup> the effort to control chemical weapons is not paired with novel incentives for the spread of peaceful chemical capabilities so long as legitimate chemical activities are not unduly impeded. Third, and especially important from the perspective of control efforts, protecting against a chemical military capability requires only the detection of large stockpiles.<sup>337</sup> The goal of the new treaty is not to catch all violations but to make it more difficult and costly for countries to pursue a surreptitious weapons program.<sup>338</sup>

*1. Treaty objectives and proscribed behavior*

The Geneva Protocol of 1925<sup>339</sup> banned wartime use of poison gas

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334. See Jay Brin, *Ending the Scourge of Chemical Weapons*, TECH. REV., Apr. 1993, at 32, 35 (noting that chemicals and equipment with legitimate industrial applications are same as those used to make toxic warfare agents).

335. See *id.* at 35 (observing that nuclear weapon treaties only require inspections of government-owned facilities). Each year, the estimated 25,000 commercial facilities that make up the global chemical industry produce, process, or consume some 70,000 assorted chemicals comprising billions of tons of material. *Id.* at 32.

336. See NPT, *supra* note 266, art. IV, 21 U.S.T. at 489, 729 U.N.T.S. at 167 (providing that benefits of nuclear technology should be made available to all parties for peaceful purposes).

337. See Brin, *supra* note 334, at 35 (noting that only stockpiles containing hundreds of tons of chemicals are large enough to have military impact).

338. Brin, *supra* note 334, at 40. It is in this regard that objection must be taken with the argument made by Kathleen Bailey in her recent article. See Kathleen C. Bailey, *Problems With a Chemical Weapons Ban*, ORBIS, Spring 1992, at 239, 241, 251 ("A cheater can carefully plan its activities so as to obscure the production of chemical agents. . . . Given that proliferation is easy, inexpensive, and virtually undetectable, any multilateral action is unlikely to halt it."). The empirical evidence Bailey cites to support her position is open to question. See Barbara H. Rosenberg, *A New Approach for Limiting Chemical Weapons?*, ORBIS, Fall 1992, at 604, 605 (arguing that Bailey overlooks deterrent effect of inspections and difficulties of conducting clandestine operations). Her argument also misconstrues the purpose of the Chemical Weapons Convention and ignores the difficulties that the treaty's extensive verification measures present to any state party that seeks to attain a militarily significant stockpile of chemical weapons without detection.

339. Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, June 17, 1925, 26 U.S.T. 571, 94 L.N.T.S. 65 [hereinafter Geneva Protocol].

and biological weapons, but not their manufacture and storage.<sup>340</sup> Recognizing the inadequacy of this prohibition in light of the recent proliferation of chemical weapons, the United Nations authorized the Conference on Disarmament to negotiate a multilateral convention that would completely and effectively prohibit the development, production, stockpiling, and transfer of these weapons.<sup>341</sup> The Chemical Weapons Convention<sup>342</sup> has been signed by over 150 nations,<sup>343</sup> it will enter into force 180 days after the sixty-fifth state deposits an instrument of ratification but not earlier than January 1995.<sup>344</sup>

Unlike the NPT, which distinguishes among nuclear weapon states and nonnuclear weapon states with regard to obligations and rights, the CWC's prohibitions against producing or retaining chemical weapon stockpiles and its verification procedures will apply to all state parties.<sup>345</sup> All state parties currently possessing chemical weapons must declare and destroy them along with their production facilities.<sup>346</sup> Destruction of chemical weapons must begin within two years and must be completed not later than ten years after the CWC takes effect.<sup>347</sup> Subject to environmental, health, and safety restrictions,<sup>348</sup> each state party may destroy its weapons and facilities however it chooses, so long as the destruction can be verified.<sup>349</sup>

In addition to destroying chemical weapons stockpiles, the CWC seeks to deter states from resuming chemical weapons production and storage.<sup>350</sup> Any country with a relatively sophisticated chemical industry has the capability to produce basic chemical weapons.

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340. See Geneva Protocol, *supra* note 339, 26 U.S.T. at 575, 94 L.N.T.S. at 69 (failing to impose any restrictions aside from those involving use of biological and poisonous weapons).

341. G.A. Res. 43/74, U.N. GAOR, 44th Sess., at 1, U.N. Doc. CD/952 (1989).

342. CWC, *supra* note 267; see also G.A. Res. 39, U.N. GAOR 49th Sess., Supp. No. 49, at 54-55, U.N. Doc. A/47/49 (1992) (opening convention for signature).

343. As of November 24, 1993, the date on which President Clinton submitted the CWC to the U.S. Senate for ratification, 154 nations had signed the CWC. *White House Submits Chemical Weapons Treaty to Congress*, UPI, Nov. 24, 1993, available in LEXIS, Nexis Library, UPI File.

344. Brin, *supra* note 334, at 34.

345. See CWC, *supra* note 267, art. I, ¶ 1.

346. CWC, *supra* note 267, art. I, ¶¶ 2-4. For a concise yet highly informative overview of the CWC's obligations regarding destruction of chemical weapons stockpiles, see Brin, *supra* note 335, at 32.

347. CWC, *supra* note 267, art. IV, ¶ 6. Destruction of chemical weapons production facilities must begin within one year and be completed within 10 years after the CWC takes effect. *Id.* art. V, ¶ 8, at 121.

348. See CWC, *supra* note 267, art. IV, ¶ 10; *id.* art. V, ¶ 11.

349. See generally CWC, *supra* note 267, Annex on Implementation and Verification [hereinafter Verification Annex] (delineating standards and procedures applicable to destruction and verification of destruction of chemical weapons stockpiles).

350. See CWC, *supra* note 267, art. IV, ¶¶ 7-8 (requiring destruction of chemical weapons facilities and inspections to verify compliance).



Indeed, chemical weapons agents are closely related to pesticides; a facility designed to produce agricultural chemicals could in a short time be converted to the production of lethal agents.<sup>351</sup> Most precursor chemicals and production equipment are applicable to commercial uses.<sup>352</sup> Consequently, the CWC creates a powerful new international regime—the Organization for the Prohibition of Chemical Weapons (OPCW)—that will govern the production capabilities of state parties and engender mutual assurance that the objectives of the CWC are being met.<sup>353</sup>

The CWC vests the OPCW with extensive legislative, investigative, and judicial responsibilities.<sup>354</sup> To meet them, the OPCW will comprise three bodies. The Conference of the State Parties will have jurisdiction to enact rules of procedure, evaluate compliance, and resolve issues as to the scope of the CWC.<sup>355</sup> The Executive Council will oversee day-to-day activities, including supervising verification.<sup>356</sup> The Technical Secretariat will have primary responsibility for monitoring and inspecting facilities that could become involved in illegal chemical weapons production.<sup>357</sup> Taken as a whole, the CWC signifies a systematic introduction of international law enforcement into chemical weapons control.<sup>358</sup>

## 2. *Verification of continued nonproduction*

Verifying nonproduction of chemical weapons is the core of the CWC. Even state parties with no chemical weapons must comply with the verification measures.<sup>359</sup> While each state party has the right to produce and use toxic chemicals for legitimate commercial purposes, such production and use carries the concomitant obligation to ensure that these chemicals are not used for purposes prohibited by the CWC.<sup>360</sup> Verification of activities not prohibited by the CWC entails

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351. Brin, *supra* note 334, at 36.

352. See Brin, *supra* note 334, at 38 (pointing out that thioglycol, for example, which is immediate precursor of sulfur mustard, is used by 100 companies worldwide for numerous commercial uses including making ink for ballpoint pens).

353. CWC, *supra* note 267, art. VIII.A, ¶ 1.

354. See CWC, *supra* note 267, art. VIII.A, ¶ 1 (defining responsibilities of organization, including implementing CWC provisions, ensuring compliance, and creating legislation when necessary).

355. CWC, *supra* note 267, art. VIII.B, ¶¶ 9-21.

356. CWC, *supra* note 267, art. VIII.C, ¶¶ 23-36.

357. CWC, *supra* note 267, art. VIII.C, ¶¶ 37-47.

358. For a full elaboration of the legal issues attendant to CWC implementation, see BARRY KELLMAN ET AL., *MANUAL FOR NATIONAL IMPLEMENTATION OF THE CHEMICAL WEAPONS CONVENTION* (1993).

359. See CWC, *supra* note 267, art. VI (requiring that each state party comply with all verification procedures).

360. CWC, *supra* note 267, art. VI, ¶ 1.

an elaborate mechanism for monitoring all production and acquisition of various chemicals by signatory nations.<sup>361</sup>

While verification of compliance with a chemical weapons treaty is abstractly similar to verifying nuclear nonproliferation, the larger size of the chemical and pharmaceutical industries and the diversity of chemical weapons precursors complicate the effort to prohibit clandestine weapons production. The existence of dynamic and diversified global industries, whose production may be easily converted to lethal agents, requires that CWC verification procedures be more extensive and intrusive than those for nuclear weapons.<sup>362</sup> Accordingly, the CWC introduces two innovations not found in the NPT: first, dual-use substances are tracked on a series of schedules corresponding to various levels of regulation;<sup>363</sup> second, the OPCW may conduct challenge inspections, with some limitations, at any facility, provided that there exist reasonable doubts as to the facility's compliance with the CWC.<sup>364</sup>

In order to facilitate verification, the CWC categorizes chemical families and individual chemicals into three schedules based on their suitability for use in weaponry and their legitimate commercial value.<sup>365</sup> Schedule 1 contains a list of supertoxic lethal chemicals<sup>366</sup> that: (1) are actual warfare agents, (2) pose a high risk of potential use as chemical weapons, (3) are key precursors with chemical structures closely related to chemical weapons, (4) pose a high risk of conversion into chemical weapons, or (5) have little use for purposes other than chemical weapons.<sup>367</sup> Schedule 2 lists chemicals that have some legitimate commercial uses,<sup>368</sup> but are also key precursors to warfare agents or are supertoxic lethal chemicals not listed in Schedule 1, and which therefore pose a significant threat to

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361. CWC, *supra* note 267, art. VI, ¶¶ 2-8.

362. See TER HAAR, *supra* note 38, at 85 (stating that challenge inspection regime for CWC is most radical and intrusive verification regime ever proposed, and that sensitive military installations were not excluded from verification). Whereas IAEA verification of nuclear nonproliferation applies to 900 facilities in more than 50 nations, CWC inspections are estimated to apply to an estimated 25,000 facilities. Compare Hans Blix, *Verification of Nuclear Nonproliferation: The Lesson of Iraq*, WASH. Q., Autumn 1992, at 57, 57 (stating that IAEA verification applies to 900 facilities in more than 50 countries) with Brin, *supra* note 334, at 35 (observing that CWC applies to approximately 25,000 commercial chemical facilities worldwide).

363. See *infra* notes 365-72 and accompanying text (discussing chemical schedules).

364. See *infra* notes 383-89 and accompanying text (discussing challenge inspections).

365. CWC, *supra* note 267, Annex on Chemicals [hereinafter Annex on Chemicals].

366. Annex on Chemicals, *supra* note 365. Two types of facilities may retain limited quantities of Schedule 1 chemicals for specified protective, research, medical, or pharmaceutical purposes. Verification Annex, *supra* note 349, pt. VI, (C)(8)-(12).

367. Annex on Chemicals, *supra* note 365, pt. A.

368. Annex on Chemicals, *supra* note 365.

the objectives of the Convention.<sup>369</sup> Schedule 3 lists chemicals that are several steps removed from warfare agents,<sup>370</sup> but which are either dual-purpose substances with properties similar to chemicals used in weapons or important precursors to Schedule 1 or Schedule 2 chemicals.<sup>371</sup> State parties must provide extensive information about production facilities and make initial and annual declarations of the total amounts of each scheduled chemical produced, consumed, imported, or exported, and the purposes for which these chemicals are obtained or processed.<sup>372</sup>

The Technical Secretariat, which is authorized to monitor the production of declared chemicals by each state party,<sup>373</sup> may install continuous monitoring systems, instruments, and seals at any declared facility.<sup>374</sup> Each state party has the right to inspect and test any equipment installed in its territory.<sup>375</sup> Each state must, however, provide the necessary preparation and support for installing and operating the monitoring system<sup>376</sup> and must report to the Technical Secretariat any event that may affect the monitoring system.<sup>377</sup>

The principal methods of verification are two types of inspections: routine onsite inspections,<sup>378</sup> and challenge inspections.<sup>379</sup> Essentially, inspections serve three purposes.<sup>380</sup> First, for countries currently possessing chemical weapons, inspections will verify that stockpiles and production facilities have been destroyed. Second, inspections of civilian chemical facilities will verify that their operations conform to national declarations and that they are not producing chemical weapons. Third, challenge inspections will verify the absence of militarily significant hidden stockpiles or production facilities.

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369. Annex on Chemicals, *supra* note 365.

370. Annex on Chemicals, *supra* note 365.

371. Annex on Chemicals, *supra* note 365.

372. State parties must declare annually the locations, inventories, and past and future activities of Schedule 1 facilities. Verification Annex, *supra* note 349, pt. VI, (D) (13)-(20). They must also declare annually various national data regarding Schedule 2 chemicals, as well as the locations of Schedule 2 facilities, the types, quantities and destinations of Schedule 2 chemicals, and the owners, capacities, purposes and plans of its Schedule 2 facilities. *Id.* pt. VII, (A) (1)-(11). Declaration requirements for Schedule 3 facilities are similar to those for Schedule 2 facilities, but do not include information as to destinations of chemical production if not produced for chemical weapons purposes. *Id.* pt. VIII, (A) (1)-(11).

373. Verification Annex, *supra* note 349, pt. III, (A) (2).

374. Verification Annex, *supra* note 349, pt. III, (B) (10).

375. Verification Annex, *supra* note 349, pt. III, (B) (11).

376. Verification Annex, *supra* note 349, pt. III, (B) (12).

377. Verification Annex, *supra* note 349, pt. III, (B) (14).

378. See CWC, *supra* note 267, art. VI, ¶¶ 3-6.

379. See CWC, *supra* note 267, art. IX, ¶¶ 8-25.

380. See generally KELLMAN ET AL., *supra* note 358, at 44-62.

Routine inspections permit the Technical Secretariat to verify the accuracy of annual declarations regarding each Schedule 1 or 2 facility.<sup>381</sup> Routine inspections serve the dual roles of deterring violations without hampering the economic or technological development of state parties, and compiling sufficiently accurate information to permit a high degree of accord among the parties as to what specific conduct constitutes a violation. Facilities holding Schedule 3 chemicals, while obligated to make annual declarations of their activities, will not be subject to routine onsite inspections.<sup>382</sup>

Challenge inspections serve a complementary function. If a state party suspects noncompliance by another, that party may request an inspection of any "facility or location."<sup>383</sup> Challenge inspections, which are relatively unconstrained, attempt to clarify "questions concerning possible non-compliance."<sup>384</sup> On the request of any state party to conduct a challenge inspection, the inspected state has the obligation to make every reasonable effort to demonstrate its compliance.<sup>385</sup> If suspicions remain, an inspection team will arrive after twelve hours' notice,<sup>386</sup> and the inspected state must transport the team to the challenged facility within twenty-four hours.<sup>387</sup> The team then has seventy-two hours to negotiate the terms of its inspection with the inspected state party, including the extent to which the team will be permitted to examine the facility, and whether the facility's owner may protect certain areas and equipment from inspection.<sup>388</sup> Once the inspection begins, it must be completed within eighty-four hours, unless the inspected state party agrees to an extension.<sup>389</sup>

Both routine and challenge inspections share the common goal of verifying the nonproduction of chemical weapons without interfering with the legal rights of state parties or their citizens. There is an inherent tension in making inspections sufficiently intrusive to enable detection of violations without jeopardizing efforts to protect national security or commercial secrets or contravening the privacy rights of

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381. Verification Annex, *supra* note 349, pt. VI, (E)(21), (28); *id.* pt. VII, (B)(15).

382. Verification Annex, *supra* note 349, pt. VIII, (B)(12) (stating that onsite inspections will only occur at Schedule 3 sites that produced during previous year, or are anticipated to produce in next year, over 230 tons of Schedule 3 chemicals).

383. CWC, *supra* note 267, art. IX, ¶ 8.

384. CWC, *supra* note 267, art. IX, ¶ 8.

385. CWC, *supra* note 267, art. IX, ¶ 11. For a fuller discussion of the process of requesting a challenge inspection, see Verification Annex, *supra* note 349, pt. X, (B)(3)-(9).

386. CWC, *supra* note 267, art. IX, ¶ 15.

387. Verification Annex, *supra* note 349, pt. X, (B)(15)(b).

388. Verification Annex, *supra* note 349, pt. X, (B)(16)-(21).

389. Verification Annex, *supra* note 349, pt. X, (C)(57).

inspected persons. The CWC provides that confidential information acquired through verification activities will not be released except in very limited circumstances.<sup>390</sup> The CWC's guiding principle is to conduct onsite inspections in a manner that avoids undue intrusion into chemical activities engaged in for peaceful purposes.<sup>391</sup>

The CWC authorizes the Conference of the State Parties to address any concerns over noncompliance and to request a state to redress violations.<sup>392</sup> Although the Conference may take necessary measures to rectify a breach, such as requesting action by the U.N. Security Council,<sup>393</sup> the treaty does not fully state the extent of these remedial measures.<sup>394</sup>

### 3. *Regulation of the international chemicals trade*

The CWC imposes varying degrees of restraint on chemical shipments to nonparties. Transfers of Schedule 1 chemicals to nonparties are prohibited except for limited purposes.<sup>395</sup> After the treaty has been in force for three years, it will prohibit transfers of Schedule 2 chemicals to nonparties; until then, state parties may export these chemicals to nonparties only under end-use certification.<sup>396</sup> Schedule 3 chemicals may be traded or transferred freely, except that nonparty importers must state the purposes for which the chemicals will be used and certify that they will not retransfer

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390. See CWC, *supra* note 267, Annex on the Protection of Confidential Information [hereinafter Confidential Information Annex]. No information obtained by the OPCW will be published or released, except general information on the implementation of CWC, information released with the express consent of the inspected state party, or confidential information released pursuant to agreed procedures in strict conformity with the needs of the Convention. *Id.* (A) (2) (c) (i)-(iii). The level of sensitivity of the confidential information or data will be established based on uniform criteria to be developed by the Technical Secretariat. *Id.* (A) (2) (d). See generally Kellman et al., *Disarmament & Disclosure—How Arms Control Verification Can Proceed Without Threatening Confidential Business Information*, 35 HARV. INT'L L.J. (forthcoming 1995).

391. CWC, *supra* note 267, art. VI, ¶ 10.

392. CWC, *supra* note 267, art. XII.

393. CWC, *supra* note 267, art. XII, ¶ 4.

394. See Brin, *supra* note 334, at 40. Brin writes:

Unfortunately, the CWC does not impose specific sanctions. Parties may restrict or suspect a violator's rights and privileges under the treaty—such as access to trade in dual-use chemicals—or recommend 'collective measures' conforming with international law, such as a trade embargo or, in extreme cases, military intervention. But the CWC does not make any of these actions an automatic consequence of misbehavior, leaving the decision to discipline a treaty violator to the discretion of the other participating countries.

*Id.*

395. Verification Annex, *supra* note 349, pt. VI, (B)(3) (limiting Schedule 1 chemical transfers to research, medical, pharmaceutical, or protective purposes).

396. Verification Annex, *supra* note 349, pt. VII, (C)(31)-(32).

them.<sup>397</sup> In addition, the treaty enjoins state parties from considering whether further measures are needed for five years.<sup>398</sup>

The treaty does not explicitly restrict transfers of dual-use plants or equipment. While a state party may place national controls on the import or export of dual-use technology and chemicals as part of its general undertaking to implement the treaty's prohibitions, no state party can restrict or impede trade in chemicals, pharmaceuticals, or pesticides for peaceful purposes in a manner incompatible with its treaty obligations.<sup>399</sup> Accordingly, each state party must review its existing trade laws to make them consistent with the CWC.<sup>400</sup>

### C. Biological Weapons Control

#### 1. *The Biological Weapons Convention in general*

The Geneva Protocol of 1925 banning the use of chemical weapons also extended "to the use of bacteriological methods of warfare."<sup>401</sup> Yet, research on biological weapons has proceeded continuously since then.<sup>402</sup> During World War II, Great Britain, Japan, and the United States developed biological weapons,<sup>403</sup> and the United States was alleged to have used them during the Korean conflict.<sup>404</sup> The United States, which stockpiled biological weapons until 1969,<sup>405</sup> destroyed its stock during the 1970s.<sup>406</sup>

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397. Verification Annex, *supra* note 349, pt. VIII, (C)(26).

398. Verification Annex, *supra* note 349, pt. VIII, (C)(27).

399. CWC, *supra* note 267, art. XI, ¶ 2(c).

400. See generally CWC, *supra* note 267, art. XI, ¶ 2(e).

401. Geneva Protocol, *supra* note 339, 26 U.S.T. 571, 575, 94 L.N.T.S. 65, 69; see TER HAAR, *supra* note 38, at 3 (stating that because term "bacteriological" does not include all types of biological warfare agents, broader term "biological" more appropriately describes modern class of organisms that may be used as weapons).

402. See generally TER HAAR, *supra* note 38, at 1-53 (chronicling history of biological weapons proliferation from 1925 to 1990). For an analysis of Soviet and Russian activity, see John Barry, *Planning a Plague?*, NEWSWEEK, Feb. 1, 1993, at 40, 41.

403. Meselson et al., *supra* note 30, at 50.

404. TER HAAR, *supra* note 38, at 4.

405. Meselson et al., *supra* note 30, at 54. The U.S. stockpile included *Francisella tularensis*, the bacterium responsible for tularemia, *Coxiella burnetii*, the rickettsial organism responsible for Q fever, and VEE, the virus that causes Venezuelan equine encephalomyelitis. In addition, there were stocks of biological agents intended for use against food crops: *Pyricularia oryzae* and *Puccinia graminis*, the fungi responsible for rice blast and wheat rust, respectively. Examples of other infectious anti-personnel agents that have been studied for use in weapons or have been actually stockpiled are the viruses that cause Chikungunya fever, eastern equine encephalomyelitis, and yellow fever; the bacteria that cause brucellosis, cholera, and glanders; and the rickettsiae responsible for Rocky Mountain spotted fever and epidemic typhus. *Id.*

406. See TER HAAR, *supra* note 38, at 12-13 (stating that in 1969, United States renounced biological warfare and ceased research in that area except for defensive measures and, in 1970, 'extended declaration to toxins); Meselson et al., *supra* note 30, at 54 (stating that in 1969, President Nixon renounced biological weapons and three months later renounced toxic weapons).

The Biological Weapons Convention of 1972 (BWC)<sup>407</sup> went much further than the Geneva Protocol and prohibited, under any circumstances, the development, production, stockpiling, acquisition, or retention of lethal biological agents,<sup>408</sup> as well as the development or transfer of biological munitions or delivery systems.<sup>409</sup> The BWC only permits exceptions for small quantities of biological agents that are needed for "prophylactic, protective or other peaceful purposes."<sup>410</sup> More than 100 countries have ratified the BWC.<sup>411</sup>

As originally drafted, the BWC does not prohibit research on biological weapons, nor does it provide for verification measures, except that the Security Council might initiate an investigation in the event that doubts arise as to a party's compliance.<sup>412</sup> In contrast to the Chemical Weapons Convention, the BWC's verification provisions are limited to obligations among states to consult and cooperate with any investigation that the U.N. Security Council may undertake in response to a complaint.<sup>413</sup> This apparent omission resulted from the general belief that it is impossible to monitor the activities of medical laboratories or to prohibit experimentation with infectious agents.<sup>414</sup> Thus, the BWC contains no system for mandatory inspections. Since 1975, three Review Conferences have been held to assess the BWC and to consider proposals to improve its effectiveness.<sup>415</sup>

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407. BWC, *supra* note 268.

408. BWC, *supra* note 268, art. I, 26 U.S.T. at 587, 1015 U.N.T.S. at 166.

409. BWC, *supra* note 268, art. III, 26 U.S.T. at 587, 1015 U.N.T.S. at 167.

410. BWC, *supra* note 268, art. I, 26 U.S.T. at 587, 1015 U.N.T.S. at 166.

411. See Tucker, *supra* note 31, at 59.

412. BWC, *supra* note 268, art. VI, 26 U.S.T. at 588, 1015 U.N.T.S. at 167. During the Second Review Conference, Article 5 was strengthened to provide for a consultative meeting to clarify unresolved matters and initiate appropriate international procedures.

413. BWC, *supra* note 268, art. VI, 26 U.S.T. at 588, 1015 U.N.T.S. at 167; see also Michael Moodie, Remarks at the Foreign Press Center Briefing Regarding the Third Biological Weapons Convention Review (Aug. 28, 1991), available in LEXIS, Nexis Library, Fednew File. Moodie states: "To verify the convention is [an] extremely difficult, if not impossible thing to do, which is why the convention, . . . does not have a verification regime the way other multilateral arms control agreements do. . . . [T]here is no mandated regime for inspections under the terms of the convention." Moodie, *supra*.

414. See Moodie, *supra* note 413. Moodie states:

A country with a reasonably developed pharmaceutical capability can produce biological weapons. There is the whole issue of those states who are interested in biotechnology and research into infectious diseases—BW has a lot of similarities to the problems of infectious diseases, and if you're doing research into infectious diseases, many of the things you have to do or might want to do are not dissimilar from things that you might want to do to develop biological weapons.

*Id.*

415. The First Review Conference was held in 1980. 1980 U.N.Y.B. 1391, U.N. Sales No. E.83.I.1. The Second Review Conference was held in 1986. 1986 U.N.Y.B. 64-65, U.N. Sales No. 90.I.1. The Third Review Conference was held in 1991. 1991 U.N.Y.B. 52-53, U.N. Sales No. 92.I.1.

## 2. *Confidence-building measures*

Confidence-building measures gained substantial strength during the Second and Third Review Conferences.<sup>416</sup> The measures that emerged from the conferences can be divided into two categories. First, the parties instituted annual reporting obligations and agreed to exchange data concerning laboratories and outbreaks of contagious infection.<sup>417</sup> This data exchange applies only to laboratories that handle biological materials posing a high risk,<sup>418</sup> to labs that are specialized in activities directly related to the Convention,<sup>419</sup> and to outbreaks of infection that deviate from normal patterns.<sup>420</sup>

Second, the parties agreed to open access to biological research by encouraging scientific publication and communication.<sup>421</sup> Unfortunately, disclosure of biological research risks infringing on both legitimate national security interests and commercial secrets, while basic research that does not pose such risks may be irrelevant to the Convention. To balance these concerns, the Third Review Conference sought to increase publication of research carried out in declared laboratories or that pertained to reported outbreaks of infection.<sup>422</sup> Contacts among scientists are encouraged because joint activities will reduce suspicions concerning their research.<sup>423</sup> Finally, the Third Review Conference expanded the exchange of data on research centers to include information on national biological defense research and development programs.<sup>424</sup>

Recently, fifty-three countries meeting in Geneva under the auspices of the Ad Hoc Group of Experts (VEREX) identified twenty-one potential verification measures. Arranged into four groups of offsite

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416. See generally STRENGTHENING THE BIOLOGICAL WEAPONS CONVENTION BY CONFIDENCE-BUILDING MEASURES (Erhard Geissler ed., 1990) (discussing activities at Second Review Conference); *Third Review Conference Focuses on Verification Confidence Building*, U.N. CHRON., Dec. 1991, at 54 (discussing Third Review Conference).

417. UNITED NATIONS DEP'T FOR DISARMAMENT AFFAIRS, THE SECOND REVIEW CONFERENCE OF THE BIOLOGICAL WEAPONS CONVENTION, FACT SHEET NO. 50, at 16-18 (1986). During the Second Review Conference, Article V was strengthened to provide for a consultative meeting to clarify unresolved matters and initiate appropriate international procedures. *Id.*

418. *Final Declaration of the Third Review Conference of the Parties to the Convention on the Prohibition of the Production, Development and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction*, 1991 U.N. Disarmament Y.B. 290, 303-04, U.N. Sales No. E.92.IX.1 [hereinafter *Third Review Conference*].

419. *Id.*

420. UNITED NATIONS DEP'T FOR DISARMAMENT AFFAIRS, *supra* note 417, art. V, ¶ 7, at 17-18. Background information from the World Health Organization may be used to determine normal patterns of infection. TER HAAR, *supra* note 38, at 41.

421. BWC, *supra* note 268, art. V, ¶¶ 7-8, at 17-18.

422. *Third Review Conference*, *supra* note 418, at 303-04.

423. TER HAAR, *supra* note 38, at 45.

424. *Third Review Conference*, *supra* note 418, at 304-06.



verification measures<sup>425</sup> and three groups of onsite verification measures,<sup>426</sup> these measures could involve very sophisticated technology and be significantly intrusive.<sup>427</sup> Similar measures have successfully revealed the existence of a biological weapons research program in Iraq<sup>428</sup> and perhaps deterred others from pursuing clandestine biological weapons initiatives.

### 3. *Regulation of international trade*

Successful production and delivery of biological agents generally requires the acquisition of infectious strains of microorganisms, equipment and materials for large-scale reproduction of the organisms, equipment for handling hazardous materials, and equipment for conserving and disseminating the finished product.<sup>429</sup> Efforts to stop the proliferation of biological weapons are severely hindered by the fact that these technologies are similar to those used for peaceful purposes, such as the production of vaccines<sup>430</sup> and immunological research.<sup>431</sup>

The contrast between Articles 3 and 10 of the BWC highlights this quandary. Article 3 prohibits parties from transferring biological weapons to any recipient or encouraging a state to manufacture or otherwise acquire such weapons.<sup>432</sup> Yet Article 10 acknowledges the right of parties to exchange equipment, materials, and scientific

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425. See Graham S. Pearson, *Prospects for Chemical and Biological Arms Control: The Web of Deterrence*, WASH. Q., Spring 1993, at 145, 156-57. These measures include:

(1) information monitoring, including publication surveillance, legislation surveillance, data on transfers, and transfer requests and multilateral information sharing; (2) data exchange, including declarations and notifications; (3) remote sensing, whether from satellites, aircraft, or ground-based off-site; and (4) inspection activities to be carried out off-site including sampling and identification, observation, and auditing.

*Id.*

426. *Id.* at 157. These measures include: "(1) exchange visits, which may be made under bilateral or multilateral arrangements; (2) inspections, including interviewing, visual inspection, identification of key equipment, auditing, sampling and identification, and medical examination; and (3) continuous monitoring on-site by instruments and/or personnel." *Id.*

427. Dr. Edward J. Lacey, *The Biological Weapons Convention Verification Challenge*, Address to the Fall Meeting of the Biological and Biotechnology Section of the Pharmaceutical Manufacturers Association (Sept. 29, 1992) (on file with the *American University Law Review*). Several methods are currently being contemplated: interviewing staff at a facility; reviewing safety quality control and manufacturing records; sampling a facility's process streams, waste streams, or the surface of work areas; or biomedical sampling from facility personnel. *Id.* Continuous monitoring could include automated sampling of a variety of process parameters (such as concentrations of dissolved oxygen), video surveillance, or human inspectors. *Id.*

428. Pearson, *supra* note 35, at 157.

429. TER HAAR, *supra* note 38, at 51.

430. TER HAAR, *supra* note 38, at 51.

431. See Moodie, *supra* note 413 (stating that research into infectious diseases and development of biological weapons involve many similar steps).

432. BWC, *supra* note 268, art. III, 26 U.S.T. at 587, 1015 U.N.T.S. at 167.

information regarding biological agents, and requires that parties "in a position to do so" cooperate in contributing to the development and application of biotechnology for peaceful purposes.<sup>433</sup> The Second Review Conference emphasized the importance of Article 10 and stated that measures to prevent the proliferation of biological weapons should not restrict the transfer of biological agents for peaceful purposes.<sup>434</sup> Therefore, no effective regime exists to restrict the trade in materials necessary to develop a biological weapons capability. Furthermore, verification of the trade in such materials is not contemplated by the BWC, even if such a regime could be devised.

#### D. *The Missile Technology Control Regime*

##### 1. *In general*

The Missile Technology Control Regime (MTCR), formally announced in April 1987,<sup>435</sup> is an agreement among the United States and six allied countries.<sup>436</sup> Since its inception, eleven more industrial countries have joined,<sup>437</sup> and another seven have pledged to honor its export guidelines.<sup>438</sup> The MTCR is not a treaty; rather, it is a voluntary set of guidelines<sup>439</sup> intended to limit the risks of nuclear proliferation by controlling technology transfers that could facilitate delivery of nuclear weapons by unmanned vehicles.<sup>440</sup>

The MTCR regulates the development of rocket systems or unmanned air vehicles with a range of 300 kilometers or more and a payload of 500 kilograms or more.<sup>441</sup> It addresses eighteen types of advanced technologies, including rocket engines and guidance systems, structural materials, and avionics.<sup>442</sup> It prohibits transfer of

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433. BWC, *supra* note 268, art. X, 26 U.S.T. at 590, 1015 U.N.T.S. at 168.

434. UNITED NATIONS DEP'T FOR DISARMAMENT AFFAIRS, *supra* note 417, art. X, at 20-22.

435. MTCR Guidelines, *supra* note 269, 26 I.L.M. at 599 n.\*.

436. These six countries are Canada, France, the United Kingdom, Italy, Japan, and the Federal Republic of Germany. MTCR Guidelines, *supra* note 269, at 599. The MTCR originated in 1982 when President Reagan signed National Security Decision Directive NSDD-70, initiating an investigation of ways to control ballistic missile proliferation. Ian Anthony, *The Missile Technology Control Regime*, in ARMS EXPORT REGULATIONS, *supra* note 165, at 219, 219.

437. The eleven nations are Australia, Austria, Belgium, Denmark, Finland, Luxembourg, the Netherlands, New Zealand, Norway, Spain, and Sweden.

438. It is not absolutely clear what is meant by "membership" in the MTCR because there is no organization to join or treaty to ratify. To comply requires only that national export licensing conforms to the MTCR guidelines. Anthony, *supra* note 436, at 219.

439. Anthony, *supra* note 436, at 221.

440. MTCR Guidelines, *supra* note 269, 26 I.L.M. at 600.

441. MTCR Guidelines, *supra* note 269, 26 I.L.M. at 604.

442. MTCR Guidelines, *supra* note 269, 26 I.L.M. at 601-02; see also James Hackett, *Market of Mass Destruction*, JERUSALEM POST, Dec. 27, 1991, at 5A (describing MTCR and assessing its role

complete systems, components that could produce a complete system, or the technology required to produce those components and systems.<sup>443</sup> While the technology needed to build a commercial launch vehicle, including rocket engines and advanced materials, is virtually identical to that needed to produce a military ballistic missile,<sup>444</sup> the MTCR is not intended to impede national space programs or international cooperation in such programs as long as they do not contribute to weapons delivery systems.<sup>445</sup>

The MTCR has had some success. The Condor missile program sponsored by Egypt, Argentina, and other nations collapsed as the financial burden of continuing the program escalated, severe technical difficulties remained unresolved, and the diplomatic costs soared.<sup>446</sup> The Condor depended heavily on technical support provided by West European companies, but that assistance vanished under pressure from MTCR nations. West European companies that once had supported programs such as the Condor recognized that their activity endangered far more lucrative contracts with the United States.<sup>447</sup> In addition, the regime is credited with discouraging Chinese sales of the M-9 missile and forcing the German Government to sanction private firms engaged in missile development efforts in both Libya and Iraq.<sup>448</sup>

The MTCR is less effective against nations that possess independent technological capability to produce missiles, such as Israel and India.

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in arms control).

443. See generally MTCR Guidelines, *supra* note 269, 26 I.L.M. at 603-13 (delineating controls on transfer of equipment, technology, intellectual property, and technical assistance).

444. For example, India's Prithvi and Agni ballistic missile programs were based on civilian rocket technology. See *Nuclear and Missile Proliferation: Hearings Before the Senate Comm. on Governmental Affairs*, 101st Cong., 1st Sess. 13 (1989) (statement of Hon. William Webster, Director, Central Intelligence Agency). Another anecdote drives this point home: when asked the difference between the Atlas rocket that put John Glenn into orbit and one armed with a nuclear warhead, President Kennedy replied, "Attitude." *Proliferation and Regional Security in the 1990's: Hearings Before the Senate Comm. on Governmental Affairs*, 101st Cong., 2d Sess. 31 (1990) (statement of Henry D. Sokoloski, Deputy for Nonproliferation Policy, Office of the Assistant Secretary of Defense, International Security Affairs, U.S. Department of Defense).

445. MTCR Guidelines, *supra* note 269, 26 I.L.M. at 600 ("The Guidelines are not designed to impede national space programs or international cooperation in such programs . . ."). Indeed, the principle that all countries are entitled to access to space is embodied in the 1967 United Nations Treaty on Outer Space: "The exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind." Treaty on Outer Space, Jan. 27, 1967, art. I, 18 U.S.T. 2410, 2412, 610 U.N.T.S. 205, 207.

446. CARUS, *supra* note 97, at 63-64 ("It has been estimated that it will cost \$3.2 billion to develop and produce 400 Condor missiles, or about \$8 million per missile. Development costs alone may exceed \$1 billion.").

447. CARUS, *supra* note 97, at 63.

448. See Nolan, *supra* note 73, at 10.

All that can be done in such cases is to diplomatically discourage these countries from transferring their missile-building capabilities to other countries, with emphasis on restricting transfers to countries of concern.

## 2. *Verification measures*

The MTCR is essentially a multilateral coordination of unilateral export controls. It has no formal verification or enforcement capabilities. While all countries involved impose civil and criminal penalties for violations, the severity of these penalties varies.<sup>449</sup> The MTCR also offers no incentive not to proliferate.

## 3. *Regulation of international trade*

The MTCR guidelines do not prohibit exports, but require states to determine that specified items meet a series of criteria before approving export.<sup>450</sup> Each state agrees to transfer items that would contribute to a nuclear weapons delivery system only if the recipient state assures that the items will be used only for their stated purpose and will not be modified or replicated without the transferring state's consent, and that neither the items nor replicas or derivatives of them will be retransferred without the consent of the transferring government.<sup>451</sup>

The MTCR Equipment and Technology Annex lists the items that the regime controls.<sup>452</sup> The Annex consists of two categories of equipment and technology.<sup>453</sup> Category I items, complete missile systems, are of the greatest concern.<sup>454</sup> There is a strong presump-

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449. See *MTCR Hearing*, *supra* note 89, at 144-47 (statement of Richard A. Clarke, Assistant Secretary of State for Politico-Military Affairs) (warning that varying severity of penalties among MTCR partners may hamper cooperation in nonproliferation efforts).

450. MTCR Guidelines, *supra* note 269, 26 I.L.M. at 600-01. The Guidelines provide:

In the evaluation of transfer applications for Annex items, the following factors will be taken into account:

- A. Nuclear proliferation concerns;
- B. The capabilities and objectives of the missile and space programs of the recipient state;
- C. The significance of the transfer in terms of the potential development of nuclear weapons delivery systems other than manned aircraft;
- D. The assessment of the end-use of the transfers, including relevant assurances of the recipient states . . . ;
- E. The applicability of relevant multilateral agreements.

*Id.*

451. See MTCR Guidelines, *supra* note 269, 26 I.L.M. at 600-01.

452. MTCR Guidelines, *supra* note 269, 26 I.L.M. at 601.

453. See MTCR Guidelines, *supra* note 269, 26 I.L.M. at 601-02.

454. MTCR Guidelines, *supra* note 269, 26 I.L.M. at 600.

tion of denial for transfers of Category I items.<sup>455</sup> Where the transfer could contribute to a nuclear weapons delivery system, the recipient government must avow that the items will be used only for their stated purpose, and that such items will not be modified or replicated without the prior consent of the transferring nation.<sup>456</sup> Retransfers of the items or replicas thereof are also subject to prior approval.<sup>457</sup> The transfer of Category I production facilities is prohibited.<sup>458</sup> In the United States, Category I items are controlled by the State Department Office of Munitions Control pursuant to the Arms Export Control Act.<sup>459</sup> These transfers are authorized only upon receipt of binding bilateral assurances that the items to be transferred will be put to their stated end use, and that no apparent risk of diversion exists.<sup>460</sup>

Category II is composed of items that are the separate components of Category I items, including propellants and propulsion systems, avionics equipment, launch equipment, and related computers and production equipment.<sup>461</sup> These technologies are treated on a case-by-case basis and are generally authorized for export only upon the recipients' assurances of strict end-use controls.<sup>462</sup> A major shortcoming of the MTCR is that a nation can assemble the completed missile systems of Category I from Category II items that are easier to obtain. Moreover, a nation can skirt the regulations by obtaining quantities of equipment that are slightly below the export control guidelines, and then assemble them into items that otherwise would be more strictly controlled. The smaller the item, the less easily it can be controlled.

## V. FORGING A COMPREHENSIVE NONPROLIFERATION REGIME

International security now demands regulation of supplies of militarily critical technology. The Hans Brinkerish efforts of the four existing control arrangements have failed to plug proliferation. This Part does not advocate abandoning the systems already in place; instead, it recommends drawing from principles of industrial and trade regulation the essential requisites of a comprehensive interna-

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455. MTCR Guidelines, *supra* note 269, 26 I.L.M. at 600.

456. MTCR Guidelines, *supra* note 269, 26 I.L.M. at 600.

457. See *supra* note 452 and accompanying text (describing MTCR requirement that replicas not be retransferred without consent of transferring government).

458. MTCR Guidelines, *supra* note 269, 26 I.L.M. at 600.

459. Arms Export Control Act, 22 U.S.C. § 2751 (1988).

460. 22 U.S.C. § 2754 (1988).

461. See MTCR Guidelines, *supra* note 269, 26 I.L.M. at 602 (summarizing category II items).

462. MTCR Guidelines, *supra* note 269, 26 I.L.M. at 599-601.

tional legal regime that could enforce what diplomats can currently only discuss.

A modern nonproliferation policy should establish institutionalized mechanisms that limit the availability of key technologies through detailed licensing requirements objectively promulgated and verified, and restrain the dissemination of potentially offensive weapons by establishing enforcement mechanisms that specify consequences for weapons proliferators. Achieving these goals requires the establishment of a uniform regulatory system that focuses on whether a given material or technology contributes to a weapons-making capability, not on the political standing of the recipient state.

The singular term *regime*, used for convenience, is not meant to suggest any particular structure. Indeed, establishing a single institution is not central to this argument.<sup>463</sup> The essential inquiries that occupy the balance of this discussion concern the regulatory initiatives to be pursued and the powers an international body should possess to carry out those initiatives.

A nonproliferation regime should consist of four integrated functions. The first two are more or less within the scope of the existing international arrangements. The last two proposals are, in the context of weapons control, far more radical. Their integration would provide sufficient legal power to fortify the regime. Aggregated within a common framework, these suggested reforms could empower the international regime to close the enforcement gaps that characterize the current situation.

The first function of the proposed regime is to formulate standards that uniformly restrict the production or trade of critical items. The standards proposed here are primarily, although not exclusively, technology-based. Second, the regime should promulgate an elaborate system to verify compliance with those standards and to assure member states that burdens are uniformly allocated. Third, the regime should prescribe modalities for transnational law enforcement that each state party could use to investigate suspicions of clandestine proliferation. Finally, the regime should be empowered to impose penalties, including trade sanctions, on nations, economic entities, and individuals who proliferate.

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463. For an excellent discussion of the merits of unifying nonproliferation arrangements, see Gary K. Bertach & Richard T. Cupitt, *Nonproliferation in the 1990's: Enhancing International Cooperation in Export Controls*, WASH. Q., Autumn 1993, at 53.

### A. *Technology Controls*

A nonproliferation regime should begin by creating lists of controlled technologies and materials. These lists should contain only those technologies and materials that are critical to a weapons capability but have little or no civilian application. Specificity is a prime virtue in this regard because overly broad lists complicate effective enforcement and necessarily intrude on the prerogatives of legitimate commercial activity.

Controlled dual-use items have both military and commercial applications.<sup>464</sup> Consequently, the regime should establish a graduated series of schedules that correspond directly to graduated regulatory safeguards. The fact that different controls attach to different schedules provides the basis for the entire regime's regulation of vast and disparate segments of industrial production. The extent of regulatory oversight, monitoring, and inspections, as well as the severity of sanctions for breach, should depend on the schedule on which the item in question is found.

Placing materials, equipment, or technologies on separate schedules requires a cost-benefit analysis that would first measure necessity of production<sup>465</sup> and exclusivity of use,<sup>466</sup> and then balance these two measurements against the costs of monitoring and containment. To the extent that an item has a legitimate commercial use, subjecting that item to regulation adds a burden on commercial users that must be balanced against the decreased likelihood that that item will contribute to a weapons capability. Furthermore, to the extent that an item is already widely disseminated, efforts to restrict its availability are not likely to have a real impact.<sup>467</sup>

#### 1. *Restrictions on production of essential military technologies*

The first schedule includes items that are absolutely essential to a weapons capability and have little or no commercial applications. These items should be the focus of the most intense, intrusive

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464. See Gerald T. Nowak, *Above All, Do No Harm: The Application of the Exon-Florio Amendment to Dual-Use Technologies*, 13 MICH. J. INT'L L. 1002, 1004-05 (1992) (defining dual-use technologies and explaining potential damage to domestic industry from strict protection of dual-use, as opposed to military technologies).

465. "Necessity of production" refers to an item's importance in establishing a weapons-making capability, accounting for the existence of substitutes that can accomplish the same purpose.

466. "Exclusivity of use" refers to the likelihood that production of a given item will be for a weapons-related purpose.

467. See John D. Steinbruner, *The Consequences of the Gulf War*, 9 BROOKINGS REV. 6, 12 (1991) (arguing that self-restraint is only practical means of controlling weapons of mass destruction, where widely disseminated technology makes denial of access impossible).

regulation, and their production should be prohibited except under the most closely monitored conditions. Simply put, if a technology or material has no use except as an indispensable component of a catastrophic weapon, its production should be illegal.

Significantly, restrictions on production should not attach exclusively to completed weapons systems or entire technological units. Rather, the restrictions should attempt to eliminate the vital building blocks of those systems. While this Article cannot possibly undertake the scientific analysis necessary to generate schedules for each of the four catastrophic weapons systems, the following discussion suggests technologies and materials whose production should be curtailed.

Severe production restrictions should apply to weapons-grade uranium and plutonium.<sup>468</sup> Vast stockpiles of nuclear materials threaten a breakout capability and a rapid deployment of warheads.<sup>469</sup> If production of these materials were banned, trade in them would provide unambiguous evidence of illegal nuclear weapons proliferation.<sup>470</sup> Furthermore, there is no need for the production of such materials.<sup>471</sup> All of the nuclear powers have sufficient weapons-grade material to maintain current force levels and, in fact, the United States and the former Soviet Union no longer produce any such material.<sup>472</sup> The nonnuclear states have no reason to

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468. The U.S. Government is currently preparing a new arms-control plan that proposes a worldwide ban on the production of materials used to make nuclear weapons. See Michael R. Gordon, *U.S. Hopes to Curb A-Arms by Restricting Fuel Output*, N.Y. TIMES, July 28, 1993, at A2.

469. See Glenn, *supra* note 70, at 21. Glenn states:

I continue to doubt that it serves our national interests or the interests of the global nuclear non-proliferation regime to encourage, directly or indirectly, large-scale commercial uses of plutonium and HEU. I do not believe that it will ever be possible to safeguard adequately such activities against illicit diversions or thefts of bomb-sized quantities of such materials. . . . With a little leadership and political will, a moratorium would surely be more successful in restricting access to bomb materials than would a policy condoning large-scale commercial uses while attempting to monitor military use.

*Id.*

470. Paul L. Leventhal, *Plugging the Leaks in Nuclear Export Controls: Why Bother?*, ORBIS, Spring 1992, at 167, 178. Leventhal states:

If there were an international consensus that there is no longer a legitimate place for bomb-grade materials in civil nuclear programs, there then would be a solid technical foundation for devising effective national and international political controls to bar commerce in these materials and the industrial equipment for producing them.

*Id.*

471. Approximately 1000 metric tons of plutonium and 1500 metric tons of highly enriched uranium now exist. DAVID ALBRIGHT ET AL., *WORLD INVENTORY OF PLUTONIUM AND HIGHLY ENRICHED URANIUM*, 1992, at 210 (1993). In addition, by 2010, currently existing reprocessing plants will separate over 500 metric tons of plutonium, mostly in Britain and France. *Id.* at 113-15.

472. See generally FEDERATION OF AMERICAN SCIENTISTS, *ENDING THE PRODUCTION OF FISSILE MATERIALS FOR WEAPONS: VERIFYING THE DISMANTLEMENT OF NUCLEAR WARHEADS 13-26* (1991) (discussing logistics of fissile production cutoff agreement).



produce weapons-grade material except to attain a weapons capability. Cheap uranium that is not suitable for weapons, but that can fuel nuclear power or research reactors, is in ample supply.<sup>473</sup>

Most ballistics technology would be inappropriate for a production ban because of the legitimate commercial interest in launching communications and weather satellites. Nevertheless, the regime should seriously consider prohibiting transfers of technology that could contribute to a MIRV (Multiple Independently Targetable Reentry Vehicle) capability.<sup>474</sup> Such a prohibition could be feasible because, unlike ballistic missiles, satellites and other commercial objects put into space do not require sophisticated terminal guidance technology capable of directing numerous warheads to separate targets.<sup>475</sup>

Schedule 1 of the Chemical Weapons Convention lists chemicals that are almost exclusively weapons related, allowing only small-scale production under the tightest of the CWC's verification measures.<sup>476</sup> By contrast, most items related to the production of biological weapons should not be banned because all biological agents may be relevant to biomedical research.<sup>477</sup> The usefulness of certain items to biomedical research, however, is certainly a question that biochemists, geneticists, and other experts could address.

## 2. *Export restrictions on critical dual-use technologies*

Many other items, also necessary to produce weapons, are distinguishable by their alternative uses. These dual-use items have legitimate commercial applications and are therefore inappropriate targets for severe production restrictions. Instead, their transnational distribution should be restricted uniformly to all states.

Export restrictions should not reflect any interest or purpose other than to reduce access to catastrophic weapons. As previously indicated, such restrictions should be based on the inherent characteristics and uses of the item in question, not on the military intentions of the likely recipient. Restrictions should not impede or

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473. Paul Levanthal & Sharon Tanzer, *Plutonium: Time for a Global Ban*, INT'L HERALD TRIB., Jan. 15, 1992, at 6; see also Cline Cookson & Bronwen Maddox, *Wonder Fuels to Burning Question: World Stockpiles of Plutonium Are Growing*, FINANCIAL TIMES, Mar. 9, 1994, at 19.

474. See Rex J. Zedalis, *On the Lawfulness of Forceful Remedies for Violations of Arms Control Agreements: "Star Wars" and Other Glimpses at the Future*, 18 N.Y.U. J. INT'L L. & P. 73, 108 (1985) (explaining how ICBMs fitted with multiple independently targeted reentry vehicles (MIRVs) increase destruction capability by increasing number of warheads each ICBM can deliver).

475. See generally David J. Lynch, *The ICBM Era Ends*, A.F. MAG., June, 1992, at 50 (discussing relationship between ballistic missiles and rocket launchers).

476. See Verification Annex, *supra* note 349, at 229.

477. Lacey, *supra* note 427, at 3.

aid another nation's economy, retaliate for trade disputes, level balances of trade, nor enforce international concerns such as environmental or human rights protection. A nation's decision to restrict exports to selected other nations for those reasons raises a host of questions that, regardless of their merits, should neither interfere with nor complicate nonproliferation efforts.

Like technology controls in general, export restrictions should be organized into graduated schedules with varying degrees of limitation.<sup>478</sup> To be effective, export restrictions should apply to a small number of items. Because the objective of export controls is exclusively to prevent foreign powers from acquiring catastrophic weapons through external means, it follows that only a few enabling technologies that make significant contributions to military capability should be withheld. A new regime would erect "higher fences around fewer goods."<sup>479</sup>

Of the four currently existing arrangements, the NPT has the most elaborate system of export controls. The MTCR seeks to control exports by its members on the basis of consensus,<sup>480</sup> but these controls are ad hoc and tend not to be uniform.<sup>481</sup> The CWC's regulation of sensitive exports is, at this point, undeveloped.<sup>482</sup> The BWC provides no export controls at all. A new nonproliferation regime would promulgate mandatory controls on exports of critical technologies in a manner that would clarify the ambiguities of these existing regimes and fill in the enforcement gaps. The following subparts discuss a number of characteristics of such an effort.

*a. Uniform export licensing criteria and evaluation*

Enumerating schedules of critical technologies and materials would, by itself, define exportable items, and would tend to harmonize export policies among nations. Nonetheless, substantial ambiguities attend the process of export licensing, resulting in loopholes. The

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478. For instance, the CWC distinguishes between immediate and less immediate weapons precursors. See Annex on Chemicals, *supra* note 365 (listing specific, highly toxic precursors in Schedule 2 and less immediate precursors in Schedule 3).

479. The term "higher fences around fewer goods" was widely used to describe the basis for sweeping changes in Western export control policy by the Coordinating Committee on Multilateral Export Controls (COCOM) following the collapse of communism in June 1990. See generally *COCOM Agrees to Rewrite Export Rules 'from Scratch,' U.S. Officials Report*, International Trade Rep. (BNA), No. 24, at 835 (1990); see also MICHAEL MOODIE, *THE DREADFUL FURY: ADVANCED MILITARY TECHNOLOGY AND THE ATLANTIC ALLIANCE* 80 (1989), quoted in NOLAN, *supra* note 49, at 139.

480. NOLAN, *supra* note 49, at 28.

481. NOLAN, *supra* note 49, at 147-49.

482. See McFate, *supra* note 211, at 75, 80.

regime will be optimally effective if it can develop uniform export control procedures and standards to address these potential loopholes and assist national export control officials to satisfy their obligations.<sup>483</sup>

Two additional problems deserve special attention. First, there are numerous items that are slightly below agreed specifications but that could be used, with an acceptable loss of efficiency, for military purposes. The regime will have to determine, therefore, how to evaluate such questionable technology so that the strictures of its schedules are not easily avoided. Second, a major problem for the existing export control regimes is how to deal with new technologies that have not yet been restricted. The regime must have some mechanism or procedure to constantly update its lists in response to such new developments.

*b. Special standards to discriminate among end-users*

While the purpose and operational focus of the proposed weapons export control regime would be to uniformly regulate critically dangerous technology, the regime cannot wholly ignore the destinations of such exports. Again, many questionable items can serve a variety of purposes, and detailed information would be needed to decide whether regulatory action is appropriate in any given instance. To address this need, the regime should require that a final transferee disclose the end use for the item, and should attach conditions or guarantees that would reasonably assure verification of the disclosed application and that the critical item is not reexported.<sup>484</sup>

The regime could categorically deny certain states access to critical items. Instead of each state separately restricting exports to foreign states, the regime would uniformly identify suspect recipients on the basis of consistent criteria concerning their weapons capabilities. For instance, access to critical materials and technologies should be denied to a state that is not a member of the nonproliferation regime or a member state found to be in material noncompliance.<sup>485</sup> Even where a categorical denial would be inappropriate, the regime could attach conditions on exports to a given state where the desired item makes no sense in the context of that nation's industrial develop-

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483. See generally Muller, *supra* note 315, at 19 (arguing for stronger nuclear trade restrictions).

484. Steinbruner, *supra* note 467, at 6, 13.

485. See Muller, *supra* note 315, at 19, 20.

ment.<sup>486</sup>

In this way, observance of the regime's regulations would objectively demonstrate a state's qualification for access to sensitive items—a far preferable situation to the current disparate and gap-filled diplomatic determinations of sundry suppliers, each with its own set of export controls.<sup>487</sup> Additionally, because nonmembership would constitute *prima facie* grounds for denial of access to critical items, developing states that do not aspire to a catastrophic weapons capability would have an incentive to join the regime.

*B. Verification: Reporting Requirements, Monitoring, Intrusive Inspections, and Confidence-Building*

The nonproliferation regime must assure states that other states are complying with the agreement's terms.<sup>488</sup> Accordingly, the steps taken to verify compliance should be commensurate with the need for assurance in a particular strategic context. Put more simply, verification measures should enable a state to detect another state's actions that go beyond the limits of the regime in a militarily significant way.<sup>489</sup>

The substantial need for elaborate and perhaps even highly intrusive measures to appraise each nation's capability to produce critical items should not be confused with the need for verification in the context of bilateral arms control that was so hotly debated during the last decade of the 'Cold War'.<sup>490</sup> During the Cold War, verification that both the United States and the Soviet Union complied with nuclear arms control agreements focused on force structure and destructive capability.<sup>491</sup> Because those concerns were at the very core of arms control, verification rose to the pinnacle of concerns in

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486. See Muller, *supra* note 315, at 22. Muller writes:

It makes no sense to supply reprocessing technology to somebody who does not even operate a single light water reactor; it is likewise imprudent to deliver huge amounts of highly enriched uranium to a country which operates a medium-sized research reactor and asks for a large fuel stockpile. In both cases, the request may be innocent and due to inept planning—but who knows?

*Id.*

487. See Bertach & Cupitt, *supra* note 463, at 53.

488. David Hafemeister et al., *The Verification of Compliance with Arms-Control Agreements*, SCI. AM., Mar. 1985, at 39, 39.

489. See McFate, *supra* note 211, at 77.

490. See generally Michael Krepon, *Arms-Treaty Verification: A Political Problem*, TECH. REV., May/June 1986, at 34 (arguing that success of present and future arms control agreements requires resolution of verification and compliance problems).

491. For a clear (but dated) discussion of superpower arms control verification, see Hafemeister et al., *supra* note 488, at 39.

the START and INF negotiations.<sup>492</sup>

In the context of the Cold War, verification could thus be said to have served two essential purposes: one military and one political. Militarily, the strategy to avoid World War III was premised on parity between the superpowers; accordingly, neither superpower could pursue aggression without risking complete destruction.<sup>493</sup> Any breakout or perceived advantage by one party could destabilize the balance of terror with horrific planetary consequences. Politically, the superpowers' relationship was based in large part on the negotiation and enforcement of complex arms agreements, any deviation from which, regardless of its actual significance, would signal a breach of the assurance that each party would stand by its word.

In contrast, verification in the nonproliferation context differs from superpower arms control verification in at least three important respects. First, the object of verification is not deployed force structure but rather the industrial capability to produce prohibited weapons. Verification, therefore, must take place earlier in the process of making and deploying weaponry. While this conclusion may suggest that verification measures must be more intrusive as to private commercial enterprises than was the case during the Cold War, it also suggests that a single breakout effort will not radically change the global strategic balance. Second, at least as to chemical and biological weapons, it is impossible to verify absolute nonproduction because anyone with moderate expertise and a rudimentary laboratory can make a deadly device. The purpose of nonproliferation verification, however, is to assure that no nation is building an arsenal to pursue widescale or systematic aggression. While verification measures cannot claim to be absolutely effective, a multilayered scheme can be designed to detect a national effort to achieve a catastrophic weapons capability. Third, verification in the nonproliferation context is not the foundation for stabilizing an otherwise hostile relationship. The political role that verification served during the Cold War is significantly less important in the modern multilateral context. Accordingly, verification efforts would not need to detect trivial discrepancies unless they pointed to a broader scheme to

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492. See McFate, *supra* note 211, at 77; see also John D. Morrocco, *Arms Control Verification: How Much Is Enough?*, AVIATION WK. & SPACE TECH., Aug. 6, 1990, at 44, 44 (noting that agreement on particular means of verification was biggest obstacle to START negotiations).

493. See generally AGATHA S.Y. WONG-FRASER, *THE POLITICAL UTILITY OF NUCLEAR WEAPONS: EXPECTATIONS AND EXPERIENCE* 60-63 (1980) (discussing strategy of mutual assured destruction).

undermine the regime's goals.<sup>494</sup>

1. *Appraisal of production capabilities and output*

On first reflection, appraisal of production capabilities is unrelated to the task of preventing international proliferation because the important information is what weapons capabilities are acquired and to what use they are put, not what commercial products are initially made. More considered inquiry, however, reveals the necessity for accurate information concerning the production and availability of critical materials and technology.

First, verification of exports will require extensive data on industrial activity so that export activity can be systematically charted from a known baseline.<sup>495</sup> Without accurate estimates of the availability of a militarily critical item, regulators can never be confident that their efforts to trace those items' uses are comprehensive. Appraisal of production capabilities, therefore, can prevent the illicit diversion of items before those items become subject to export controls.

Second, to the extent that concerns about proliferation center on indigenous production, as opposed to acquisition of critical items from the international marketplace, appraisal of production capabilities may raise confidence that nations are not pursuing a prohibited weapons capability. At least as to items subject to a virtual ban on production, appraisal of production can confirm that a nation is upholding its obligation.

Third, one of the regime's objectives is to identify, in a timely manner, the development of new technological means to achieve catastrophic ends. Appraisal of productive capabilities offers a method for tracking developments at facilities in critical or suspect industries.

Devising a scheme to appraise production capabilities is not difficult. The Chemical Weapons Convention, with its extensive

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494. See McFate, *supra* note 211, at 84. McFate notes:

The heavy emphasis that has been placed on compliance with actions required in elaborate verification regimes needs rethinking. In a cold war environment, missed notifications, incorrect data, and delayed access for on-site inspectors would be judged harshly as violations; in a cooperative environment, they would be viewed as mistakes. . . . In a cooperative environment, the emphasis on "verification to detect noncompliance" should be replaced by the concept of "confirmation of compliance."

*Id.*

495. See 2 *Arms Trade and Nonproliferation in the Middle East: Hearing Before the Subcomm. on Technology and National Security of the Joint Economic Comm.*, 102d Cong., 2d Sess. 26 (1992) (statement of William C. Potter, Director, Center for Russian and Eurasian Studies, and Professor, Monterey Institute of International Studies) [hereinafter *Hearings on Arms Trade and Nonproliferation*] (advocating use of empirical data on potential proliferators to circumvent future proliferation).

measures to verify production and use of chemicals, offers a model for all future nonproliferation regimes. Simply put, a new regime should apply the CWC's verification procedures to other critical industrial sectors, including the processing of nuclear materials, biological substances, and missile guidance technologies.

Initially, each nation must declare all facilities within its jurisdiction that produce an item subject to controls. Those facilities should be obligated to prepare detailed reports concerning their production activities and to submit a summary of their production of critical items and the intended uses for those items. Facilities producing sensitive items may be obligated to permit the installation of onsite monitoring devices that could serve as a primary mechanism to verify the accuracy of their declarations. A system of regular onsite inspections would be far more expensive and intrusive but arguably necessary to verify declarations concerning highly critical items.<sup>496</sup> The NPT and the CWC already contemplate both onsite monitoring and routine inspections of declared facilities,<sup>497</sup> and current BWC negotiations contemplate the adoption of similar confidence-building techniques.<sup>498</sup> Extension of these efforts to facilities that produce critical technologies for ballistic missiles is a logical step.

The most important and most controversial verification technique is challenge or suspicion-based inspections. As discussed, the CWC provides for challenge inspections virtually anywhere a chemical weapon could be covertly produced or stored.<sup>499</sup> Whether the IAEA currently has the power to conduct challenge inspections is hotly debated.<sup>500</sup> That debate should be resolved by explicitly authorizing

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496. For a discussion of the strengths and limitations of onsite inspections, see DEREK LEEBAERT, HERITAGE FOUND., *THE VERIFICATION ISSUE: KEY TO A U.S.-SOVIET ARMS ACCORD* (1987).

497. NPT, *supra* note 266, art. III, 21 U.S.T. at 487-88, 729 U.N.T.S. at 172; Verification Annex, *supra* note 349, at 829; *see also* INTERNATIONAL ATOMIC ENERGY AGENCY, *A SHORT HISTORY OF NON-PROLIFERATION 19-22* (1976) (discussing inspection process).

498. *See* McFate, *supra* note 211, at 75, 76.

499. Verification Annex, *supra* note 349, at pt. IV(A), (D) (45); *see* KELLMAN ET AL., *supra* note 358, at 52-56.

500. *See* Leventhal, *supra* note 471, at 177. Leventhal argues:

The [IAEA] board has never authorized short-notice, challenge inspections of safeguarded facilities to check for possible activities related to weapons development; of unsafeguarded facilities to determine whether undeclared nuclear materials are in production or storage; or of natural uranium to ensure against diversions for secret production of bomb-grade uranium or plutonium. The IAEA's model safeguards agreement with NPT members authorizes such inspections, but some members of the Board of Governors have opposed them as being too extensive and intrusive.

*Id.*; *see also* Fischer, *supra* note 297, at 41 (discussing process by which IAEA may conduct special inspections); Blix, *supra* note 362, at 57-58 (noting that situation in Iraq prompted debate over authority and effectiveness of IAEA's safeguard system).

challenge inspections.<sup>501</sup>

The prospect of international inspectors entering facilities and questioning personnel raises potential conflicts with legal protections against unreasonable searches and seizures. Many nations, including the United States, uphold rights to privacy and require judicial permission for a lawful search.<sup>502</sup> In addition, the possibility that inspections might require persons to testify about illegal activities, thereby risking subsequent prosecution, raises issues of due process and self-incrimination. Finally, verification activities may lead to the loss of confidential business information because foreign inspectors will have access to sensitive areas during inspections.<sup>503</sup> As to each of these issues, verification measures must be carefully integrated into the state parties' legal systems in a manner that respects protected rights.<sup>504</sup>

## 2. *Verification of exports: manifests and tagging*

For items that are permitted for export, the most important control mechanism would be a system of manifests that provide a traceable paper trail from the exporter to the final destination. Many of the items likely to be subject to export controls become weapons-capable only when combined with other items that could be exported separately. A manifest system would enable a central repository of such information to follow the movement of separate items.<sup>505</sup> Such manifests would be analogous to the efforts recently promulgated by the United Nations to lend transparency to conventional arms trades.<sup>506</sup>

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501. See generally IAEA BOARD OF GOVERNORS, STRENGTHENING THE EFFECTIVENESS AND EFFICIENCY OF THE SAFEGUARDS SYSTEM: REPORT BY THE DIRECTOR GENERAL ON SAGSI'S RE-EXAMINATION OF SAFEGUARDS IMPLEMENTATION (1993).

502. See generally BARRY KELLMAN ET AL., DEFENSE NUCLEAR AGENCY, A COMPARATIVE STUDY OF THE LEGAL IMPLEMENTATION OF THE CHEMICAL WEAPONS CONVENTION IN FOREIGN JURISDICTIONS (1993).

503. See Kellman et al., *supra* note 390. See also Bryan L. Sutter, *The Nonproliferation Treaty and the "New World Order"*, 26 VAND. J. TRANSNAT'L L. 181, 195 (1993) (noting concern over loss of industrial secrets through intrusive inspections).

504. For a full discussion of the legal issues attendant to onsite verification measures in the context of the Chemical Weapons Convention, see KELLMAN ET AL., *supra* note 358; EDWARD A. TANZMAN & BARRY KELLMAN, HARMONIZING THE CHEMICAL WEAPONS CONVENTION WITH THE UNITED STATES CONSTITUTION (Defense Nuclear Agency Technical Report No. DNA-TR-91-216, 1992); David A. Koplow, *Arms Control Inspection: Constitutional Restrictions on Treaty Verification in the United States*, 63 N.Y.U. L. REV. 229 (1988).

505. See Amy Sands, *Emerging Nuclear Supplies: Where's the Beef?*, in INTERNATIONAL NUCLEAR TRADE AND NONPROLIFERATION, *supra* note 98, at 25, 33 (arguing that loosely monitored diffusion of technical capabilities may undermine nonproliferation regime).

506. *General and Complete Disarmament: Transparency in Armaments Report on the Register of Conventional Arms*, Report of the Secretary-General, U.N. GAOR, 47th Sess., at 8-19, U.N. Doc. A/47/342 (1992). See generally Edward J. Laurance, *The UN Register of Conventional Arms:*



Electronic tags could track critical items through a satellite link.<sup>507</sup> While the efficacy of current tagging technology is debatable,<sup>508</sup> a focused program involving only the most critical technologies might increase confidence that purchasers do not resell such technology. Tags could monitor movements of technology and materials and thereby provide a means to verify the manifest system so long as three conditions are met. First, regulators could equip items with tamper indicators that signal improper use or configure the tags so as to disable critical equipment if they are removed. Second, to avoid concerns that regulators or other nations could use the tags for industrial or political espionage, the tags should only transmit information on location and evidence of tampering. Third, the tags would be only as effective as the satellite communications system to which they are connected; accordingly, regulators must have access to secure methods of transmission and data authentication.<sup>509</sup>

### *C. International Investigations and Implementing Cooperation of Legal Authorities*

Every effort to limit the proliferation of catastrophic weapons has suffered grievously from the lack of well-developed law enforcement modalities. Without rigorous law enforcement, weapons sellers could pursue short-term financial gains by trading in an environment in which everyone presumed that others were doing the same. As this Article has demonstrated, that presumption has considerable merit.

The most important single step that can be taken to control weapons proliferation would be to treat it as a penal, rather than diplomatic, matter. If proliferation is a crime, then it would no longer be diplomatically acceptable to sell weapons, regardless of whether the recipient is a friend or enemy, stable member of the world community, or pariah. Furthermore, once the international

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*Rationales and Prospects for Compliance and Effectiveness*, WASH. Q., Spring 1993, at 163, 165 (discussing U.N. transparency approach as alternative to arms export controls).

507. See Breck W. Henderson, *Arms Control Pacts May Outpace Advances in Verification Technology*, AVIATION WK. & SPACE TECH., Aug. 6, 1990, at 51, 52 (discussing electronic tag technology).

508. See generally Hugh De Santis, *Commercial Observation Satellites and Their Military Implications: A Speculative Assessment*, WASH. Q., Summer 1989, at 185, 186, 198-99 (noting adverse effects observation satellite technology may have on international stability); David A. Fulghum, *Advanced Arms Spread Defies Remote Detection*, AVIATION WK. & SPACE TECH., Nov. 9, 1992, at 20, 22 (suggesting that answer to accelerated proliferation of advanced weapons systems is neither export controls nor intelligence technology, but encouragement not to proliferate).

509. See generally Harold V. Argo, *Satellite Verification of Arms Control Agreements*, in *ARMS CONTROL VERIFICATION: THE TECHNOLOGIES THAT MAKE IT POSSIBLE* 290, 291-93 (David W. Hafemeister et al. eds., 1986) (discussing development of satellite detection of nuclear detonation).

community criminalizes proliferation, a variety of powerful modalities may be employed to detect noncompliance. The criminalization of proliferation would transform the current environment, in which a primary justification for proliferation is the suspicion that everyone else is doing it, to an environment in which a primary justification for nonproliferation is the assurance that intense international scrutiny would uncover and punish any attempt at clandestine weapons trading.

### 1. *International mutual legal assistance*

Proliferators do not respect national borders. It is reasonable to expect that as export regulations tighten for dual-use items, the small portion of the market that is intended for weapons production will subvert verification efforts. A serious problem therefore attends the possibility of weapons segmentation or parcelization. Instead of producing weapons at one facility where inspections could reveal them, operations may be split among numerous facilities in various countries, making detection more complicated.<sup>510</sup> In this regard, the verification efforts discussed above will be less effective in detecting illegitimate weapons activities than in providing assurances that commercial activity is legitimate.

Efforts to detect covert weapons activities will be limited if the international regime cannot compel states to carry out enforcement duties.<sup>511</sup> Furthermore, national courts and other legal authorities traditionally have jurisdiction only within their national territory.<sup>512</sup> In the event that law enforcement officials in one state are concerned about activities that involve another state, but which do not rise to a level sufficient to request a challenge inspection, the concerned officials must rely on letters rogatory and subpoenas in order to obtain information.<sup>513</sup>

These time-worn diplomatic channels are inadequate to cope with modern weapons proliferation. Such mechanisms are generally slow

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510. See Michael R. Gordon, *U.S. Accuses India on Chemical Arms*, N.Y. TIMES, Sept. 21, 1992, at A1, A2 (citing example of India's shipment of chemical weapons precursors to Syria).

511. See Robert L. Pisani & Robert Fogelnest, *The United States Treaties on Mutual Assistance in Criminal Matters*, in INTERNATIONAL CRIMINAL LAW: A GUIDE TO U.S. PRACTICE AND PROCEDURE 233, 233-37 (Ved. P. Nanda & M. Cherif Bassiouni eds., 1987) (discussing reasons for development of mutual assistance treaties).

512. *Id.*

513. See Bruce Zagaris, *Developments in International Judicial Assistance and Related Matters*, 18 DENV. J. INT'L L. & POL'Y 339, 351-52 (1990) (discussing why mutual legal assistance treaties are more effective than letters rogatory and subpoenas, emphasizing that mutual legal assistance treaties are less expensive and more efficient because requests move directly from one law enforcement agency to another).

and expensive because they entail passing a letter through the courts, embassies, and foreign and justice ministries of both countries. These mechanisms rely on comity, and they impose no obligation to provide information or assistance.<sup>514</sup> Furthermore, it is uncertain whether such requests will be respected, at least by courts of the United States, as incident to pre-indictment investigations rather than post-indictment criminal proceedings.<sup>515</sup> Moreover, diplomatic channels are bilateral.<sup>516</sup> In the context of uniformly addressing a global proliferation problem for nearly 200 nations, it is obvious that countries have dissimilar legal capabilities to process such requests and to receive and act upon them.<sup>517</sup>

The regime should develop formal modalities to expedite effective international legal cooperation through an agreement to provide mutual legal assistance. In addition to rectifying the problems of letters rogatory, a formal mutual legal assistance agreement would offer the important advantage of specifying obligations among state parties instead of functioning merely as a matter of comity.<sup>518</sup> If incorporated into a broader nonproliferation agreement, a provision for mutual legal assistance could specify the procedures to be followed in making and executing such requests that would both preserve the obligations of states already party to a mutual legal assistance treaty as well as include all other states that are not party to a separate assistance treaty.<sup>519</sup>

A state party should be obligated to provide information relating to facially noncriminal but suspect activities of persons or entities within its jurisdiction, including disclosing information it possesses, conduct-

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514. *Id.* at 352.

515. Compare *In re Request for Assistance from Ministry of Legal Affairs of Trinidad and Tobago*, 848 F.2d 1151, 1155-56 (11th Cir. 1988) (granting request for subpoena for documents in criminal investigation and holding that proceeding does not have to be pending to grant request), *cert. denied*, 488 U.S. 1005 (1989) with *Fonseca v. Blumenthal*, 620 F.2d 322, 324 (2d Cir. 1980) (*per curiam*) (reversing grant of subpoena for suitcase in a pre-indictment investigation).

516. See M. Cherif Bassiouni, *Critical Reflections on International and National Control of Drugs*, 18 DENV. J. INT'L L. & POL'Y 311, 332 (1990) (discussing problems of bilateral systems, including inability to understand intricacies of all other legal systems and inadequate number of administrative and technical personnel generally provided to complete necessary functions).

517. See *id.* at 332 ("In effect, there is a very primitive system of bilateral and, in some cases, regional cooperation involving small staffs in the various ministries of justice that deal with all these various modalities as well as they can.").

518. See generally Ethan A. Nadelmann, *Negotiations in Criminal Law Assistance Treaties*, 33 AM. J. COMP. L. 467 (1985) (discussing background of mutual-assistance treaties).

519. See David P. Stewart, *Internationalizing the War on Drugs: The U.N. Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances*, 18 DENV. J. INT'L L. & POL'Y 387, 399 (1990) (discussing Article 7 of U.N. Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances and its use of mutual legal assistance treaty to specify procedures for acquiring evidence by both party and non-party states).

ing searches, examining sites or objects, taking evidence or statements from persons, effecting service of judicial papers, and providing relevant documents such as financial or business records.<sup>520</sup> A strong addition found in the United Nations Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances<sup>521</sup> requires a state to comply with a request for legal assistance without regard to domestic bank secrecy laws that may shield the tremendous profits of trafficking in contraband and facilitate money laundering.<sup>522</sup> As was mentioned above in regard to verification activities, the regime will have to include mechanisms to ensure that protected rights of privacy and due process receive as much respect as would be accorded by the domestic law of the requested state.<sup>523</sup>

Implementation of the technology standards and verification measures discussed above would establish the basic elements of such law enforcement modalities. The regime would have an organizational hub that would serve as a central source of information and data and would collect and analyze reports filed by state parties. Each state party would have a governmental organ responsible for gathering such information and for monitoring dual-use exports. A provision in the convention obligating each state party to provide legal assistance to any requesting state party is all that would be needed to effectuate mutual legal assistance.

In addition, the regime could improve enforcement by establishing the relevant procedures that export control officials must employ. Currently, each country's export control procedures vary dramatically; even if substantive obligations were made uniform, their application from one nation to the next may be uncoordinated and thus subject to evasion.<sup>524</sup> The regime could achieve procedural uniformity by establishing techniques for monitoring transfers, maintaining appropriate manifests, and selectively inspecting appropriate items. Once these procedures are in place, reporting critical information to the regime and to other state parties will be a simple matter.

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520. Zagaris, *supra* note 513, at 346.

521. Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances, *opened for signature* Dec. 20, 1988, 28 I.L.M. 493.

522. *Id.* at 509 (providing "a party shall not decline to render mutual assistance . . . on the ground of bank secrecy").

523. Zagaris, *supra* note 513, at 346 (elaborating that while due process and domestic rights of privacy may bar answering certain requests, party states are strongly urged to grant party state's requests).

524. See SPECTOR, NUCLEAR EXPORTS, *supra* note 18, at 7 (explaining that emerging nuclear states either exploit system or comply with it).

## 2. *Establishing national authorities*

Each state party would have to establish a special enforcement authority to implement and coordinate the regime's obligations. This authority would undertake four primary tasks. First, the authority should carry out the regime's reporting obligations by gathering appropriate information from regulated entities, analyzing that information, and providing it to the regime's central organization. Second, the authority should license all dual-use exports that are regulated by the regime's technology standards. Third, the authority should expedite onsite monitoring and verification activities carried out within that nation's jurisdiction. Fourth, the authority should have primary law enforcement responsibilities concerning nonproliferation and should work in conjunction with its counterparts in all other state parties.

While establishing a national authority would seem to be a straightforward method of fulfilling the regime's obligations, internal bureaucratic divisions inherent in most countries' administrative and law enforcement systems may undermine such efforts.<sup>525</sup> The realpolitik approach to nonproliferation may exacerbate these intrinsic divisions. In this connection, bureaucratic conflict inevitably means that only senior political officials, up to and including the head of state, can make important decisions. Again, from the perspective of realpolitik, the head of state is exactly who should make such decisions.

The U.S. nonproliferation effort is the quintessential model of the realpolitik approach. The major effort to monitor global proliferation is based in the Central Intelligence Agency, which has no regulatory authority. Implementation of the onsite verification measures of arms control treaties generally is the responsibility of the On-Site Inspection Agency within the Department of Defense.<sup>526</sup> While the national authority to oversee compliance with the new Chemical Weapons Convention has not yet been named, a new interagency task force

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525. See M. Cherif Bassiouni, *Report Presented to the Seventh United Nations Congress on Crime Prevention and the Treatment of Offenders* at 40-43, U.N. Doc. A/Conf.121/NGO 1 (1986). National criminal justice systems consist of different subsystems, such as law enforcement, prosecution, judiciary, and corrections. Each subsystem may have its own separate bureaucratic and administrative units. Often, these subsystems are self-contained entities with their own peculiar bureaucratic and administrative exigencies. Thus, each subsystem protects its own interests, methods, goals, and purpose. This confrontation makes integration difficult, and, ultimately, leads to the whole criminal justice system's fragmentation.

526. See 22 U.S.C. § 2595 (1988) (defining and setting out duties of On-Site Inspection Agency).

with a rotating chairmanship among the Departments of State, Defense, and Commerce will likely assume the responsibility.

Moreover, over a dozen other agencies and several interagency groups are involved in export licensing. During the review process, the agencies assess the end user's reliability.<sup>527</sup> Each agency's treatment of an application for an export license varies, however, because each agency uses different criteria to review applications and has different standards for judging the desirability of approving certain types of licenses.<sup>528</sup> The foremost controversy tends to be between the Department of Defense, which zealously blocks dual-use exports out of concern for national security, and the Department of Commerce, which zealously promotes exports out of concern for the U.S. trade deficit.<sup>529</sup>

The multiplicity of agencies involved in regulating exports with potential military applications from the United States can be categorized into three groups. First, the export of defense articles and services listed in the U.S. Munitions List<sup>530</sup> is controlled by the Office of Defense Trade Controls within the Department of State (DOS) under the authority of the Arms Export Control Act.<sup>531</sup> When DOS receives an export license application, the licensing officer checks a manual to determine whether restrictions apply to the recipient country; if not, a license may issue without further action.<sup>532</sup>

Second, exports of dual-use items are regulated by the Office of Export Licensing of the Department of Commerce<sup>533</sup> under the authority of section 5 of the Export Administration Act.<sup>534</sup> Commerce has specific authority to decide on licenses destined for a specific missile project of concern.<sup>535</sup> Items that are subject to national security controls are reviewed continuously by the Office of

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527. The review tends to consist of three kinds of technical evaluations: (1) the specific product's potential military significance, (2) the end user's potential for diversion, and (3) the appropriateness of the product's stated end use.

528. H.R. REP. NO. 137, *supra* note 210, at 14 (noting that most differences in treatment have to do with different evaluations of recipient country).

529. Matthew W. Sawchak, Note, *The Department of Defense's Role in Free-World Export Licensing Under the Export Administration Act*, 1988 DUKE L.J. 785, 804-06 (1988).

530. 22 C.F.R. § 121.1 (1993).

531. 22 U.S.C. § 2778 (1988 & Supp. IV 1992).

532. U.S. GENERAL ACCOUNTING OFFICE, ARMS CONTROL: U.S. EFFORTS TO CONTROL THE TRANSFER OF NUCLEAR-CAPABLE MISSILE TECHNOLOGY 4 (1990).

533. See 15 C.F.R. § 770.1 (1993) (setting forth export licensing general policy and stating that exports of dual-use items are regulated by Office of Export Licensing of Department of Commerce).

534. 50 U.S.C. App. § 2405(a) (1988 & Supp. III 1991).

535. *Id.* § 2405(c)(3).

Technology and Policy Analysis, which recommends denial or approval of a license, with or without assurances.<sup>536</sup> If assurances are necessary, they are requested by the DOS from the recipient government on behalf of Commerce.<sup>537</sup> In addition, the Department of Defense (DOD) reviews some applications for export licenses.<sup>538</sup> In the event of a disagreement between Defense and Commerce, the application is referred first to the interagency Policy Coordinating Committee on Technology Transfers, and then, if necessary, to the President.<sup>539</sup>

Finally, export regulation of items related to nuclear technologies is divided. Commerce, in consultation with the Department of Energy (DOE), licenses dual-use items.<sup>540</sup> The Nuclear Regulatory Commission licenses items that are solely nuclear-energy related under the authority of the Nuclear Non-Proliferation Act.<sup>541</sup> In the event of a disagreement among Commerce, DOE, or DOS, the matter is referred to the National Security Council Ad Hoc Group on Non-Proliferation, and from there, if necessary, to the President.<sup>542</sup>

The involvement of many government agencies in the licensing process has produced a system that has been described as inherently inefficient, incapable of implementing a revised export control regime, and lacking accountability.<sup>543</sup> As stated, this decentralized system of responsibility forces nonproliferation policies to be formulated and executed on an ad hoc basis and in a manner that

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536. See 15 C.F.R. § 770.1(b) (1993) (setting forth Office of Export Licensing's screening procedures).

537. U.S. GENERAL ACCOUNTING OFFICE, *supra* note 532, at 5.

538. See 15 C.F.R. § 770.13(f) (1993) (setting forth procedures used by Department of Defense when reviewing proposed exports to countries to which exports are controlled for national security purposes).

539. See 15 C.F.R. § 770.13(f)(2)(iii).

540. Exec. Order No. 12,058, 43 Fed. Reg. 20,947 (1978), *reprinted in* 22 U.S.C. § 3201 (1988) (setting out duties of various departments and procedures for interactions among them).

541. 22 U.S.C. §§ 3201-3282 (1988).

542. Exec. Order No. 12,058, 43 Fed. Reg. at 20,947, *reprinted in* 22 U.S.C. § 3201 (1988).

543. See H.R. REP. NO. 137, *supra* note 210, at 7. The House Report states:

Because different agencies license exports that involve munitions, dual-use, and nuclear items, confusion results over what type of license certain sales require and which agency is the proper licensing authority. In addition, fragmented licensing authority has spawned an elaborate and cumbersome referral process, and a time-consuming interagency dispute resolution process. Both of these processes are rendered chaotic by constant interagency bickering over specific cases. The underlying cause of this bickering is agencies' different perspectives on export control policy, which are themselves a reflection of agencies' different constituencies and conflicting missions. Perhaps the most dangerous consequences of this "interagency gridlock" in the 1980s was a series of potentially disastrous licensing mistakes, notably the licensing of goods and technologies to Iraq that probably contributed to that nation's development of ballistic missiles and nuclear, chemical, and biological weapons.

exemplifies the *realpolitik* approach.

By contrast, implementing an international regime with the obligations that have been set out above would require a unification of efforts. The establishment of a sole authority to administer the entire export licensing system for munitions would provide far greater predictability for U.S. exporters and the international community. As the undisputed leader in addressing the global problem of catastrophic weapons proliferation, the United States should assert the primacy of the role of law by organizing its own nonproliferation efforts to embody an accountable regulatory system that could serve as a model for other nations to follow.

#### *D. Enforcement: Incentives and Penalties*

The absence of any formal statement of consequences for proliferating is the most serious weakness of current control efforts. Accordingly, the single most important step that a new nonproliferation regime could take would be to promulgate specific diplomatic and trade penalties for states and private entities that disobey the regime's technology restrictions. Penalties do not involve the violence and destruction of armed force, yet they enable the world community to take steps more decisive than diplomatic protests. In addition, penalties can be proportionate—the commission of a minor violation should not lead to draconian consequences, and the commission of a horrific violation should lead to more than a mere slap on the wrists.

Because the primary motivation for proliferation is pecuniary, not ideological, the most effective penalties would impose adverse economic consequences. If pursuit of profits from selling weapons-critical items carried penalties that vastly outweighed the gains, the motivation to participate in that market would be substantially diminished. Combined with stringent efforts to detect clandestine activity, stipulating penalties would render proliferation a bad business risk.

Economic penalties for proliferation have achieved some success,<sup>544</sup> despite the fact that penalties have been inconsistently imposed on an *ad hoc* basis by only a few nations.<sup>545</sup> Unfortunately,

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544. See Barry E. Carter, *International Economic Sanctions: Improving the Haphazard U.S. Legal Regime*, 75 CAL. L. REV. 1159, 1174 (1987) (providing examples of successful impositions of economic sanctions to prevent proliferation).

545. See generally Patrick Clawson, *Sanctions as Punishment, Enforcement, and Prelude to Further Action*, 7 ETHICS & INT'L AFF. 17 (1993) (focusing on general trade sanctions of 1990s).



the use of such sanctions has not always been successful.<sup>546</sup> If many nations formulated and enforced a consistent penalties policy, the deterrent power of such penalties would rise substantially.

Broadly put, economic penalties for violating international norms fall into three categories of severity: diplomatic measures, withdrawal of economic assistance, and import restrictions. The least coercive measures are denial or suspension of diplomatic prerogatives, including expulsion of diplomatic personnel, lodging a formal diplomatic protest, suspension of cultural exchanges, and termination of landing rights.<sup>547</sup> These diplomatic sanctions could be relevant to nonproliferation enforcement if applied consistently by all state parties. A more coercive measure would be to link developmental assistance to compliance with nonproliferation policies. Such a measure could include both multilateral assistance from the World Bank and unilateral assistance from wealthy nations such as the United States. Accordingly, states that accept and respect limitations on weapons-critical items would have access to aid and commercial grants.<sup>548</sup> Most coercive, and most important, would be multilateral imposition of restrictions on imports from a country or private entity found to be in noncompliance with nonproliferation efforts. Restrictions should be graduated to apply to increasingly larger segments of trade as the proliferating conduct becomes more egregious. It would be both logical and effective to threaten to close off access to profitable markets for those who continue to proliferate.

As has been discussed at length, proliferation has flourished as weapons sellers have taken advantage of open access to markets to gain available profits. At the same time, the major proliferators, including the four nations discussed in Part III, rely heavily on exports to sustain their economies. Certainly, denial of access to the lucrative U.S. market could generate economic losses to offset profits from weapons sales. An international regime would require that all

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546. See Carter, *supra* note 544, at 1174 (discussing ineffective attempts to use economic sanctions to coerce South Africa, India, Argentina, Brazil, and Pakistan into accepting multilateral IAEA safeguards).

547. See generally WARREN CHRISTOPHER, *DIPLOMACY: THE NEGLECTED IMPERATIVE* 1, 22-36 (1981) (discussing generally role of diplomacy in arms control context, with emphasis on Iran).

548. See David A. Koplow & Philip G. Schrag, *Carrying a Big Carrot: Linking Multilateral Disarmament and Development Assistance*, 91 COLUM. L. REV. 993, 1026-42 (1991). For this linkage to be effective, the development funds must be reliable, the linkage must be explicit and overt, the tradeoff must be proportional, the aid must be specific and useful for economic development, the substance of the development programs should be linked to the substance of the disarmament programs, an obligation to participation in verification and enforcement systems should be included, and an equitable, acceptable mechanism for collecting and distributing financial aid should be designed.

complying nations deny access to proliferators, thereby multiplying the deterrent effect.

From the perspective of the imposing nation, import restrictions have the advantage of eliminating competition from a class of imports.<sup>549</sup> While the sanctioning nation might have to endure substitutes that are inexact or available on less favorable terms, fungible replacements for most products are readily available from alternative, often domestic, sources. In contrast to export controls that can inflict lost sales and lost jobs on a few domestic citizens, the effects of import controls are broadly distributed and resulting losses are marginal.<sup>550</sup>

To be effective, all three of the penalties discussed above must satisfy at least two criteria. First, all state parties must impose penalties consistently. Second, the regime must delineate penalties before an allegation of a violation arises so that all parties have notice of the consequences of selling weapons.

### 1. *Necessity of consistent multilateral enforcement*

Underlying the urgency for uniform technology controls is a recognition of the "free rider" problem that applies to international weapons sales. If a nation ceases weapons sales to its international allies and clients only to have another seller step into the vacuum, the only real effect is an economic loss for the abstaining nation and a concomitant loss of diplomatic leverage over the weapons recipient. It is often claimed, therefore, that if we stop selling catastrophic weapons, someone worse will take our place.<sup>551</sup> Regardless of the morality of this claim, there is some truth to the concern that unilateral nonproliferation initiatives are unlikely to succeed. Put affirmatively, the likelihood of nonproliferation success would be substantially augmented by a system that assures every restricted supplier that its forbearance would be a mutually shared obligation.

No one nation, even with perfect export controls, can dampen the vibrant market for catastrophic weapons. Furthermore, the unilateral imposition of penalties means that the imposing nation must bear the entire burden of the loss of trade as well as the concomitant political consequences, while the proliferator is free to turn to a wide array of

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549. See Carter, *supra* note 544, at 1200 (discussing desire of imposing nation to protect domestic industries and jobs).

550. See Carter, *supra* note 544, at 1181-82 (discussing procedures and costs for implementing import controls).

551. See JOHN LECARRE, *THE SECRET PILGRIM* 333-35 (1990) (demonstrating unintended adverse effects of realpolitik approach).

alternative sources for its supply. Enhancing international security thus requires strict limitations on access to key weapons items, which in turn requires international law enforcement that regulates the traffic in militarily critical technologies and provides penalties for conduct that contributes to proliferation.

2. *Necessity of certain and advance delineation of mandatory penalties*

It is imperative that the international regime declare mandatory penalties for specified misconduct. Such a declaration would distinguish law enforcement, which penalizes violations of its stated policies, from diplomacy, which permits varying responses to similar conduct by different parties. At least two arguments favor law enforcement.

First, sanctions are reactive measures that can influence a state's conduct only after a problem has been identified. But the *threat* of sanctions is a proactive measure that can deter countries and foreign citizens from exporting militarily critical technology. This deterrence is effective only to the extent that nations and private entities believe that the international community will actually enforce sanctions. If the vagaries of shortsighted diplomatic efforts spawn doubts about the enforcement of sanctions, there may be more of a temptation to pursue the economic rewards of supplying weapons technology.

Second, the enactment of mandatory sanctions sends a message to countries and companies that may be weighing the costs and benefits of new weapons development. The refusal to impose sanctions against Iraq and its suppliers in the past decade sent a strong message to the rest of the world community that the use of chemical weapons, even against a nation's own people, would not bring serious consequences. Thus, nations other than Iraq may be tempted to acquire catastrophic weapons with the expectation that such acquisition would give rise to at worst a diplomatic rebuke. By contrast, mandatory sanctions would convey the impression that they are inevitable, thereby strengthening the effectiveness of the nonproliferation policy.

## CONCLUSION

This Article's conclusions can be presented at two distinct levels of abstraction. First, and most specific, this Article has urged the following seven reforms:

1. Production of items that are both militarily essential and commercially irrelevant should be virtually prohibited. Such items include the chemicals listed on Schedule 1 of the CWC, weapons-grade fissile materials, and MIRV technology.

2. Dual-use items critical to catastrophic weapons capabilities should be subject to strict export controls based on the inherent danger posed by the material or technology. Some restraints, however, should be targeted at only those recipient nations that pose the greatest threats to international security.

3. The production of militarily critical items should be subject to strict reporting, monitoring, and inspection requirements in order to expedite efforts to regulate their export. Nations can reduce the intrusiveness of such verification activities by adopting and enforcing strict controls on the international sale of critical items.

4. Exports of militarily critical items should be traced both through a system of manifests and, where possible, by tagging to ensure that the identified recipient actually takes possession of the items and uses them for their declared purpose.

5. An organ should be established within the national government of each nation to implement these obligations, and these national organs should cooperate with each other to detect noncomplying activities.

6. When evidence of noncompliance is discovered, the offending person and the offending nation should be penalized by the imposition of predetermined sanctions that are levied by all state parties.

7. The United States should initiate many of the above reforms by consolidating its nonproliferation efforts and by implementing trade sanctions against foreigners engaged in proliferation.

At the second and somewhat more general level, the international community should recognize that strengthening and integrating nonproliferation efforts requires a commitment to employ legal structures and legal process. Accordingly, while lawyers have long contributed their skills as negotiators and crafters of words to international fora, they have acted as diplomats.<sup>552</sup> What is needed now is the contribution of substantive legal expertise: the knowledge of how institutions are structured and operate, a familiarity with and respect for established procedures, experience with regulatory and licensing systems, and commitment to the concept that law can work only when those who violate it are held accountable for their noncompliance.

Clausewitz's maxim that "war is the extension of diplomacy but by other means"<sup>553</sup> is out of date. War is now the extension of industri-

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552. See John H. McNeill, *U.S.-USSR Nuclear Arms Negotiations: The Process and the Lawyer*, 79 AM. J. INT'L L. 52, 65-67 (1985) (discussing role of lawyers in nuclear arms negotiating process).

553. KALEVI J. HOLSTI, *PEACE & WAR: ARMED CONFLICTS AND INTERNATIONAL ORDER* 1648-1689 13 (Cambridge University Press 1991) (discussing Carl von Clausewitz's maxims on war).

al regulation but by other means. The Gulf War proved that the failure to regulate the international proliferation of catastrophic weaponry can force resort to war with all its horrors. In defeat, Saddam Hussein's sole legacy is the lesson that proliferation will cease only when it is put under tight legal control, enforced by expensive sanctions against the masters of war who sell catastrophic weapons for profit.

The new strategic era demands adoption of the regulatory approach. During the Cold War, when much of foreign affairs was divided East-West, there may indeed have been a need for a *realpolitik* approach capable of balancing diverse interests through the adroit use of diplomacy. By contrast, pursuit of strategic security in the coming era must depend less on political relations than on the ability to control the trade of catastrophic weaponry by stipulating adverse consequences for merchants of mass destruction.

For too long, diplomats and politicians have determined which nation gets what weaponry, as the industrialized nations stoked the flames of an international arms race with disastrous results. Weapons proliferation is too important to be left to the diplomats. The legal profession must shoulder the responsibility to build a true strategic defense initiative: an international regime for controlling militarily critical items. Only the rule of law through formal institutions offers a meaningful opportunity to corral the masters of war.

