

## NOTES

- 1 This report uses the phrase “weapon-usable fissile material” to refer to highly enriched uranium and plutonium. There are other nuclear materials used in weapons, such as beryllium, which are not fissile (capable of sustaining a chain reaction), and other fissile materials, such as low-enriched uranium, that cannot produce a nuclear explosion in a weapon.
- 2 Six nations abandoned indigenous nuclear weapon programs under way or under consideration in the 1960s: Egypt, Italy, Japan, Norway, Sweden, and West Germany. Since the late 1970s, Argentina, Australia, Belarus, Brazil, Canada, Iraq, Kazakhstan, Libya, Romania, South Africa, South Korea, Spain, Switzerland, Taiwan, Ukraine, and Yugoslavia have abandoned nuclear weapon programs or nuclear weapons (or both) on their territory. North Korea and Iran are the only two states that began acquiring nuclear weapon capabilities in this later period and have not ceased the effort.
- 3 In 1970, the year the NPT entered into force, there were about 38,000 nuclear weapons in global arsenals, mostly in the stockpiles of the United States and the Soviet Union; by 1986, the number of weapons had increased to a peak of 65,000 worldwide; in 2004, there were approximately 27,000.
- 4 For more on this concept, see Kurt M. Campbell, Robert Einhorn, and Mitchell Reiss, eds., *The Nuclear Tipping Point: Global Prospects for Revisiting Nuclear Renunciation* (Washington, D.C.: Brookings Institution Press, June 2004) (hereafter referred to as Campbell et al., *The Nuclear Tipping Point*).
- 5 National Security Council, *The National Security Strategy of the United States of America*, September 2002, available at [www.whitehouse.gov/nsc/nss.pdf](http://www.whitehouse.gov/nsc/nss.pdf) (accessed May 11, 2004); National Security Council, *National Strategy to Combat Weapons of Mass Destruction*, December 2002, available at [www.whitehouse.gov/news/releases/2002/12/WMDStrategy.pdf](http://www.whitehouse.gov/news/releases/2002/12/WMDStrategy.pdf) (accessed April 27, 2004), p. 1 (hereafter referred to as *National Strategy to Combat Weapons of Mass Destruction*).
- 6 The final document of the 2000 NPT Review Conference, agreed upon by all the states parties, says, “The Conference reaffirms that the total elimination of nuclear weapons is the only absolute guarantee against the use or threat of use of nuclear weapons.”

- 7 *National Strategy to Combat Weapons of Mass Destruction*, p. 3.
- 8 The FY 2005 budget submitted to Congress in January 2004 cut Nunn-Lugar funding by \$17 million. Congress increased the funding for a net final increase in FY 2005 appropriations of \$37 million over FY 2004.
- 9 Francis Fukuyama, "The Neoconservative Moment," *The National Interest*, June 1, 2004.
- 10 Robert Kagan, *Of Paradise and Power: America and Europe in the New World Order* (New York: Alfred A. Knopf, 2003), afterword, p. 154.
- 11 See John Shalikashvili, "Address to Carnegie International Non-Proliferation Conference" (remarks, Washington, D.C., March 16, 2000), available at [www.ceip.org/files/events/ShaliAddress2000.asp?p=8](http://www.ceip.org/files/events/ShaliAddress2000.asp?p=8) (accessed April 22, 2004); see also John Shalikashvili, "Findings and Recommendations Concerning the Comprehensive Nuclear Test Ban Treaty," January 2001, available at [www.state.gov/www/global/arms/ctbtpage/ctbt\\_report.html#report](http://www.state.gov/www/global/arms/ctbtpage/ctbt_report.html#report) (accessed April 22, 2004).
- 12 See United Kingdom Ministry of Defence, *A Summary Report by the Ministry of Defence on the Role of Historical Accounting for Fissile Material in the Nuclear Disarmament Process, and on Plutonium for the United Kingdom's Defence Nuclear Programme*, September 2003, available at [www.mod.uk/publications/nuclear\\_weapons/accounting.htm](http://www.mod.uk/publications/nuclear_weapons/accounting.htm) (accessed April 27, 2004) (hereafter referred to as the UK, *Summary Report*).
- 13 India already has moved in this direction. For instance, in 2000 its minister on external affairs declared to parliament, "Though [India is] not a party to the NPT, India's policies have been consistent with the key provisions of NPT that apply to nuclear weapon states. These provisions are contained in Articles I, III and VI... India has been a responsible member of the international nuclear nonproliferation regime and will continue to take initiatives and work with like-minded countries to bring about stable, genuine and lasting nonproliferation, thus leading to a nuclear-weapon-free-world." Jaswant Singh, "Statement on the 6th NPT Review Conference" (remarks in Parliament, New Delhi, May 9, 2000). Israel could make this commitment without publicly acknowledging possession of nuclear weapons; it would commit simply to do as the other named states do.

- 14 Matthew Meselson and Julian Robinson, "A Draft Convention to Prohibit Biological and Chemical Weapons under International Law," *Fletcher Forum of World Affairs*, 28, no. 1 (Winter 2004): p. 58, available at <http://fletcher.tufts.edu/forum/28-1pdfs/Meselson.pdf> (accessed April 21, 2004).
- 15 Apart from the five permanent members of the UN Security Council, nonpermanent representatives from Algeria, Brazil, Chile, Germany, Pakistan, the Philippines, Romania, and Spain voted in favor of the resolution.
- 16 See "The Equator Principles: A Framework for Banks to Manage Environmental and Social Issues in Project Financing," available at [www.equator-principles.com](http://www.equator-principles.com). Another voluntary regime worth examining in this context is the "Global Compact" launched by UN Secretary-General Kofi Annan, which brings companies together with UN agencies, labor, and civil society to support nine principles in the areas of human rights, labor, and the environment. It was initiated on July 26, 2000. See [www.unglobalcompact.org](http://www.unglobalcompact.org) (accessed January 12, 2005).
- 17 For an interesting analysis of the potential costs of such attacks, see C. C. Abt, "The Economic Impact of Nuclear Terrorist Attacks on Freight Transport Systems in an Age of Seaport Vulnerability," Contract no. DTR57-03-P-80130, Abt Associates, Inc., Cambridge, MA, 2003.
- 18 See "F&C Banking on Human Rights: Confronting Human Rights in the Financial Sector," September 2004, summary; full report available at [www.isisam.com/uploadFiles/banking\\_human\\_rights\\_sept04.pdf](http://www.isisam.com/uploadFiles/banking_human_rights_sept04.pdf) (accessed January 12, 2005).
- 19 For an excellent description of the Kimberley Process, see A. Bone, "Conflict Diamonds: The De Beers Group and the Kimberley Process," in *Business and Security: Public-Private Sector Relationships in a New Security Environment*, ed. A. Bailes and I. Frommelt (Stockholm International Peace Research Institute, Oxford University Press, 2000), pp. 129–47.
- 20 The report authors are indebted to Lee Kimball for important insights into existing international regimes in these areas. Kimball is a legal expert specializing in institutions that address the problems of environment and development, with a particular focus on international ocean management. She has served as the founding

director of the Council on Ocean Law and as a senior associate at the World Resources Institute on International Institutions.

- 21 Brad Roberts of the Institute for Defense Analyses has insightfully explored how the United States could induce the other major powers to accept greater responsibility for effecting a secure nuclear order. Brad Roberts, *American Primacy and Major Power Concert: A Critique of the 2002 National Security Strategy*, IDA Paper P-3751 (Washington, D.C.: Institute for Defense Analyses, December 2002), available at [www.ida.org/IDAnew/Tasks/AmericanPrimacyFinal.pdf](http://www.ida.org/IDAnew/Tasks/AmericanPrimacyFinal.pdf) (accessed April 27, 2004).
- 22 See Joseph Cirincione, Jessica Mathews, and George Perkovich, *WMD in Iraq: Evidence and Implications* (Washington, D.C.: Carnegie Endowment for International Peace, January 2004), available at [www.carnegieendowment.org/intel](http://www.carnegieendowment.org/intel) (accessed January 5, 2005). See also Jessica T. Mathews "What Happened in Iraq? The Success Story of United Nations Inspections" (keynote address, International Peace Academy Conference, "Weapons of Mass Destructions and the United Nations: Diverse Threats and Collective Responses," March 5, 2004), available at [www.carnegieendowment.org/publications/index.cfm?fa=view&id=1471](http://www.carnegieendowment.org/publications/index.cfm?fa=view&id=1471) (accessed December 15, 2004); and Charles Duelfer, Iraq Survey Group (testimony before the Senate Armed Services Committee, October 6, 2004).
- 23 See Barbara Hatch Rosenberg, "Enforcing WMD Treaties: Consolidating a UN Role," *Disarmament Diplomacy*, no. 75 (January/February 2004), available at [www.acronym.org.uk/dd/dd75/75bhr.htm](http://www.acronym.org.uk/dd/dd75/75bhr.htm) (accessed April 27, 2004).
- 24 Trevor Findlay, "Preserving UNMOVIC: The Institutional Possibilities," *Disarmament Diplomacy*, no. 76 (March/April 2004), available at [www.acronym.org.uk/dd/dd76/76tf.htm](http://www.acronym.org.uk/dd/dd76/76tf.htm) (accessed April 28, 2004).
- 25 State cooperation is helpful, but recent experiences suggest that it is often unlikely to occur and is not in itself critical to the success of an inspection regime.
- 26 See Jessica T. Mathews, *Iraq: A New Approach* (Washington, D.C.: Carnegie Endowment for International Peace, August 2002), available at [www.ceip.org/files/publications/iraq/mathews.htm](http://www.ceip.org/files/publications/iraq/mathews.htm) (accessed April 27, 2004).

- 27 For the purposes of this report, the cost of the Iraq War, which is outside the annual budget, is not considered.
- 28 See, for example, National Intelligence Council, *Foreign Missile Developments and the Ballistic Missile Threat to the United States through 2015*, December 2001, p. 8 (hereafter referred to as NIC, *Foreign Missile Developments*): “U.S. territory is more likely to be attacked with [chemical, biological, radiological, and nuclear] materials from nonmissile delivery means—most likely from terrorists—than by missiles, primarily because nonmissile delivery means are less costly, easier to acquire, and more reliable and accurate. They can also be used without attribution.”
- 29 This has not changed since Russia and China deployed their first intercontinental ballistic missiles, in 1959 and 1981, respectively.
- 30 For a more detailed description see Joseph Cirincione, “A Much Less Explosive Trend,” *Washington Post*, March 10, 2002, sec. B, p. 3, available at [www.ceip.org/files/Publications/2002-03-10-cirincione-post.asp](http://www.ceip.org/files/Publications/2002-03-10-cirincione-post.asp) (accessed May 6, 2004).
- 31 High-level U.S. officials insist that in the run-up to the Iraq War they did not call or consider Iraq an “imminent” threat. See, for example, George J. Tenet, “Iraq and Weapons of Mass Destruction” (remarks, Georgetown University, Washington, D.C., February 5, 2004), available at [www.cia.gov/cia/public\\_affairs/speeches/2004/tenet\\_georgetownspeech\\_02052004.html](http://www.cia.gov/cia/public_affairs/speeches/2004/tenet_georgetownspeech_02052004.html) (accessed April 27, 2004); see also Donald Rumsfeld, interview, *Face the Nation*, CBS, March 14, 2004, available at [www.defenselink.mil/transcripts/2004/tr20040314-secdef0542.html](http://www.defenselink.mil/transcripts/2004/tr20040314-secdef0542.html) (accessed April 27, 2004).
- 32 Kissinger couches his call in the context of *realpolitik*: “As the most powerful nation in the world, the United States has a special unilateral capacity to implement its convictions. But it also has a special obligation to justify its actions by principles that transcend the assertions of preponderant power. It cannot be in either the American national interest or the world’s interest to develop principles that grant every nation an unfettered right of preemption against its own definition of threats to its security.” Secretary-General Annan strikes a similar chord: “We must not shy away from questions about the adequacy and effectiveness of the rules and instruments at our disposal....[Security Council] members may need to begin a discussion on the criteria for an

- early authorization of coercive measures to address certain types of threats; for instance, terrorist groups armed with weapons of mass destruction.” Henry Kissinger, “Consult and Control: Bywords for Battling the New Enemy,” *Washington Post*, September 16, 2002, sec. A, p. 19; Kofi Annan, “Address to UN General Assembly” (remarks, New York, September 23, 2003), available at [www.un.org/News/Press/docs/2003/ga10156.p2.doc.htm](http://www.un.org/News/Press/docs/2003/ga10156.p2.doc.htm) (accessed April 27, 2004).
- 33 Report of the Secretary-General’s High-Level Panel on Threats, Challenges, and Change, “A More Secure World: Our Shared Responsibility,” United Nations, 2004, p. 67.
  - 34 For an outstanding treatment of this issue, see Brad Roberts, “NBC-Armed Rogues: Is There a Moral Case for Preemption?” in *Close Calls: Intervention, Terrorism, Missile Defense, and ‘Just War’ Today*, ed. Elliott Abrams and James Turner Johnson (Washington, D.C.: Ethics and Public Policy Center, 1998).
  - 35 See, for example, Neta C. Crawford, “The Slippery Slope to Prevent War,” *Ethics and International Affairs*, 17, no. 1 (Spring 2003), p. 30, available at [www.cceia.org/viewMedia.php/prmTemplateID/8/prmID/868](http://www.cceia.org/viewMedia.php/prmTemplateID/8/prmID/868) (accessed April 27, 2004); Miriam Sapiro “The Shifting Sands of Preemptive Self-Defense,” *American Journal of International Law*, 97, no. 3 (July 2003), pp. 599–606.
  - 36 Again, states remain free to act in self-defense, including on an anticipatory basis, where threats are clearly imminent.
  - 37 European leaders bypassed the UN Security Council in taking military action against Serbia over Kosovo.
  - 38 All nuclear reactors produce plutonium that can be used for nuclear weapon production only after extraction from spent fuel. As such, “separated plutonium” refers to plutonium that has been separated and is usable in a nuclear weapon.
  - 39 George W. Bush, “Address on Weapons of Mass Destruction Proliferation” (remarks, National Defense University in Washington, D.C., February 11, 2004), available at [www.whitehouse.gov/news/releases/2004/02/20040211-4.html](http://www.whitehouse.gov/news/releases/2004/02/20040211-4.html) (accessed April 27, 2004) (hereafter referred to as Bush, “Weapons of Mass Destruction Proliferation”).

- 40 For a full discussion, see *The Future of Nuclear Power: An Interdisciplinary Study* (Boston: MIT, 2003), available at <http://web.mit.edu/nuclearpower> (accessed April 27, 2004).
- 41 The Belfer Center at Harvard University, under the direction of John Holdren and Matthew Bunn, has done several major studies on the issue of nuclear security, with the support of the Nuclear Threat Initiative. Many of the ideas from the center are reflected in this section.
- 42 The National Academy of Sciences has recommended that the “highest standards of security and accounting applied to the storage of intact nuclear weapons should be maintained” for all nuclear materials in the disposal process. See *Management and Disposition of Excess Weapons Plutonium* (Washington, D.C.: National Academy of Sciences, 1994) (hereafter referred to as *Management and Disposition of Excess Weapons Plutonium*).
- 43 These are published as the IAEA’s information circular or INFCIRC 225.
- 44 This was another recommendation of the 1994 National Academy of Sciences study. It suggested that “the United States pursue new international arrangements to improve safeguards and physical security over all forms of plutonium and HEU worldwide.” *Management and Disposition of Excess Weapons Plutonium*, p. 2.
- 45 Efforts to strengthen the Convention on the Protection of Nuclear Materials and the routine process involved in revising the IAEA’s nonbinding standards on physical protection for nuclear materials have been hampered by various obstacles. These include a desire by states to protect their national authority, states’ resistance to opening their nuclear activities to international scrutiny, and industrial, financial, and bureaucratic imperatives.
- 46 Security Council Resolution 1540 states: “Acting under Chapter VII of the Charter of the United Nations...[the Security Council] decides also that all States shall take and enforce effective measures to establish domestic controls to prevent the proliferation of nuclear...weapons, including by establishing controls over related materials, and to this end shall (a) develop and maintain appropriate effective measures to account for and secure such items in production, use, storage and transport; (b) develop and maintain appropriate physical protection measures...”

- 47 Such assistance is noted in the *EU Strategy against Proliferation of Weapons of Mass Destruction* by the G-8 Global Partnership Statement, and in UN Security Council Resolution 1540.
- 48 Clear red lines, however, will need to be drawn to avoid assisting Israel, India, and Pakistan in ways that might help them manage their nuclear arsenals in violation of NPT commitments.
- 49 See Matthew Bunn, Anthony Wier, and John P. Holdren, *Controlling Nuclear Warheads and Materials: A Report Card and Action Plan* (Washington, D.C.: Nuclear Threat Initiative and the Project on Managing the Atom, Harvard University, March 2003), available at [www.nti.org/e\\_research/cnwm/overview/report.asp](http://www.nti.org/e_research/cnwm/overview/report.asp) (accessed April 27, 2004).
- 50 Both HEU and plutonium can be used to produce a nuclear weapon, and terrorist groups with money and resources can produce a weapon with either. It is technically simpler, however, to produce a weapon using HEU.
- 51 *Management and Disposition of Excess Weapons Plutonium*, p. 1.
- 52 Of the nine states known or believed to possess nuclear weapons, the United States, Russia, France, the United Kingdom, and China have ceased production of HEU or plutonium for weapons production. Russia continues to produce 1.5 metric tons of plutonium annually from former production reactors, but the material is not used for weapons, under bilateral agreement with the United States. It is believed that Israel, India, Pakistan, and North Korea all continue to produce material for nuclear weapons.
- 53 Bush, “Weapons of Mass Destruction Proliferation.”
- 54 In the initial draft of the present document, the authors recommended that all states adopt a ban on the production of HEU and, to ease verification requirements and minimize distinctions between states, a temporary pause on all enrichment activities. Discussions with officials and industry representatives made clear that the marginal benefits of a comprehensive pause on enrichment were outweighed by the technical, economic, and security challenges such a pause would entail. Thus, the pause on all enrichment activities has been dropped from this final set of recommendations, but retained for enrichment above 20 percent U-235.



- 55 Observers note that Pakistan's enrichment capability was stolen from URENCO and question the wisdom of adopting the URENCO model. There was nothing inherent in the international nature of URENCO's ownership that allowed A. Q. Khan to steal the information needed to advance Pakistan's nuclear ambitions. Appropriate personnel reliability and technology controls can reduce risks to an acceptable level.
- 56 Massive capital investments have been made in plutonium recycling in Japan and Europe. These investments make terminating plutonium unlikely, but should not eliminate consideration of a pause in plutonium separation until supply and demand achieves equilibrium and consideration of new, advanced fuel cycles that do not rely on separated weapon-usable materials.
- 57 As of May 7, 2004, Nunn-Lugar programs under the U.S. Department of Defense had deactivated or destroyed 6,312 nuclear warheads and destroyed 535 ballistic missiles, 459 ballistic missile silos, 11 ballistic missile mobile launchers, 128 bombers, 708 nuclear air-to-surface missiles, 496 submarine-launched ballistic missiles, 408 submarine missile launchers, and 27 strategic missile submarines. It had also sealed 194 nuclear test tunnels. For additional information on Nunn-Lugar accomplishments by the Department of Defense and by the Departments of Energy, and State, see Michael Roston, "Reported Accomplishments of Threat Reduction and Nonproliferation Programs, by Agency," *RANSAC Policy Update*, July 2004, at [www.ransac.org](http://www.ransac.org) (accessed January 13, 2005).
- 58 See "Statement by G8 Leaders: The G8 Global Partnership against the Spread of Weapons and Materials of Mass Destruction," June 27, 2002, at [www.g8.gc.ca/2002Kananaskis/globpart-en.asp](http://www.g8.gc.ca/2002Kananaskis/globpart-en.asp) (accessed May 6, 2004).
- 59 Information on the more recent members of the Global Partnership may be found at [www.state.gov/t/np/rls/fs/34967.htm](http://www.state.gov/t/np/rls/fs/34967.htm) (accessed January 10, 2005).
- 60 The analysis and discussion that follow are provided by William Hoehn of the Russian-American Nuclear Security Advisory Council and Matthew Bunn of the Project on Managing the Atom at Harvard University. Their work and the work of their organizations are gratefully acknowledged.

- 61 “The Worldwide Threat 2004: Challenges in a Changing Global Context,” Testimony of George J. Tenet before the Senate Armed Services Committee, March 9, 2004, available at [www.cia.gov/cia/public\\_affairs/speeches/2004/tenet\\_testimony\\_03092004.html](http://www.cia.gov/cia/public_affairs/speeches/2004/tenet_testimony_03092004.html) (accessed January 14, 2005).
- 62 A detailed discussion of this issue may be found in Matthew Bunn and Anthony Wier, *Securing the Bomb: An Agenda for Action* (Washington, D.C.: Nuclear Threat Initiative and the Project on Managing the Atom, Harvard University, May 2004), available at [www.nti.org/e\\_research/cnwm/overview/2004report.asp](http://www.nti.org/e_research/cnwm/overview/2004report.asp) (accessed January 10, 2005).
- 63 The Global Threat Reduction Initiative (GTRI) is already active in Russia in that it is removing Russian-origin HEU and spent fuel from research reactors around the world. As is argued in the present chapter under “Threat Reduction,” this program should also be accelerated from its current ten-year schedule to four years.
- 64 In December 2004, the Bush administration publicly embraced the goal of completing such security upgrades in four years. Paul Longworth, the deputy administrator of the National Nuclear Security Administration, laid out this goal in his remarks to the Tenth Annual International Nuclear Materials Policy Forum, Alexandria, Va., December 14, 2004. A report on his remarks is provided in David Ruppe “U.S. Threat-Reduction Efforts Quicken, Official Says,” *Global Security Newswire*, December 15, 2004, available at [www.nti.org/d\\_newswire/issues/2004\\_12\\_15.html#75E8F3A8](http://www.nti.org/d_newswire/issues/2004_12_15.html#75E8F3A8) (accessed January 10, 2005).
- 65 In November 2004, Senator Richard Lugar, chairman of the Senate Foreign Relations Committee, introduced legislation in the Senate that would actually lift the certification/waiver requirements. A press release on the draft legislation may be found at <http://lugar.senate.gov/pressapp/record.cfm?id=227989> (accessed January 10, 2005).
- 66 Bush, “Weapons of Mass Destruction Proliferation.”
- 67 IAEA Director General Mohamed ElBaradei has said, “The current system relies on a gentleman’s agreement that is not only non-binding, but also limited in its membership: it does not include many countries with growing industrial capacity. And some members fail to control the exports of companies unaffiliated

- with the government enterprise.” Mohamed ElBaradei, “Saving Ourselves from Self-Destruction,” *New York Times*, February 12, 2004, available at [www.iaea.org/NewsCenter/Statements/2004/ebNYT20040212.html](http://www.iaea.org/NewsCenter/Statements/2004/ebNYT20040212.html) (accessed January 12, 2005).
- 68 The Zangger Committee is a body established under the NPT to determine which items will require the application of IAEA safeguards.
- 69 China is the exception, having recently expressed interest in joining the Nuclear Suppliers Group.
- 70 United Nations Security Council, “Non-Proliferation of Weapons of Mass Destruction,” United Nations Security Council Resolution 1540, April 28, 2004, available at [www.state.gov/t/np/rls/other/31990.htm](http://www.state.gov/t/np/rls/other/31990.htm) (accessed January 12, 2005) (hereafter referred to as UNSC Resolution 1540).
- 71 UNSC Resolution 1540.
- 72 The laws themselves are riddled with loopholes, for example, allowing the Ministry of Defense to exempt itself from export restrictions. See Anupam Srivastava and Seema Gahlaut, “Curbing Proliferation From Emerging Suppliers: Export Controls in India and Pakistan,” *Arms Control Today* (September 2003): p. 12–16, available at [www.armscontrol.org/act/2003\\_09/AnupamandGahlaut.asp](http://www.armscontrol.org/act/2003_09/AnupamandGahlaut.asp) (accessed January 12, 2005).
- 73 Michael Beck, Cassady Craft, Seema Gahlaut, and Scott Jones, *Strengthening Multilateral Export Controls: A Nonproliferation Priority* (Athens, Ga.: Center for International Trade and Security, University of Georgia, September 2002), available at [www.uga.edu/cits/documents/pdf/regime\\_report.pdf](http://www.uga.edu/cits/documents/pdf/regime_report.pdf) (accessed January 12, 2005) (hereafter referred to as Beck et al., *Strengthening Multilateral Export Controls: A Nonproliferation Priority*).
- 74 Beck et al., *Strengthening Multilateral Export Controls: A Nonproliferation Priority*.
- 75 “Nuclear Non-Proliferation: An Agenda for the Future,” Roundtable Conference cosponsored by the United Nations Foundation, the Belfer Center for Science and International Affairs, and the Nuclear Threat Initiative in Cambridge, Mass., April 5, 2004.
- 76 Beck et al., *Strengthening Multilateral Export Controls: A Nonproliferation Priority*.

- 77 Tamer Gabelnick and Rachel Stohl, "Developing Sound Export Control Reforms for Today's Security Environment," in *Challenging Conventional Wisdom: Debunking the Myths and Exposing the Risks of Arms Export Reform*, ed. Tamer Gabelnick and Rachel Stohl (Washington D.C.: Center for Defense Information and Federation of American Scientists, June 2003).
- 78 "NSG Seeks Agreement on Tightening Export Controls," *NIS Export Control Observer*, February 2004, available at [http://cns.miis.edu/pubs/nisexcon/pdfs/ob\\_0402e.pdf](http://cns.miis.edu/pubs/nisexcon/pdfs/ob_0402e.pdf) (accessed January 12, 2005); "Developments in International Supplier Regimes," *NIS Export Control Observer*, January 2004, available at [http://cns.miis.edu/pubs/nisexcon/pdfs/ob\\_0401e.pdf](http://cns.miis.edu/pubs/nisexcon/pdfs/ob_0401e.pdf) (accessed January 12, 2005).
- 79 Campbell et al., *The Nuclear Tipping Point*.
- 80 While the report authors assert this position, we would also like to note the moral arguments against it, which several of those who commented on the draft relayed. Their viewpoint was strongly articulated in "The Morality of Nuclear Deterrence," a statement issued by seventy-five U.S. Catholic bishops in June 1998. The bishops argued that "because of the horrendous results if these weapons should be used, and what we see as a greater likelihood of their use, we now feel it is imperative to raise a clear, unambiguous voice in opposition to the continued reliance on nuclear deterrence." For the full text of the statement, see [www.ccnr.org/pax\\_christi.html](http://www.ccnr.org/pax_christi.html) (accessed January 12, 2005).
- 81 For discussion of the report, see "Pentagon Panel Backs Smaller Nuclear Weapons," *Global Security Newswire*, March 29, 2004, available at [www.nti.org/d\\_newswire/issues/2004/3/29/9F8B193E-3CE9-49AB-8025-76494F799CB3.html](http://www.nti.org/d_newswire/issues/2004/3/29/9F8B193E-3CE9-49AB-8025-76494F799CB3.html) (accessed January 12, 2005).
- 82 Alexei Arbatov describes this phenomenon as a "one-way street." For Arbatov's comments on the issue, drawing on the discussions of a working group that he has chaired at the Carnegie Moscow Center, see "The Future of the Nonproliferation Regime," *Live at Carnegie*, December 1, 2004, available at [www.carnegieendowment.org/events/index.cfm?fa=eventDetail&id=732](http://www.carnegieendowment.org/events/index.cfm?fa=eventDetail&id=732) (accessed January 12, 2005).
- 83 This view was expressed during seminars that were held at the Carnegie Moscow Center in April and September 2004 in

- order to seek Russian expert comment on two different drafts of *Universal Compliance*. For further discussion of the point, see Rose Gottemoeller, "Russian Nuclear Weapons Policy," *The Russian Military* (Cambridge, Mass.: MIT Press, 2004).
- 84 See Martin Sieff, "North Korea: The Bee Comes Stinging," *The Globalist*, September 8, 2003, available at [www.theglobalist.com/DBWeb/StoryId.aspx?StoryId=3414](http://www.theglobalist.com/DBWeb/StoryId.aspx?StoryId=3414) (accessed January 12, 2005).
- 85 For a Defense Department briefing on the Nuclear Posture Review, see J. D. Crouch, "Special Briefing on the Nuclear Posture Review," *Department of Defense*, January 9, 2002, available at [www.defenselink.mil/transcripts/2002/t01092002\\_t0109npr.html](http://www.defenselink.mil/transcripts/2002/t01092002_t0109npr.html) (accessed January 12, 2005). For the National Security Strategy's discussion of preemption and nuclear, chemical, and biological weapons see *The National Security Strategy of the United States of America*, September 2002, pp. 13–16 of the full text, available at [www.comw.org/qdr/fulltext/nss2002.pdf](http://www.comw.org/qdr/fulltext/nss2002.pdf) (accessed January 12, 2005).
- 86 See Charles V. Peña, "The Iraq War Makes the Case against Mini-Nukes," December 10, 2003, *CATO Daily Commentary*, available at [www.cato.org/dailys/12-10-03.html](http://www.cato.org/dailys/12-10-03.html) (accessed January 12, 2005); Tod Lindbergh, "Deterrence and Prevention," *Weekly Standard*, 8, no. 20 (February 3, 2003), available at [www.weeklystandard.com/Content/Public/Articles/000/000/002/162kkofc.asp?pg=1](http://www.weeklystandard.com/Content/Public/Articles/000/000/002/162kkofc.asp?pg=1) (accessed January 12, 2005).
- 87 The authors of this report are grateful to Sir Michael Quinlan and Dr. Lewis Dunn, who commented on this point. They also noted that the international regimes banning chemical and biological weapons could be strengthened to criminalize possession of such weapons, thus further negating the need for extreme military measures involving the use of nuclear weapons.
- 88 See, for example, Michael M. May and Zachary Haldeman, *Effectiveness of Nuclear Weapons against Buried Biological Agents* (Stanford, Calif.: Center for International Security and Cooperation, Stanford University, June 2003), available at <http://iis-db.stanford.edu/pubs/20216/MayHaldeman0104.pdf> (accessed January 12, 2005); Robert W. Nelson, "Nuclear Bunker Busters, Mini-Nukes, and the U.S. Nuclear Stockpile," *Physics Today*, 56, no. 11 (November 2003): p. 32, available at [www.aip.org/pt/vol-56/iss-11/p32.html](http://www.aip.org/pt/vol-56/iss-11/p32.html) (accessed January 12, 2005); Michael E. Levi,

- “Effects of Nuclear Earth-Penetrating Weapon and Other Weapons” (remarks, National Academy of Sciences in Washington, D.C., April 27, 2004), available at [www.brook.edu/views/testimony/fellows/levi20040427.pdf](http://www.brook.edu/views/testimony/fellows/levi20040427.pdf) (accessed January 12, 2005); William Matthews, “Scientists: Bunker-Busting Nukes Are Unreliable,” *Defense News*, May 4, 2004, available at [www.nuclearpolicy.org/NewsArticle.cfm?NewsID=1557](http://www.nuclearpolicy.org/NewsArticle.cfm?NewsID=1557) (accessed January 6, 2005).
- 89 Donald Rumsfeld, “Defense Department Budget for Fiscal Year 2004 and Posture of the U.S. Armed Forces” (testimony, Senate Armed Services Committee, February 13, 2003).
- 90 For a description of such non-nuclear strike missions and the “new triad,” see the briefing by Assistant Secretary of Defense J. D. Crouch on the Nuclear Posture Review, which may be found in J. D. Crouch, “Special Briefing on the Nuclear Posture Review,” Department of Defense, January 9, 2002, available at [www.defenselink.mil/transcripts/2002/t01092002\\_t0109npr.html](http://www.defenselink.mil/transcripts/2002/t01092002_t0109npr.html) (accessed January 12, 2005).
- 91 Sam Nunn, “Address to Carnegie International Non-Proliferation Conference,” Remarks in Washington, D.C., June 22, 2004, available at [www.ceip.org/files/projects/npp/resources/2004conference/speeches/nunn.htm](http://www.ceip.org/files/projects/npp/resources/2004conference/speeches/nunn.htm) (accessed January 12, 2005). See also Valery E. Yarynich, “The Ultimate Terrorism,” *Washington Post*, April 30, 2004, sec. A, p. 29.
- 92 David E. Mosher, Lowell H. Schwartz, David R. Howell, and Lynn E. Davis, “Beyond the Nuclear Shadow: A Phased Approach for Improving Nuclear Safety and U.S.-Russian Relations,” RAND Corporation, 2003, available at [www.rand.org/publications/MR/MR1666/](http://www.rand.org/publications/MR/MR1666/) (accessed January 12, 2005); Sergei Rogov’s briefing on the Institute of the USA and Canada’s study may be found at [www.ceip.org/files/events/events.asp?EventID=706](http://www.ceip.org/files/events/events.asp?EventID=706) (accessed February 7, 2005).
- 93 See the interview with Undersecretary of State John Bolton, “Expounding Bush’s Approach to U.S. Nuclear Policy,” *Arms Control Today*, March 2002, available at [www.armscontrol.org/act/2002\\_03/boltonmarch02.asp](http://www.armscontrol.org/act/2002_03/boltonmarch02.asp) (accessed January 12, 2005).
- 94 Scott D. Sagan, “The Commitment Trap,” *International Security*, 24, no. 4 (Spring 2000): pp. 85–116.

- 95 Linton F. Brooks, "U.S. Nuclear Weapons Policies and Programs," Speech to the Carnegie International Nonproliferation Conference, June 21, 2004, available at [www.ceip.org/files/projects/npp/resources/2004conference/speeches/brooks.doc](http://www.ceip.org/files/projects/npp/resources/2004conference/speeches/brooks.doc) (accessed January 12, 2005). See also Brooks's speech, "U.S. Nuclear Weapons Policies and Programs," delivered at the Symposium "Post-Cold War U.S. Nuclear Strategy: A Search for Technical and Policy Common Ground," Committee on International Security and Arms Control, U.S. National Academy of Sciences, August 11, 2004, available at [www7.nationalacademies.org/cisac/Brooks\\_Presentation.pdf](http://www7.nationalacademies.org/cisac/Brooks_Presentation.pdf). (accessed January 12, 2005).
- 96 J. D. Crouch, assistant secretary of defense for international security policy, stated the position in briefing the Nuclear Posture Review: "We have a responsive force. We may decide at—somewhere along the line that we have to flatten out our reductions because changes have been made in the strategic environment that require us to do that. We may decide that we would have to increase our forces. We may also decide that we could decrease our forces further, or bring our forces down much faster, depending upon the security environment, depending upon technological surprise, and depending upon our ability and our confidence in developing new elements or fielding new elements of the triad. So we are going to be assessing along the way, along this journey, as we reach the president's goal of 1,700 to 2,200 operationally deployed warheads in a decade." See J. D. Crouch, "Special Briefing on the Nuclear Posture Review," Department of Defense, January 9, 2002, available at [www.defenselink.mil/transcripts/2002/t01092002\\_t0109npr.html](http://www.defenselink.mil/transcripts/2002/t01092002_t0109npr.html) (accessed January 12, 2005).
- 97 *2000 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons Final Document*, (New York: 2000), p. 14, available at <http://disarmament.un.org:8080/wmd/npt/2000FD.pdf> (accessed January 13, 2005).
- 98 As Israel does not admit having nuclear weapons, it would comply with its obligation to contribute to nonproliferation by explaining how it could secure and account for its fissile materials.
- 99 The United Kingdom admirably has taken the commitment to nuclear disarmament seriously enough to commission official assessments of how it might be accomplished. According to an official report by the UK Ministry of Defence, "the Government does

not believe that it will ever be possible for any of the relevant States to be able to account with absolute accuracy and without possibility of error or doubt for all the fissile material they have produced for national security purposes.” This conclusion appears plausible not only for the United Kingdom, and raises questions that must be addressed to assess the meaning and feasibility of securely and verifiably eliminating all nuclear arsenals. UK, *Summary Report*.

- 100 *Verification of Nuclear Disarmament: First Interim Report on Studies into the Verification of Nuclear Warheads and Their Components*, Working Paper submitted by the United Kingdom of Great Britain and Northern Ireland to the Preparatory Committee for the 2005 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, April 23, 2003, available at [www.awe.co.uk/Images/n0333117\\_tcm6-1769.pdf](http://www.awe.co.uk/Images/n0333117_tcm6-1769.pdf) (accessed January 12, 2005).
- 101 For a detailed analysis and policy agenda in this area, see Rose Gottemoeller with Rebecca Longworth, *Enhancing Nuclear Security in the Counter-Terrorism Struggle: India and Pakistan as a New Region for Cooperation*, working paper no. 29 (Washington, D.C.: Carnegie Endowment for International Peace, August 2002), available at [www.ceip.org/files/pdf/wp29.pdf](http://www.ceip.org/files/pdf/wp29.pdf) (accessed January 12, 2005).
- 102 See, for example, Michael Krepon and Ziad Haider, eds., *Reducing Nuclear Dangers in South Asia*, Stimson Report no. 50 (Washington, D.C.: Henry L. Stimson Center, February 2004), available at [www.stimson.org/southasia/pubs.cfm?ID=92](http://www.stimson.org/southasia/pubs.cfm?ID=92) (accessed January 12, 2005); see also reports by the Kashmir Study Group, available at [www.kashmirstudygroup.com](http://www.kashmirstudygroup.com) (accessed January 12, 2005), and the International Crisis Group, available at [www.crisisweb.org/home/index.cfm?id=1268&l=2](http://www.crisisweb.org/home/index.cfm?id=1268&l=2) (accessed January 12, 2005).
- 103 For a more complete discussion of this issue, see Ashley J. Tellis, *India and Missile Defense* (Washington, D.C.: Carnegie Endowment for International Peace, forthcoming 2005).
- 104 Egypt, Iran, Iraq, Israel, Libya, and Syria.
- 105 For example, one of the grievances cited by al Qaeda’s strategist, Ayman Al-Zawahiri, is that “the Americans and the Jews” have weakened Egypt and other Muslim states “through signing peace



agreements and *treaties that ban weapons of mass destruction for us only* [emphasis added], disarming Sinai, and allowing direct U.S. occupation of our land and holding joint military exercises.” Ayman Al-Zawahiri, *Knights under the Prophet’s Banner* (Al-Sharq Al-Awsat: London, 2001), available at [www.fas.org/irp/world/para/ayman\\_bk.html](http://www.fas.org/irp/world/para/ayman_bk.html) (accessed January 12, 2005).

- 106 Daniel Yankelovich, “Cutting the Lifeline of Terror: What’s Next After Iraq,” (transcript of remarks, New York Academy of Sciences, July 14, 2004), pp. 24–25, available at [www.publicagenda.org/aboutpa/pdfs/cutting\\_the\\_lifeline\\_of\\_terror.pdf](http://www.publicagenda.org/aboutpa/pdfs/cutting_the_lifeline_of_terror.pdf) (accessed February 2, 2005).
- 107 Norman Wulf, Interview with Ralph Dannheisser, April 21, 2000, available at <http://hongkong.usconsulate.gov/uscn/wh/2000/042101.htm> (accessed January 12, 2005). In speaking of Israel’s “nuclear weapons option,” the U.S. representative acknowledged this capability more starkly than Israel ever has. Secretary of State Colin Powell reaffirmed at a press briefing that “it has always been U.S. policy that we would like to see that whole region free of weapons of mass destruction.” Colin Powell, “Foreign Press Center Briefing,” Remarks in Washington, D.C., April 15, 2003, available at [www.state.gov/secretary/rm/2003/19662.htm](http://www.state.gov/secretary/rm/2003/19662.htm) (accessed January 12, 2005).
- 107 The chemical and biological weapons conventions conclude that there is no legitimate basis for possessing these weapons. The greatest and perhaps only legitimate ground for possessing nuclear weapons is to deter threats to the existence of the possessing state or its allies. It is not surprising, then, that a state facing adversaries that reject its right to exist would perceive an existential threat and not sign or implement agreements requiring it to forgo acquisition of the sort of strategic deterrence that nuclear weapons may provide. Even if such a deterrent is not militarily necessary, relinquishing such a deterrent may be politically impossible in the face of existential threats.