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How Do We Get Rid of These Things? Dismantling Excess Weapons While Protecting the Environment

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HOW DO WE GET RID OF THESE THINGS?: DISMANTLING EXCESS WEAPONS WHILE PROTECTING THE ENVIRONMENT

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I. INTRODUCTION

The startling successes of contemporary international arms control negotiations call to mind the old aphorism that one should be careful about what one wishes for, because the wish just might come true.

Today, disarmament diplomacy has wrought unprecedented triumphs across a wide range of global bargaining issues, producing a series of watershed treaties that offer spectacular new advantages for the security of the United States and for the prospect of enduring world peace. At the same time, however, these unanticipated *negotiation* breakthroughs have themselves generated unforeseen *implementation* problems, spawning a host of novel difficulties for which the traditional tools and methods of arms control are ill-prepared or inappropriate.

This Article examines one such difficulty: the potential legal and political conflict posed when a dramatic and crucial new arms control agreement, the 1993 Chemical Weapons Convention (CWC),[1] confronts the equally fundamental and pressing dictates of national environmental protection policy. In short, the CWC will mandate the peaceful dismantling of massive national arsenals of now obsolete, but still exceptionally lethal chemical weapons (CW) agents, armaments,

* Professor of Law, Georgetown University Law Center. The author gratefully notes the support of the Lawyers Alliance for World Security in the preparation of this Article. The author thanks Hope Babcock, George Bunn, Barry Kellman, and Amy E. Smithson for their comments and suggestions on an earlier draft of this Article, and Jonathan Jackel for his creative and persistent research assistance, supported by a grant from the Ford Foundation.

[1] Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction, *opened for signature* Jan. 13, 1993, 32 I.L.M. 800 [hereinafter Chemical Weapons Convention or CWC]. The CWC will enter into force 180 days after 65 countries have deposited an instrument of ratification, but no earlier than January 1995. *Id.* art. XXI, para. 1.

and facilities—and the destruction must be accomplished relatively promptly, reliably, and under the supervision of international inspectors. In the United States, however, long-standing environmental legislation, starting with the National Environmental Policy Act of 1969 (NEPA)[2] and continuing through a sequence of resource-specific anti-pollution enactments, mandates punctilious adherence to procedural safeguards (such as the preparation of disclosive Environmental Impact Statements) and compliance with stringent national and local substantive standards on emissions, hazardous wastes, community participation, and safety.

At present, there is no established technology that can credibly promise to dismantle the United States CW stockpile in a manner that is entirely consistent with both of these sets of legal compulsion. Unless some Solomonic and politically tolerable mechanism can quickly be invented, therefore, the United States (and other treaty parties) may be forced to depart from one, or both, of our hard-fought priorities: it is not entirely clear, at this point, that the United States can simultaneously remain fully faithful to the language and spirit of both the CWC and the NEPA. Under those circumstances, arms controllers and environmentalists are suddenly cast into the uncomfortable, mutually-antagonistic posture of asking which set of laws should the country abandon, modify, defer, or violate?

Following this Introduction, Part II of the Article addresses the public policy of arms control, highlighting the accomplishments—especially the provisions requiring weapons dismantling—of earlier arms control agreements and contrasting them with the greater exactitude of the CWC. That Part demonstrates why the novel approach to the regulation of chemical weapons will pose challenges far greater than those associated with prior generations of disarmament obligations pertaining to nuclear, biological, conventional, or other weaponry. Part III addresses the public policy of environmental protection, summarizing what NEPA and its legislative and judicial progeny now require before (and while) undertaking certain major federal actions. It constitutes essentially a primer highlighting those aspects of American environmental law that will be most relevant to chemical weapons disposal. Part IV next identifies two prominent types of jurisprudential issues arising in this hierarchy-of-laws context under the Supremacy Clause[3] of the Constitution. One set of questions con-

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2 National Environmental Policy Act, Pub. L. No. 91-190, 83 Stat. 852 (codified at 42 U.S.C. § 4321) (1970).

3 U.S. CONST. art. VI, § 2 ("This Constitution, and the Laws of the United States which shall be made in Pursuance thereof; and all Treaties made, or which shall be made, under the Authority of the United States, shall be the supreme Law of the Land; and the Judges in every State shall be bound thereby, any Thing in the Constitution or Laws of any State to the Contrary notwithstanding.").

cerns the legal priority accorded to treaties (such as the CWC) versus statutes (such as NEPA); the other addresses the pre-emption *vel non* of state and local environmental regulation by overarching federal policy.

In Part V, the Article scrutinizes the current, deeply flawed effort to fashion a technological solution to these conflicts—the "baseline" incineration approach embodied in the Johnston Atoll Chemical Agent Disposal System (JACADS). The United States Army's prototype facility, located on a minute, isolated Pacific Ocean island, JACADS relies upon a dedicated high-temperature, multi-furnace process which, based on performance to date, augurs to serve perfectly the interests of neither arms control nor environmentalism. The prospect of replicating this experimental facility at eight sites around the continental United States, as the Army currently plans, is therefore daunting—for its social and ecological implications, as well as for its estimated $8.6 billion pricetag.[4]

The international ramifications of this dilemma are described in Part VI, where the cognate problems—and the associated domestic political and legal disquietude—of Russia and other key CWC countries are displayed. The CWC's dismantling mandate is no more accessible in other nations than it is in the United States, as the imperatives of deweaponization and environmental protection continue to clash worldwide. Russia alone has more CW than does the United States (an estimated forty thousand metric tons of chemical agent in Russia, compared to approximately thirty thousand tons for the United States) and fewer technological and financial resources available to cope with the challenges.[5]

Part VII then recapitulates the overall problem posed by this conflict of social interests and proposes some solutions. These include recommendations for improving the operation of JACADS, exploring technological alternatives to that baseline approach, and—as a temporary expedient—deferring some aspects of the problem by distinguishing between "deweaponizing" the CW arsenal in the short term

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[4] The eventual pricetag for the chemical weapons stockpile destruction effort is difficult to calculate, as the program undergoes recurrent modifications and stretch-outs and as the official estimates continuously rise. The current projection is $8.6 billion. *Department of Defense Authorization for Appropriations for Fiscal Year 1994 and the Future Years Defense Program: Hearings on S. 1298 Before the Comm. on Armed Services*, 103d Cong., 1st Sess. 302 (1993) (statement of Michael W. Owen, Acting Assistant Secretary of the Army) [hereinafter Owen Statement]. *See also* Michael Satchell, *Death Rattle of Poison Gas*, U.S. NEWS & WORLD REP., Sept. 13, 1993, at 54 (estimating $9 billion or more). Not long ago, the Army had consistently publicly placed the total cost of the program at $7.9 billion. Amy E. Smithson, *Chemical Destruction: The Work Begins*, BULL. ATOM. SCIENTISTS, Apr. 1993, at 38-39. The completed *destruction* program may eventually cost approximately 100 times as much as the original *construction* of the chemical weapons. Timothy M. Beardsley, *Easier Said Than Done*, SCI. AM., Sept. 1990, at 48, 50.

[5] Smithson, *supra* note 4, at 38-39.

and "destroying" it over a longer time. The Army's current eight-site plan for constructing CW incinerators should be abandoned, while the essence of NEPA and fundamental goals of the CWC should be simultaneously honored via a pragmatic compromise approach.

Finally, some concluding comments are offered, reflecting upon any democracy's inherent difficulty in making decisions about this type of complex, pressing, and obtuse social and scientific dilemma. Public choice theory confirms the empirical investigation contained in this Article, identifying the recurrent obstacles to rational group policy-setting, especially under conditions of legal uncertainty and political urgency.

Overall, the thesis of this Article is that environmentalism and arms control, two crucial sectors of American and international public life that have long existed in segregated "parallel universes," are now starting to intersect. Each of these areas contains its own hard choices, irreconcilable alternatives, and political controversies; when the two sets collide, the uncertainties and the barriers can become paralyzing. Nonetheless, analysts and government officials must attempt to make sense of the morass, plowing some tenable course to serve the full range of United States and global interests. In the case of chemical weapons dismantling, these competing concerns can be accommodated—but only partially, temporarily, and uncomfortably.

II. THE PUBLIC POLICY OF ARMS CONTROL

Throughout the twentieth century, Americans and others have labored mightily to constrain the growth of their respective military arsenals, attempting to reduce the likelihood of war, the financial costs of defense preparations, and the devastating consequences of international conflict.[6] After World War II, as the disastrous implications of general warfare became more apparent, efforts at achieving a broad range of disarmament measures accelerated.[7] Only in the post-cold war era, however, has it become possible to achieve true breakthroughs, and recent years have witnessed sudden successes constraining nuclear, conventional, and other weaponry in dazzling fashion.[8]

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[6] *See* 22 U.S.C. § 2551 (Supp. 1990) (setting forth the congressional statement of purpose in enacting Arms Control and Disarmament Act of 1961).

[7] *See generally* GEORGE BUNN, ARMS CONTROL BY COMMITTEE: MANAGING NEGOTIATIONS WITH THE RUSSIANS (1992); U.S. ARMS CONTROL AND DISARMAMENT AGENCY, ARMS CONTROL AND DISARMAMENT AGREEMENTS: TEXTS AND HISTORIES OF THE NEGOTIATIONS (1990) [hereinafter ACDA TREATY BOOK].

[8] *See, e.g.*, Treaty on the Further Reduction and Limitation of Strategic Offensive Arms, Jan. 3, 1993, U.S.-U.S.S.R. (not in force) [hereinafter START II], *reprinted in* ARMS CONTROL TODAY, Jan.-Feb. 1993, at START II Supp. 5; Treaty on the Reduction and Limitation of Strategic Offensive Arms, July 31, 1991, U.S.-U.S.S.R., *available in* Senate Treaty Document 102-20,

The subject of the actual dismantling of the excess weapons, however, has only barely been addressed, and the arms control community is now engaged for the first time in sustained, controversial analysis of the most suitable mechanisms and legal procedures for destroying the military capabilities so laboriously built up by prior generations.[9]

A. Dismantling Obligations Under Prior Treaties

Earlier iterations of arms control efforts had adopted several distinct attitudes toward the disposal of the regulated weaponry. At the simplest level, the 1925 Geneva Protocol[10] on chemical weapons constituted essentially just a "non-use" regime, permitting its parties to retain and augment their CW arsenals unconstricted.[11] Other treaties basically amounted to mere geographic limitations upon the deployment or positioning of weapons, rather than prohibitions or limitations upon their possession, and therefore did not mandate any numerical reductions.[12] In a similar vein, some arms control treaties

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102-32 (not in force) [hereinafter START I]; Treaty on Conventional Armed Forces in Europe, Nov. 19, 1990, 30 I.L.M. 6 [hereinafter CFE Treaty].

9 *See generally* STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE, CHEMICAL WEAPONS: DESTRUCTION AND CONVERSION (1980); Lawrence E. Rouse, *The Disposition of the Current Stockpile of Chemical Munitions and Agents*, 121 MIL. L. REV. 17 (1988); Lois R. Ember, *Chemical Weapons Disposal: Daunting Challenges Still Ahead*, CHEMICAL & ENGINEERING NEWS, Aug. 13, 1990, at 9; Trevor Findlay, *Chemical Disarmament and the Environment*, ARMS CONTROL TODAY, Sept. 1990, at 12; Triana Silton, *Out of the Frying Pan. . .*, ECOLOGIST, Jan.-Feb. 1993, at 18; Sara Wylie, The Army's Chemical Weapons Disposal Program: Noncompliance with NEPA (1992) (unpublished J.D. seminar paper, Georgetown University Law Center, on file with the author).

10 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].

11 Under the Geneva Protocol, parties undertook not to use certain chemical and biological weapons in international conflict; however, several reservations to the treaty essentially converted it into a prohibition against the *first* use of the regulated weaponry. *Id.* The treaty contains no provisions regarding the dismantling of the weapons or the inspection of suspicious activities. *Id.*

12 For example, the Antarctic Treaty, Dec. 1, 1959, 12 U.S.T. 794, 402 U.N.T.S. 71 (entered into force June 23, 1961), prohibits the emplacement in Antarctica of certain weapons, but does not limit them elsewhere. Similarly, the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 18 U.S.T. 2410 (entered into force Oct. 10, 1967), and the Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Seabed and the Ocean Floor and in the Subsoil Thereof, Feb. 11, 1971, 23 U.S.T. 701, 610 U.N.T.S. (entered into force May 18, 1972) [hereinafter The Seabed Arms Control Treaty], both carve out certain "special areas" to be relatively free from military competition, but do not inhibit their parties' possession of weapons elsewhere. The Treaty for the Prohibition of Nuclear Weapons in Latin America, Feb. 14, 1967, 22 U.S.T. 762, 634 U.N.T.S. 281, bans nuclear weapons programs by Latin American states; through its protocols, other countries also undertake not to conduct their nuclear weapons activities within the geographic area defined by the treaty. *See* Additional Protocol II to the Treaty for the Prohibition of Nuclear Weapons in Latin America, Feb. 14, 1967, 22 U.S.T. 754, 634 U.N.T.S. 364.

attempted to constrain the *testing* or development of new types of weapons, but these, too, failed to prohibit continued production or deployment of the existing types.[13] Moreover, several prominent international arrangements—notably, the 1968 Non-Proliferation Treaty[14]—are designed to inhibit the spread of a designated weapon capability, without directly requiring the states that already possess the specified arms to dismantle or otherwise limit them.[15]

In other instances, a treaty established numerical ceilings upon the parties' permitted weaponry, but deliberately set those caps so high that little, if any, actual dismantling was contemplated.[16] The two SALT I documents (the 1972 Anti-Ballistic Missile (ABM) Treaty[17]

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13 The Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water, Aug. 5, 1963, 14 U.S.T. 1313, 480 U.N.T.S. 43 [hereinafter LTBT]; the Treaty on the Limitation of Underground Nuclear Weapons Tests (Threshold Test Ban Treaty), July 3, 1974, U.S.-U.S.S.R., 13 I.L.M. 967 [hereinafter TTBT]; the Treaty on Underground Nuclear Explosions for Peaceful Purposes, May 28, 1976, 15 I.L.M. 893 U.S.-U.S.S.R. [hereinafter PNET]; the Verification Protocol to the Treaty on the Limitation of Underground Nuclear Weapon Tests, June 1, 1990, U.S.-U.S.S.R., 29 I.L.M. 969; and the Verification Protocol to the Treaty on Underground Nuclear Explosions for Peaceful Purposes, June 1, 1990, U.S.-U.S.S.R., 29 I.L.M. 1025, together regulate the size, location, purpose, and other characteristics of nuclear explosions. These treaties have played a key role in inhibiting the development of new generations of nuclear weaponry, but they do not require the parties to dismantle any existing devices. Similarly, the Agreement on Notification of Launches of Intercontinental Ballistic Missiles and Submarine-launched Ballistic Missiles, May 31, 1988, U.S.-U.S.S.R., 27 I.L.M. 1200, requires the parties to notify each other in advance of the test firing of strategic weaponry, but does not obligate them to dismantle or otherwise limit the arms.

14 Treaty on the Non-Proliferation of Nuclear Weapons, July 1, 1968, 21 U.S.T. 483, 729 U.S.T.S. 161 (entered into force Mar. 5, 1970) [hereinafter NPT]. The NPT bars its parties from assisting additional countries' efforts at acquiring a nuclear weapons capacity, but it only marginally commits the states that already possess those weapons to pursue efforts at nuclear disarmament. *Id.* arts. I, II, VI.

See also the nascent Missile Technology Control Regime, a cartel among the relatively technologically advanced countries, designed to inhibit other countries which might be attempting to acquire the capacity to deploy or produce ballistic missiles. Members of the Control Regime pledge themselves to resist proliferation attempts, but they have not undertaken to reduce their own reliance upon those weapons. John R. Harvey & Uzi Rubin, *Controlling Ballistic Missiles: How Important? How To Do It?*, ARMS CONTROL TODAY, Mar. 1992, at 13.

15 Many countries have complained about the "discriminatory" aspects of key arrangements such as the NPT, which allows states that already possess nuclear weapons to retain them, but prohibits other states from acquiring those devices. Joseph F. Pilat & Robert E. Pendley, *Conclusions*, *in* BEYOND 1995: THE FUTURE OF THE NPT REGIME 165 (Joseph F. Pilat & Robert E. Pendley eds., 1990).

16 Skeptics complained that throughout the Cold War era, the leading nuclear weapon states cynically avoided accepting real constraints upon their weapons activities, pursuing instead policies which *appeared* to support disarmament, but which in reality allowed them essentially unfettered discretion to proceed with their hegemonic weapons programs. *See* ALVA R. MYRDAL, THE GAME OF DISARMAMENT: HOW THE UNITED STATES AND RUSSIA RUN THE ARMS RACE 294 (1976).

17 Treaty on the Limitation of Anti-Ballistic Missile Systems, May 26, 1972, U.S.-U.S.S.R., 23 U.S.T. 3435 [hereinafter ABM Treaty].

and the 1972 Interim Agreement on Strategic Offensive Arms[18]) and the 1979 SALT II Treaty[19] essentially fit this description.[20] Even in those cases where a treaty purported to abolish a category of weaponry altogether, as with the 1972 Biological Weapons Convention (BWC),[21] it typically dealt with weapons that no country had actually deployed in sizeable numbers, and little attention was consequently paid to the question of how to verifiably and safely dispose of the now-illegal arms.[22]

Moreover, on those occasions when the disarmament obligations did amount to compulsory dismantling, the enforcement timetable

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18 Interim Agreement on Certain Measures With Respect to the Limitation of Strategic Offensive Arms, May 26, 1972, U.S.-U.S.S.R., 23 U.S.T. 3462 (entered into force Oct. 3, 1972) [hereinafter SALT I Interim Agreement].

19 Treaty on the Limitation of Strategic Offensive Arms, June 18, 1979, U.S.-U.S.S.R., 18 I.L.M. 1138 (not in force) [hereinafter SALT II Treaty].

20 For example, the ABM Treaty, *supra* note 17, limited the two parties to no more than two anti-ballistic missile sites apiece, at a time when neither side had completed any. ACDA TREATY BOOK, *supra* note 7, at 152. Similarly, the SALT I Interim Agreement, *supra* note 18, was essentially a "freeze" on the parties' arsenals of intercontinental-range ballistic missiles, allowing each side to retain its existing stockpiles (and to complete the construction of any weapons then being built). ACDA TREATY BOOK, *supra* note 7, at 167. The SALT II Treaty, *supra* note 19, would have required some modest dismantling of American nuclear weapons, and a bit more reduction on the Soviet side, but these could have been accomplished merely by retiring selected obsolete weapons, without altering either country's true military capability very much. United States Department of State, *SALT II: The Path of Security and Peace*, CURRENT POL'Y, Apr. 1979, at 3; Edward N. Luttwak, *Ten Questions about SALT II*, COMMENTARY, Aug. 1979, at 21.

21 Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, Apr. 10, 1972, 26 U.S.T. 583, 1015 U.S.T.S. 163 (entered into force Mar. 26, 1975) [hereinafter BWC].

22 In the case of biological weapons (BW), the United States had unilaterally decided to renounce those arms and to dispose of its entire BW stockpile even before treaty negotiations were initiated. The American military leaders had determined that biological weaponry was of so little battlefield utility (being uncontrollable, unsafe, and unpopular) that it was relatively easy to give up that military option, regardless of what other countries might do or not do in response. ACDA TREATY BOOK, *supra* note 7, at 129-30. The BWC, therefore, was negotiated with precious little attention to dismantling procedures, verification arrangements, or dispute-resolution mechanisms—omissions that some countries are now belatedly attempting to redress in the aftermath of unresolved compliance controversies. Nicholas A. Sims, Reinforcing Biological Disarmament: Issues in the 1991 Review (1991) (discussion draft, on file with the author). Article II of the BWC states simply that each party is to destroy its biological "agents, toxins, weapons, equipment and means of delivery" within nine months after the treaty enters into force, but no mechanisms are established to monitor or control these efforts, or to ensure their environmental soundness. BWC, *supra* note 21, art. II.

A similar set of conditions underlay the negotiations of the Seabed Arms Control Treaty, *supra* note 12, and the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, May 18, 1977, 31 U.S.T. 333, T.I.A.S. 9614 [hereinafter EnMod Convention]. Both these agreements prohibit weapons systems or applications that no country has ever built or used. ACDA TREATY BOOK, *supra* note 7, at 107-08, 211. These seemingly bold absolute bans may have prophylactic utility as arms control measures, but they do not raise any issues about a dismantling timetable or process.

was generally gradual;[23] the quantities and locations of the weapons were well-known;[24] and the verification methodology was mainly via remote, satellite-based reconnaissance, as opposed to intrusive on-site inspection.[25] Most important, these treaties typically required destruction of only the "launcher" or the "delivery vehicle" (*i.e.*, the missile silo, missile, airplane, or other device for containing the warhead and transporting it to the intended target) instead of mandating disassembly of the explosive or lethal element (*i.e.*, the warhead or bomb) itself.[26] Therefore, treaty negotiators did not usually concern themselves with the interstices of the dismantling process, being content to leave the operational details of the elimination to subsequent deliberations—political conditions simply did not yet permit the disarmers to pursue more effective and creative solutions.[27]

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[23] For example, under the SALT II Treaty, *supra* note 19, each side was allowed an original ceiling of 2400 strategic nuclear weapons, and that aggregate was later to be reduced to 2250. Parties were allowed approximately 18 months after signature of the treaty to reach the 2400 level, and a further 12 months to complete the dismantling required to reach the lower aggregate. *Id.* art. III, para. 1-2, XI, para. 3.

[24] The United States has long enjoyed high confidence in its ability to locate, identify, and count the large, immobile weapon systems (*e.g.*, ICBM silos, ABM radars, submarine bases) which were the primary focus of the early SALT reductions. *See generally* Les Aspin, *The Verification of the SALT II Agreement*, SCI. AM., Feb. 1979, at 38.

[25] *See* T.R. Reid, *Dismantling Nuclear Missiles is a Titanic Task*, WASH. POST, Apr. 30, 1985, at A3. A primary mechanism for monitoring arms control treaties has been the array of so-called National Technical Means (NTM) of verification. NTM include the network of photo-reconnaissance satellites, long distance seismic sensors, over-the-horizon radars, and other apparatus capable of remote sensing of military targets. *See also* Aspin, *supra* note 24. NTM may be contrasted to the more proximate forms of treaty monitoring, including various programs of on-site inspection (OSI) through which foreign personnel are permitted to visit the site of suspicious activities. *See* LEWIS A. DUNN, ARMS CONTROL VERIFICATION AND THE NEW ROLE OF ON-SITE INSPECTION (1990).

[26] To a large extent, the early SALT accords adopted the strategy of focusing on the limitation and dismantling of delivery systems (rather than of the nuclear warheads) because of verification considerations: only the launchers, airplanes, and submarines were large enough to be monitored by NTM. Neither side was yet willing to contemplate intrusive on-site inspection (of the sort that would be necessary, for example, to count individual nuclear devices reliably), so the treaties were crafted to embrace only the most conspicuous items. As later generations of arms control agreements began to deal with weaponry that was small, mobile, or malleable, the monitoring challenges multiplied, and additional verification methodologies, especially intrusive on-site inspection, became necessary. Kenneth L. Adelman, Verification in an Age of Mobile Missiles, Address Before the City Club in San Diego (Sept. 1987), *in* DEP'T ST. BULL. at 27; William J. Broad, *Russian Says Soviet Atom Arsenal Was Larger Than West Estimated*, N.Y. TIMES, Sept. 26, 1993, § 1, at 1.

[27] For example, the ABM Treaty simply requires that excess equipment "shall be destroyed or dismantled under agreed procedures within the shortest possible agreed period of time." ABM Treaty, *supra* note 17, art. VIII. Subsequent accords then established the applicable principles and outlined the procedures to govern the requisite ABM dismantling—but even these subsidiary accords did not approach the level of detail and specificity crafted into later treaties. Protocol to the Treaty on the Limitations of Anti-Ballistic Missile Systems, July 3, 1974, U.S.-U.S.S.R., 27 U.S.T. 1647; Supplementary Protocol to the Protocol on Procedures Governing the Replacement, Dismantling or Destruction, and Notification Thereof, For ABM Systems and

Even at this modest level of arms control, controversies were frequent. Critics asserted that by focusing exclusively on the launchers and delivery vehicles, the United States was inadvertently permitting the Soviet Union or others to continue to stockpile dangerous weaponry without effective limits. Allegedly, these latent arms could be brandished with decisive effect in some hypothetical "breakout" scenario, in which a rogue country would suddenly abrogate its disarmament obligations, pull a ream of functioning weaponry out of well-maintained retirement, quickly remanufacture any necessary associated elements, and then seize an advantage over other countries that had not so assiduously sustained their re-armament capabilities.[28]

Similarly, there was plenty of grist for critics to argue that the Soviets had incompletely complied with those few treaties that did mandate some degree of dismantling.[29] Even where the retired weaponry was patently no longer useable—the equivalent of being disassembled and left to rust in an open field—punctilious attention to the legal standards seemed to require more.[30]

Through it all, the leading negotiating parties, as well as those monitoring their progress, consistently reasserted their dedication to

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Their Components of July 3, 1974 (Oct. 28, 1976) (unpublished document on file with author) [hereinafter Protocol on Procedures Governing ABM Replacement].

28 SALT's focus on limiting delivery systems, rather than nuclear devices, was criticized by Ralph K. Bennett, *The Fateful Illusions of SALT II*, READER'S DIG., May 1979, at 97; Edward L. Rowny, START in a Historical Perspective, Address Before Atlanta Kiwanis Club (Apr. 10, 1984), *in* CURRENT POLICY No. 563, Apr. 10, 1984, at 3. *See also* Michael R. Boldrick, *START Again*, REASON, Aug.-Sept. 1993, at 60 (asserting similar arguments regarding START I and II treaties).

29 *See* Robert W. Buchheim & Philip J. Farley, *The U.S.-Soviet Standing Consultative Commission*, *in* U.S.-SOVIET SECURITY COOPERATION: ACHIEVEMENTS, FAILURES, LESSONS 254 (Alexander L. George et al. eds., 1988).

30 The test for efficacy in dismantling could plausibly be stated as the effort to ensure that the object (weapon, warhead, silo, etc.) is so completely disassembled that the task of reconstituting it would be virtually as difficult (in speed, financial cost, risk of being detected, etc.) as the task of starting from scratch in building a completely new version of the item. Letter from Manfred Eimer, former Assistant Director, U.S. Arms Control and Disarmament Agency, to David A. Koplow, Professor of Law, Georgetown University Law Center (Mar. 19, 1993) (on file with the author). *See also* Protocol on Procedures Governing ABM Replacement, *supra* note 27, art. III.

In implementing the SALT I accords, there were occasions upon which the Soviet Union was tardy or incomplete in effectuating the dismantling procedures. These omissions carried no military significance, but were nonetheless pursued in detail in high-level diplomacy. U.S. DEP'T OF STATE, SALT ONE: COMPLIANCE, SALT TWO: VERIFICATION, SELECTED DOCUMENTS No. 7, at 7 (1978); Sidney N. Graybeal & Michael Krepon, *SCC: Neglected Arms Control Tool*, BULL. ATOM. SCIENTISTS, Nov. 1985, at 30, 32; Robert W. Buchheim & Dan Caldwell, The US-USSR Standing Consultative Commission: Description and Appraisal 11 (May 1983) (unpublished working paper, on file with the author); Buchheim & Farley, *supra* note 29; Gloria Duffy, *Arms Control Treaty Compliance*, *in* 1 ENCYCLOPEDIA OF ARMS CONTROL AND DISARMAMENT 279 (Richard D. Burns ed., 1993); Sidney N. Graybeal & Michael Krepon, *Making Better Use of the Standing Consultative Commission*, 10 INT'L SECURITY 183 (1985).

the goal of more meaningful reductions.[31] Numerous treaties and international declarations cited, with almost liturgical fealty, the ultimate objectives of "nuclear disarmament" or "general and complete disarmament" even as they were notching only very small increments toward that nirvana.[32] The actual practice of arms control gradualism succeeded in bringing only a precious few weapons from the active stockpile to the scrapyard.

This lackadaisical approach to dismantling, however, was altered forever with the 1987 Intermediate-Range Nuclear Forces (INF) Treaty,[33] which abolished an entire category of deployed nuclear arms and established exacting procedures for destruction or retirement of the missiles. Under the INF Treaty, unique elimination procedures are identified for each category of weaponry and supporting equipment. These procedures define specific methods, such as explosive demolition, burning, crushing, flattening, or cutting the item into pieces.[34] The INF Treaty set a new standard for punctilious attention to the details of the dismantling process,[35] and the eliminations it contemplated were all completed on schedule, with a minimum of political or technological snafus.[36]

For all of this excruciating exactitude, however, the INF Treaty still did not require destruction of the nuclear warheads formerly

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31 *See* NPT, *supra* note 14, art. VI (committing the parties to far-reaching measures toward cessation of the nuclear arms race, nuclear disarmament, and general and complete disarmament).

32 *See generally* SALT II Treaty, *supra* note 19, pmbl.; BWC, *supra* note 21, pmbl.; ABM Treaty, *supra* note 17, pmbl.

33 Treaty on the Elimination of Their Intermediate-Range and Shorter-Range Missiles, Dec. 8, 1987, U.S.-U.S.S.R., 27 I.L.M. 84 [hereinafter INF Treaty].

34 Protocol on Procedures Governing the Elimination of Missile Systems Subject to the Treaty on the Elimination of Their Intermediate Range and Shorter-Range Missiles to the INF Treaty, Article II., Dec. 8, 1987, U.S.-U.S.S.R., 27 I.L.M. 183. For example, the dismantling of the Soviet Union's SS-20 system requires separate steps applicable to the missile, the launch canister, and the launcher. To dispose adequately of just the launcher, the protocol requires removal of various mechanisms, instrumentation, and mountings; cutting the components at locations that are not assembly joints into two pieces of equal size; and severing an aft portion of the chassis at least 0.78 meters in length. *Id.* art. II, para. 10.

35 *See generally* JOSEPH P. HARAHAN, ON-SITE INSPECTIONS UNDER THE INF TREATY: A HISTORY OF THE ON-SITE INSPECTION AGENCY AND INF TREATY IMPLEMENTATION 1988-1991 (1993). The Treaty also inaugurated unprecedented verification procedures, including a pervasive set of different types of on-site inspections, allowing each party to monitor the other's progress toward elimination of the stockpile. *See* Protocol on Procedures Governing the Elimination of Missile Systems Subject to the Treaty on the Elimination of Their Intermediate-Range and Shorter-Range Missiles, *supra* note 34, art. II, para. 2.

36 HARAHAN, *supra* note 35. The INF Treaty eventually required the elimination of over 7600 items and the inspection of 133 Soviet sites and 31 U.S. sites. All of these activities were completed within the applicable time limitations, at a cost to the United States of approximately $522 million. U.S. GEN. ACCOUNTING OFFICE, INTERMEDIATE-RANGE NUCLEAR FORCES TREATY IMPLEMENTATION, NSIAD-91-262 1-4 (1991).

deployed atop the destroyed ballistic and cruise missiles.[37] Both the United States and the Soviet Union contemplated the possibility of reusing those explosive devices, or the fissile components, in future generations of weaponry, and they both insisted upon retaining the right to stockpile the radioactive material, even as they were crushing and burning the INF delivery vehicles.[38] This approach, under which the INF Treaty arguably did, or did not, constitute a real reduction in the nuclear threat, was roundly criticized by Senator Jesse Helms, among others, who alleged that, "The truth is that not one nuclear weapon—not a single nuclear warhead—will be destroyed under the terms of this Treaty."[39]

The INF Treaty, furthermore, provides inadequate guidance for the CWC dismantling process in another important respect because it fails to include any specifications related to environmental protection. Neither the INF Treaty itself, nor its detailed protocols, established any standards or articulated any principles to circumscribe the environmental impacts of the disarmament.[40] Even the simple expedient of disposing of unarmed missiles by launching them into the ocean was approved.[41]

Other recent arms control accords have adopted similar postures. The 1991 START I[42] and 1993 START II[43] agreements reflected the Reagan and Bush administrations' view that real reductions in strategic nuclear arsenals, rather than simple caps on the rate of increase, were essential.[44] The mandated "deep cuts" in strategic weaponry will alter forever the prior "balance of terror," and the intrusive verifica-

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37 Protocol on Procedures Governing the Elimination of Missile Systems Subject to the Treaty on the Elimination of Their Intermediate-Range and Shorter-Range Missiles, *supra* note 34, art. II, para. 3; U.S. ARMS CONTROL AND DISARMAMENT AGENCY, UNDERSTANDING THE INF TREATY 21.

38 *See generally* Robert S. Norris & William M. Arkin, *Beating Swords into Swords*, BULL. ATOM. SCIENTISTS, Nov. 1990, at 14-16 (stating that nuclear warheads retired from INF missiles are repackaged as B61 bombs).

39 The INF Treaty, Report of the Senate Comm. on Foreign Relations, S. Exec. Doc. No. 100-15, 100th Cong., 2d Sess. 184 (1988) (setting forth Sen. Helms's views).

40 The effectuation of the INF Treaty's destruction requirements did raise environmental concerns. The open air "static firing" of the solid fuel Pershing missiles in Utah, Colorado, and Texas generated huge plumes of noxious smoke, sparking research into alternative disposal technologies. William J. Broad, *New Methods Sought To Dispose of Rockets With No Harm to Earth*, N.Y. TIMES, Sept. 17, 1991, at C4.

41 INF Treaty, *supra* note 33, art. X, para. 5; Protocol on Procedures Governing the Elimination of Missile Systems Subject to the Treaty on the Elimination of Their Intermediate-Range and Shorter-Range Missiles, *supra* note 34, art. III.

42 *See* START I, *supra* note 8.

43 *Id. See* START II, *supra* note 8.

44 Pat Towell, *Turning the Goals of One Presidency into a Treaty for Those Who Follow*, 50 CONG. Q. WKLY. REP. 3070 (1992); Dunbar Lockwood, *START: An Essential Step in a New Era*, ARMS CONTROL TODAY, Nov. 1991, at START Supp. 2. *But see* Boldrick, *supra* note 28, (criticizing START for not going far enough to reduce threat).

tion arrangements provide a degree of openness previously considered unthinkable between suspicious superpower antagonists.[45] Hundreds of missile launchers, submarines, and airplanes[46]—but again, not necessarily the actual warheads[47]—will be reduced by both sides in sequential phases over a period of years.[48] The START accords extend the verification breakthroughs initiated in the INF Treaty, including agreement upon a system of "portal/perimeter" monitoring, whereby each party allows the other to station permanent inspectors outside the formerly secret facilities where missile components or other sensitive military apparatus are produced.[49] In some instances, a facility itself is to be disassembled or converted to civilian applications. In other cases, foreign inspectors are entitled to enter

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45 *See generally* KERRY M. KARTCHNER, NEGOTIATING START: STRATEGIC ARMS REDUCTION TALKS AND THE QUEST FOR STRATEGIC STABILITY SECURITY (1992); STROBE TALBOTT, THE MASTER OF THE GAME: PAUL NITZE AND THE NUCLEAR PEACE (1988).

46 START I establishes benchmarks for the dismantling of weaponry at 36, 60, and 84 months after the treaty enters into force. START I, *supra* note 8, art. II. A protocol then defines the precise procedures relevant to the effective dismantling of each type of weaponry—as well as selected related facilities—covered by the accord. *Id.* The treaty not only limits the delivery vehicles and associated instruments, it also, for the first time, effectively caps the "throw-weight" of the missile fleets, by placing a ceiling upon the total tonnage of weaponry available to each side. *Id.* art. II, para. 3.

The START II Treaty adopts the START I structure (including the key verification arrangements) and advances the disarmament process by providing for substantially deeper reductions in strategic forces, to be accomplished within seven years after entry into force. START II, *supra* note 8, art. I; START II Executive Summary, ARMS CONTROL TODAY, Jan.-Feb. 1993, at START II Supp. 3.

47 Neither START I nor START II directly requires the destruction of nuclear warheads. U.S. DEP'T OF DEFENSE, LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT FOR STRATEGIC ARMS REDUCTION TREATY (1991) [hereinafter START I LEIS]; U.S. DEP'T OF DEFENSE, SUPPLEMENTAL LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT FOR START II 6 (1993); Boldrick, *supra* note 28. However, it is expected that the United States will, in fact, disassemble large numbers of warheads under the treaties in the coming years—if adequate facilities can be developed to perform the work and safely store the resulting nuclear materials. Matthew L. Wald, *U.S. Is Unprepared To Disarm A-Bombs*, N.Y. TIMES, Sept. 24, 1993, at A13; Thomas W. Lippman, *U.S. Has No Firm Disposal Policy For Plutonium, Study Maintains*, WASH. POST, Sept. 24, 1993, at A2. It is likewise anticipated that Russia will also destroy a great many of its strategic nuclear warheads pursuant to the START process. However, despite START's intrusive verification apparatus, the United States is still not entirely confident about the degree to which Russia has actually dismantled the nuclear devices to date. Martin Sieff, *Moscow Balks at Verification of Scrapped Nukes*, WASH. TIMES, Sept. 30, 1993, at A17. A recent U.S.-Russia agreement on mutual inspections of plutonium storage facilities should facilitate the dismantling process. Dunbar Lockwood, *U.S., Russia Reach Agreement For Plutonium Site Inspections*, ARMS CONTROL TODAY, Apr. 1994, at 22; John Deni & Dunbar Lockwood, *DOD Plan Calls for More Transparency in Managing U.S.-Russian Plutonium*, ARMS CONTROL TODAY, Apr. 1994, at 23.

48 START I also allows the two parties to re-use many of their long-range ballistic missiles after the associated launchers, submarines, or aircraft are eliminated. As a practical matter, however, it is expected that many more missiles will actually be destroyed. R. Jeffrey Smith, *Treaty Won't Require Arms Destruction*, WASH. POST, Aug. 15, 1991, at A1.

49 INF Treaty, *supra* note 33, art. XI, para. 6; START I, *supra* note 8, art. XVI.

the plant site to take measurements or install "black box" technical monitoring equipment, or to observe all outgoing traffic to ensure that no contraband hardware is shipped from the plant.[50] These verification assurances amply support START's detailed provisions regarding weapons destruction, but as with the INF Treaty, they are silent regarding any possible environment-, health-, or safety-related limitations, standards, or protections.

In the same vein, the 1990 Conventional Forces in Europe (CFE) Treaty strongly stresses the importance of achieving a permanent reduction in non-nuclear military capacity[51] by requiring the disassembly of huge quantities of tanks, armored personnel carriers, helicopters, and other devices.[52] Like the INF Treaty, it specifies precise procedures for neutralizing each type of covered equipment, and it provides for detailed on-site inspection to ensure fidelity to the agreed standards.[53] The CFE Treaty, however, retains for each party "the right to use any technological means it deems appropriate" to accomplish the requisite eliminations, and it, too, imposes no environmental, safety, or other inhibitions.[54]

Finally, it is noteworthy that several of these recent international accords and governmental actions have sponsored, in various ways, the "conversion" of selected defense resources to civilian purposes.[55]

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50 U.S. ARMS CONTROL AND DISARMAMENT AGENCY, *supra* note 37, at 26-30. The INF Treaty permits the United States to maintain, for 13 years, a continuous monitoring presence outside the missile facility at Votkinsk, Russia. The American inspectors are permitted to measure and weigh cargoes that exit the facility and to use a nondamaging imaging sensor (roughly comparable to an X-ray machine) to ascertain that no treaty-related items are escaping. Russia maintains a comparable portal/perimeter installation outside a former U.S. missile facility at Magna, Utah. *Id.*

51 *See* CFE Treaty, *supra* note 8. In comparison, the 1921-22 Washington Naval Treaties had helped to establish a temporary respite from the emerging race to develop and deploy additional sea power, by mandating fixed ratios and tonnage limits for the major ocean-faring states. These understandings did not, however, require reductions in existing naval strength, and they proved to be of only short duration. ACDA TREATY BOOK, *supra* note 7, at 4.

52 Under the CFE Treaty, the 29 participating countries are required to draw down their stockpiles of key military hardware in five categories: tanks, armored combat vehicles, artillery, aircraft, and helicopters. Lee Feinstein, *Weapons in Europe Before and After CFE*, ARMS CONTROL TODAY, June 1992, at 32. Under a subsequent CFE 1A agreement, the numbers of combat personnel in Europe will be reduced, too. Thomas Graham, Jr., *The CFE Story: Tales From the Negotiating Table*, ARMS CONTROL TODAY, Jan.-Feb. 1991, at 9.

53 *See generally* Protocol on Inspection, Nov. 19, 1990, 30 I.L.M. 52 (setting forth the inspection procedures for the Treaty on Conventional Armed Forces in Europe) [hereinafter CFE Inspection Protocol]; Gregory Webb, *CFE Update*, BULL. ATOM. SCIENTISTS, Dec. 1993, at 24.

54 Protocol on Procedures Governing the Reduction of Conventional Armaments and Equipment Limited By the Treaty on Conventional Armed Forces in Europe, Nov. 19, 1990, 30 I.L.M. 32, at § I, para. 2 [hereinafter CFE Reduction Protocol].

55 The increased interest in eliminating or converting selected military assets has also sponsored something of a boom in the related private-sector environmental services industry. Additional firms are entering the field, hoping to capitalize on the government's newfound need for cleanup technology and safe industrial capacity. F. Housley Carr, *Chemical Weapons Are for*

At the smallest level, the CFE Treaty contemplates that some of the regulated hardware—individual trucks and tanks, for example—may properly be deweaponized and converted to heavy-duty nonmilitary applications instead of being completely destroyed or disassembled, and it specifies steps to guard against reconversion back into military usefulness.[56] Likewise, in the START accords, the United States and Russia have agreed that at least a few of their expensive intercontinental ballistic missiles may be saved from the scrapyard by conversion into space launch vehicles, projecting artificial satellites toward orbit, instead of weapons toward a target.[57] At a higher level, countries have attempted to reconfigure their weapons design or fabrication facilities for more benign purposes—Russia's adaptation of a former INF missile production plant into a factory for producing baby carriages is the most conspicuous example.[58] At a still more macroeconomic level, entire industries in the United States, Russia, and elsewhere are facing the stark challenge of converting to lower military spending, and the entire defense "food chain"—including research laboratories, test sites, production facilities, and deployment bases—is experiencing the pressures of demobilization.[59]

Burning, CHEMICAL WK., Mar. 16, 1988, at 84; Gregory D. Morris, *E&C Firms Gain in Nerve Gas Treaty*, CHEMICAL WK., June 13, 1990, at 30.

56 CFE Reduction Protocol, *supra* note 54, § VII. For example, limited numbers and selected types of battle tanks may be converted for service as bulldozers, fire fighting vehicles, or rescue vehicles, pursuant to articulated standards. *Id.* In addition, some of the armaments may be placed on "static display" (for example, in a museum) or used as targets or for other military training functions. *Id.* §§ XI, XII.

57 *START II Executive Summary*, ARMS CONTROL TODAY, Jan.-Feb. 1993, at START II Supp. 3, 4. *See* Bruce D. Nordwell & Jeffrey V. Lenorovitz, *U.S.-Russian SLBM Venture Plans Initial Test for 1994*, AVIATION WK. & SPACE TECH., May 3, 1993, at 60 (discussing development of a new commercial space launch vehicle, using elements from stockpiled Russian SS-N-23 and SS-N-20 missiles). *See generally* Edmund L. Andrews, *New Careers for Cold War Relics*, N.Y. TIMES, Apr. 15, 1994, at D1; Ann M. Florini & William C. Potter, *Goodwill Missions for Castoff Missiles*, BULL. ATOM. SCIENTISTS, Nov. 1990, at 25. *But see* Ben Iannotta, *NASA Hesitates To Employ Missiles as Space Launchers*, DEF. NEWS, Aug. 2, 1993, at 2-8 (stating that a sudden glut of government-sponsored space launch capacity may undercut emerging industry efforts to develop private launch services market).

58 *See generally* U.N. OFFICE OF DISARMAMENT AFFAIRS, POTENTIAL USES OF MILITARY-RELATED RESOURCES FOR PROTECTION OF THE ENVIRONMENT (1993) [hereinafter POTENTIAL USES]; Christopher Anderson, *Weapons Labs in a New World*, 262 SCI. 168 (1993); Margaret Shapiro, *Switching From Missile Systems to Teapots*, WASH. POST, Sept. 18, 1993, at A16; R. Jeffrey Smith, *Environmental Cleanup Role Considered for A-Weapons Lab*, WASH. POST, Mar. 9, 1993, at A10; Amy E. Smithson, *Russia Wants Plastics, Too*, BULL. ATOM. SCIENTISTS, May 1994, at 14.

59 *See generally* DISARMAMENT AGREEMENTS AND NEGOTIATIONS: THE ECONOMIC DIMENSION (Serge Sur ed., 1991); John Burgess, *Bombs Into Bulldozers*, WASH. POST, Aug. 23, 1992, at H1; Holly Idelson, *Nuclear Weapons Complex Braces For Overhaul*, CONG. Q., Apr. 25, 1992, at 1066; Alexei I. Izyumov, *Conversion: Economic Adjustments in an Era of Arms Reduction*, 1991 DISARMAMENT 53; Gary Lee & Rick Atkinson, *The Battle to Beat Swords Into Shoes*, WASH.

Perhaps the most dramatic instance of beating swords into plowshares is the recent arrangement under which the United States has agreed to purchase, on mutually advantageous terms, five hundred metric tons of Russia's now surplus weapons-grade highly enriched uranium over a twenty-year period.[60] The plan is to dilute the radioactive mass, rendering it unusable for weaponry, and to transform it into fuel for United States civilian nuclear power reactors. The cash payments will bolster Moscow's faltering economy at the same time that the exchange whittles away the size of the nuclear weapons threat facing the United States.[61]

B. Dismantling Obligations Under the Chemical Weapons Convention

The above chronology demonstrates that the key weapons negotiating states have come a long way from their earlier indifference to actual disarmament. Recent accords have addressed the elimination process in conspicuous detail and have initiated the process of walking swiftly back from the abyss of "overkill." The world has already learned a great deal about the challenges of effective dismantling of military equipment and about the opportunities for conversion of defense assets to more productive applications.

The 1993 Chemical Weapons Convention, however, raises all these issues in an even more acute, intractable form. The treaty attempts to achieve the comprehensive abolition of CW arsenals worldwide—not just among two superpowers, but for all states, including several that continue to deny possession of any CW.[62] It aims, more-

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POST, Nov. 21, 1990, at A12 (part 4 of 4); Tom A. Zamora, *New Jobs For Old Labs?*, BULL. ATOM. SCIENTISTS, Nov. 1992, at 14.

60 Agreement Concerning the Disposition of Highly Enriched Uranium Extracted from Nuclear Weapons, Feb. 18, 1993, U.S.-Russian Federation, Hein's No. KAV 3503.

61 William J. Broad, *From Soviet Warheads to U.S. Reactor Fuel*, N.Y. TIMES, Sept. 6, 1992, § 4, at 1; Thomas W. Lippman, *U.S. to Buy Russian Uranium*, WASH. POST, Sept. 1, 1992, at A1. *See also* William J. Broad, *Russian Says Soviet Atom Arsenal Was Larger Than West Estimated*, N.Y. TIMES, Sept. 26, 1993, § 1, at 1 (reporting that when United States contracted to purchase the 500 metric tons of highly enriched uranium, American officials believed that quantity constituted almost all of Moscow's supply, but recent reports estimate that Russia may now have a total inventory of 1200 metric tons). More recently, the terms of this tradeoff have been extended to include American purchases of uranium derived from former Soviet missiles located inside the Ukraine, and Kiev, too, is expected to share in the financial aid. R.W. Apple, Jr., *Ukraine Gives in on Surrendering Its Nuclear Arms*, N.Y. TIMES, Jan. 11, 1994, at A1.

62 Only three states (the United States, Russia, and Iraq) currently admit possessing chemical weapons, but the number of other countries suspected of covertly maintaining a CW capacity (or of working assiduously in that direction) ranges as high as twenty or more. *See* Charles C. Flowerree, *Current Chemical Weapons Proliferation*, *in* CHEMICAL WEAPONS AND MISSILE PROLIFERATION: WITH IMPLICATIONS FOR THE ASIA/PACIFIC REGION 9, 13 (Trevor Findlay ed., 1991); U.S. GEN. ACCOUNTING OFFICE, ARMS CONTROL: U.S. AND INTERNATIONAL EFFORTS TO BAN CHEMICAL WEAPONS (1991) [hereinafter EFFORTS TO BAN]; Brad Roberts, *Controlling Chemical Weapons*, 2 TRANSNAT'L L. & CONTEMP. PROBS. 435, 438 (1992).

over, at a permanent injunction against chemical warfare, by essaying to destroy the *capability* for quick weaponization of chemicals, through elimination of the facilities where the combat agents have been produced or armed.[63] Crucially, the CWC regulates even "dual use" and "precursor" chemicals—substances which are not themselves lethal warfare agents, but which could be converted into weapons relatively easily—even when those same chemicals have become exceedingly widespread in an immense variety of civilian applications across the breadth of the international economy, ranging from pesticides to plastics to paint.[64]

Unlike most of its arms control ancestors, therefore, the CWC will strive: (1) to eliminate the lethal warheads, not merely the delivery systems, and even to destroy the facilities formerly used to produce them; (2) to root out even small quantities of weapons, which might still prove militarily meaningful; (3) to deal with protean substances, which can be secretly converted from weaponry into benign fluids and gases (and back again) with unsettling rapidity; (4) to intrude its verification obligations upon private industry, which handles toxic chemicals in great profusion, as well as upon the more familiar governmental sector; and (5) to anticipate possible future ordnance concepts, which might midwife new types of chemical weapons even as the old versions are being dismantled.[65]

Central to this Article, the CWC is different from even its most ambitious predecessors in yet another way: its nascent attention to the environmental implications of the dismantling process. Unlike the INF, START, CFE, and other treaties, which were silent about their potential ecological ramifications, the CWC explicitly provides that: "Each State Party, during the implementation of its obligations under this Convention, shall assign the highest priority to ensuring the safety of people and to protecting the environment, and shall cooperate as appropriate with other State Parties in this regard."[66]

While this passage is not nearly as fulsome or as detailed as it might be (or as many other provisions of the exceptionally fastidious

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63 As noted above, the 1925 Geneva Protocol had established an international norm against the first use of chemical weapons in international combat, but it did not prohibit the production or deployment of lethal agents. *See* Geneva Protocol, *supra* note 10 and accompanying text. CWC negotiators determined to outlaw not only the hostile application of chemical agents, but also their possession, and the new treaty extended its ban to require the destruction or conversion of key CW-related production facilities. CWC, *supra* note 1, arts. IV, V.

64 Gordon M. Burck, *Chemical Weapons Production Technology and the Conversion of Civilian Production*, ARMS CONTROL, Sept. 1990, at 122; Kyle B. Olson, *The U.S. Chemical Industry Can Live With A Chemical Weapons Convention*, ARMS CONTROL TODAY, Nov. 1989, at 21.

65 Regarding the provisions of the CWC and its effect upon existing United States law, see EDWARD A. TANZMAN & BARRY KELLMAN, DEFENSE NUCLEAR AGENCY, HARMONIZING THE CHEMICAL WEAPONS CONVENTION WITH THE UNITED STATES CONSTITUTION (1991).

66 CWC, *supra* note 1, art. VII, para. 3.

CWC certainly are[67]), it does establish a basic mandate, and the parties have taken seriously their obligation to respect the environmental concerns in addressing the dismantling process.[68]

The tasks of understanding and implementing the multifarious CWC provisions related to dismantling will now mandate some unraveling of the tortured history of the weaponry and the longstanding disarmament negotiations, asking first how the weapons and the treaty text evolved; second, what the treaty actually requires of the parties regarding dismantling; and third, what the planet's existing CW arsenal now includes.

1. How We Got These Things: The Evolution of CW and the CWC.—Explicating the legal and political imperatives of the Chemical Weapons Convention requires some background in the problem of chemical weaponry itself.[69] Various forms of "fulminating smoke," "noxious gases," and "hellish poison" have been applied in combat for centuries, occasionally with telling military consequences.[70] At the same time, public opinion has recoiled against the mysteries of CW, reviling the incorporeal application of violence as a particularly loathsome form of combat.[71] During World War I, both these factors inten-

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67 The CWC is an exceptionally long and detailed instrument, even by the standards of modern arms control agreements, which have recently assumed monumental length. The CWC runs to almost 200 pages, laden with technical minutiae that dwarf its predecessors such as the Geneva Protocol and the BWC.

68 The CWC also incorporates environmental protection into the provisions regarding (1) transporting, sampling, storing, and destroying chemical weapons, and (2) destroying chemical weapons production facilities, by requiring that each party "shall assign the highest priority to ensuring the safety of people and to protecting the environment" during those operations. CWC, *supra* note 1, arts. IV, para. 10, art. V, para. 11. In addition, the CWC—while generally affirming the right of each party to determine its own process for destroying its weaponry—specifically forbids disposal via ocean dumping, land burial, or open-pit burning. *Id.* Verification Annex, Part IV (A), para. C, § 13. See also the provisions related to securing whatever permits and adhering to whatever procedures are required pursuant to domestic environmental and safety laws during the elimination and inspection operations. *Id.* Part II, para. B, § 11(d); Part II, para. E, § 43; Part IV(A), para. C, § 32; Part VI, para. C, § 7.

69 *See generally* THOMAS BERNAUER, THE CHEMISTRY OF REGIME FORMATION: EXPLAINING INTERNATIONAL COOPERATION FOR A COMPREHENSIVE BAN ON CHEMICAL WEAPONS 17-30 (1993); GORDON M. BURCK & CHARLES C. FLOWERREE, INTERNATIONAL HANDBOOK ON CHEMICAL WEAPONS PROLIFERATION (1991); John E. Moon, *Controlling Chemical and Biological Weapons Through World War II*, *in* 2 ENCYCLOPEDIA OF ARMS CONTROL AND DISARMAMENT 657 (Richard D. Burns ed., 1993); MARK STORELLA, POISONING ARMS CONTROL: THE SOVIET UNION AND CHEMICAL/BIOLOGICAL WEAPONS (1984); VICTOR A. UTGOFF, THE CHALLENGE OF CHEMICAL WEAPONS (1991); John P. Jones & Eileen Wagner, *Poison Gas Proliferation: Paradox, Politics, and Law*, 15 LOY. L.A. INT'L & COMP. L.J. 521 (1993); Symposium, *Chemical and Biological Weapons*, 262 JAMA 640 (1989).

70 UTGOFF, *supra* note 69, at 1-3; JOHN HEMSLEY, THE SOVIET BIOCHEMICAL THREAT TO NATO 66-69 (1987).

71 UTGOFF, *supra* note 69, at xviii. Early efforts to emplace some types of primitive controls on chemical weapons date back at least to a 1675 French-German agreement to outlaw poison

sified, as new genres of phosgene, mustard gas, and other CW claimed over one million casualties, including one hundred thousand fatalities,[72] resulting in a public revulsion that impelled progress toward the Geneva Protocol.[73]

Remarkably, chemical agents were not generally employed during World War II, despite (or perhaps because of) the fact that partisans on both sides had assembled massive CW arsenals,[74] including new generations of extraordinarily lethal organophosphorus nerve gases.[75] Through the succeeding decades, many states flirted with a CW capacity; quite a few devoted considerable resources to developing and deploying active arsenals; and several deliberately maintained a studious ambiguity in which they never quite acknowledged the CW capabilities and aspirations they were widely suspected of sustaining.[76] Many leading strategic authorities, however, eventually drifted toward the conclusion that chemical arms were relatively unattractive militarily, being too uncontrollable on the battlefield, since their location, persistence, and lethality would be heavily influenced by wind, precipitation, temperature, terrain, and other autonomous factors.[77] CW

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bullets, and continued through the Hague Conventions of 1899 and 1907. *Id.* at 3-4; ACDA TREATY BOOK, *supra* note 7, at 3-4.

72 UTGOFF, *supra* note 69, at 5-11; JULIAN P. ROBINSON, THE PROBLEM OF CHEMICAL AND BIOLOGICAL WEAPONS: THE RISE OF CB WEAPONS (1971) (published by the Stockholm International Peace Research Institute); ACDA TREATY BOOK, *supra* note 7, at 129.

73 BURCK & FLOWERREE, *supra* note 69, at 540-41; UTGOFF, *supra* note 69, at 11-18; Jean P. Zanders, *Chemical Weapons: Beyond Emotional Concerns*, 21 BULL. PEACE PROPOSALS 87 (1990); BERNAUER, *supra* note 69, at 18.

The visceral reaction to the horrors of chemical warfare during World War I has had a lasting impact. When I taught a seminar course entitled "Chemical and Biological Weaponry" during the fall 1991 semester at the Georgetown University Law Center, several students volunteered that a primary reason for enrolling in the course was a curiosity prompted by recalling family stories they had been told about their grandfathers' experiences with gas during The Great War.

74 BERNAUER, *supra* note 69, at 19. Chemical weapons were used by Japan against China and by Italy against Ethiopia, but they were not widely applied in the main battlefronts of the war, even though both sides were well equipped to use CW and even though both experienced severe provocations in which chemical use was strongly considered. UTGOFF, *supra* note 69, at 27-68; STORELLA, *supra* note 69, at 9-11.

75 UTGOFF, *supra* note 69, at 22-26. There is a wide variety of types of chemical weapons, including "blister agents" (such as mustard gas), "blood agents" (such as hydrogen cyanide), and "nerve agents" (such as soman and tabun). These chemicals differ in their lethality, persistence, mode of delivery, and other parameters. U.S. GOV'T, REPORT OF THE CHEMICAL WARFARE REVIEW COMM'N 5-9 (1985) [hereinafter STOESSEL COMM'N]; BURCK & FLOWERREE, *supra* note 69, at 20-21, 579-81; *see infra* text accompanying notes 129-35.

76 BURCK & FLOWERREE, *supra* note 69, at xxi-xxiii, 162-77.

77 BURCK & FLOWERREE, *supra* note 69, at 579; Jones & Wagner, *supra* note 69, at 554. Despite this seeming inutility of chemical weaponry, the Soviet Union built a massive CW capability, which it continued to update, train, and integrate into its main warfighting doctrine—activities which many Western tacticians viewed with considerable alarm. UTGOFF, *supra* note 69, at 143-98; STORELLA, *supra* note 69, at 42-73; HEMSLEY, *supra* note 70.

were therefore widely considered unsuitable for application against a reasonably well-trained and defensively equipped adversary,[78] and their primary function became deterrence: to persuade a foe not to initiate chemical hostilities, for fear of inciting retaliation in kind.[79]

At the same time, there were occasional episodes of the use, alleged use, or threatened use of chemicals in isolated hostilities around the globe,[80] including by Egypt against Yemen in the 1960s[81] and perhaps by the Soviet Union or its surrogates in Afghanistan and Southeast Asia twenty years later.[82] Particularly after the widespread use of CW by both sides in the 1980-88 Iran-Iraq war—with greater apparent military effectiveness than generally predicted[83]—the widespread international taboo against chemical warfare appeared to be in jeopardy.[84] Even if the most militarily sophisticated countries could afford

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78 Chemical weapons have rarely, if ever, been used with decisive military impact against a force that was outfitted with state-of-the-art defensive systems. Contemporary "gas masks" and associated protective clothing, equipment, and decontamination techniques could substantially reduce the lethality of even a large, modern chemical attack. Matthew Meselson, *The Myth of Chemical Superweapons*, BULL. ATOM. SCIENTISTS, Apr. 1991, at 12; Jane M. Orient, *Chemical and Biological Warfare: Should Defenses Be Researched and Developed?*, 262 JAMA 644 (1989).

79 BURCK & FLOWERREE, *supra* note 69, at 14-15. Tactical use of chemical weaponry could potentially have a significant effect as a "force multiplier" even against a well-prepared enemy in degrading the enemy force's fighting ability, by compelling the soldiers to don cumbersome, hot, protective clothing, thereby inhibiting their mobility, communication, and overall effectiveness. *Id.*; STOESSEL COMM'N, *supra* note 75, at 50-54.

80 There were at least 20 occasions since World War II in which serious allegations were asserted about the possible use of chemical weapons. Many of these instances were patently spurious, but several remain plausible. UTGOFF, *supra* note 69, at 69-87; STORELLA, *supra* note 69, at 49-54.

81 Reliable evidence demonstrated that Egypt used lethal chemical weapons repeatedly during its intervention in the Yemeni civil war of the 1960s. UTGOFF, *supra* note 69, at 70-71.

82 The United States accused the Soviet Union of employing a variety of chemical, biological, or toxic weapons (in the form of a "Yellow Rain") against indigenous rebels in Afghanistan, Laos, and Cambodia during the early 1980s. In-depth investigation, however, failed to adduce dispositive evidence to substantiate the claim, and alternative explanations—establishing that the substances detected were of natural origin—became more widely accepted. Thomas Whiteside, *Annals of the Cold War*, NEW YORKER, Feb. 11, 1991, at 38 (part 1 of 2); Thomas Whiteside, *Annals of the Cold War*, NEW YORKER, Feb. 18, 1991, at 44 (part 2 of 2); UTGOFF, *supra* note 69, at 74-80; STORELLA, *supra* note 69, at 19-32; Howard Hu et al., *The Use of Chemical Weapons: Conducting an Investigation Using Survey Epidemiology*, 262 JAMA 640 (1989).

83 Iraq used various chemical weapons frequently against a variety of Iranian military and civilian targets, achieving some degree of local success, especially early in the war. Iran's CW retaliation was of much more limited scope and effectiveness. BURCK & FLOWERREE, *supra* note 69, at 31-137; UTGOFF, *supra* note 69, at 80-86; Hu et. al., *supra* note 82.

84 A major international conference on chemical weapons convened in Paris in 1989, and provided the occasion for 149 countries to express the world's revulsion with chemical weapons and their commitment to control the dangers. The conferees refused, however, to condemn Iraq by name for its CW attacks on Iran, and generally adopted a less vigorous posture on chemical proliferation and on international sanctions against the renegades than the United States and other key players had expected. Edward Cody, *149 Nations Vow to Shun Poison Gas*, WASH. POST, Jan. 12, 1989, at A1; Jill Smolowe, *Chemical Warfare: Return of the Silent Killer*, TIME,

to eschew chemical weapons in favor of more effective and manageable ordnance, CW still retained its considerable cachet among the less developed nations' arsenals, as "the poor country's atomic bomb."[85] The recent (so far, fragmentary and unconfirmed) reports that Iraq may have employed some level of chemical warfare during the 1991 Desert Storm battles;[86] that Serbian military units may have utilized poison gas inside Bosnia-Herzegovina;[87] and that chemical ordnance may even have found their way into the Angolan civil war;[88] add still newer chilling chapters to this fearsome ledger.

Meanwhile, international negotiations toward a CWC had been underway, with only glacial progress, for decades.[89] Most of the deliberations occurred within or around the Geneva-based Conference on Disarmament, a multilateral United Nations affiliate widely recognized as the leading disarmament negotiating body,[90] but substantial bilateral United States-Soviet Union bargaining inevitably played a key role, too.[91] (The superpowers even concluded, but have not yet fully effectuated, two interim bilateral agreements related to CW nonproduction, destruction, and verification.[92]) As a draft multilateral

Aug. 22, 1988, at 46; UTGOFF, *supra* note 69, at 123-25; BURCK & FLOWERREE, *supra* note 69, at 545-47.

85 Orient, *supra* note 78, at 645 (reporting that inflicting casualties via chemical warfare is much cheaper than conventional or nuclear means, and does not require advanced technology).

86 Bill McAllister, *Riegle Suggests Iraq Conducted Chemical Warfare*, WASH. POST, Sept. 10, 1993, at A18; Bill Gertz, *Nerve Gas Detected by Czechs During Gulf War*, WASH. TIMES, Sept. 7, 1993, at A3.

87 *News Chronology*, CHEMICAL WEAPONS CONVENTION BULL., Sept. 1993, at 11, 12, 24.

88 *Id.* at 17-18.

89 BURCK & FLOWERREE, *supra* note 69, at 541-45; UTGOFF, *supra* note 69, at 88-97, 104-20. In the 1970s, the problem of biological weapons was diplomatically split off from the problem of chemical weapons. The Geneva Protocol had dealt with both types of arms, but the effort to develop a more comprehensive follow-on accord proved far easier for BW than for CW, and the BWC, *supra* note 21, was concluded in 1972. ACDA TREATY BOOK, *supra* note 7, at 129-32.

90 THOMAS BERNAUER, THE PROJECTED CHEMICAL WEAPONS CONVENTION: A GUIDE TO THE NEGOTIATIONS IN THE CONFERENCE ON DISARMAMENT 5-7, 20-32 (1990); BERNAUER, *supra* note 69, at 25-30, 59-75. The Conference on Disarmament, and its several percursor organizations, had played a key role in the evolution of prior arms control accords, including the BWC, the NPT, and others. ACDA TREATY BOOK, *supra* note 7, at 89-97, 129-32.

91 UTGOFF, *supra* note 69, at 110-12.

92 In September 1989, the United States and Soviet Union concluded a bilateral Memorandum of Understanding (MOU) to establish a two-part program of data exchanges and reciprocal verification inspections. (The first phase of the MOU has been implemented, but the second has been deferred.) In June 1990, the two parties also signed a Bilateral Destruction Agreement to eliminate most of their chemical weapons stockpiles on an accelerated timetable, long before the CWC was concluded. Difficulties in deriving a suitable destruction methodology, however, have delayed the entry into force and the implementation of this accord, and the timetable for the required disarmament is being stretched out to coincide largely with that of the CWC. *See* Agreement Regarding a Bilateral Verification Experiment and Data Exchange Related to Prohibition of Chemical Weapons, Sept. 23, 1989, U.S.-U.S.S.R., 28 I.L.M. 1438; Agreement on Destruction and Non-Production of Chemical Weapons and on Measures to Facilitate the Multilateral Convention on Banning Chemical Weapons, June 1, 1990, U.S.-U.S.S.R., 29 I.L.M.

treaty text gradually evolved, a multiplicity of thorny issues also emerged, leading to only fitful, incremental progress and eventually to a carefully balanced set of tradeoffs through which no country obtained everything it wanted, and each had to accept compromises and offsetting obligations.[93]

Crowning the negotiations was the January 1993 signing ceremony in Paris, at which 130 countries affiliated themselves with the instrument[94]—but even this event was jeopardized by a threatened Arab League boycott, which only partially dissipated at the last minute.[95] The process of obtaining ratifications by the necessary sixty-five states[96] and establishing the institutional framework essential for operating the treaty will likely consume at least two years prior to entry

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932; Marian Nash, *Contemporary Practice of the United States Relating to International Law: Arms Control and Disarmament*, 88 AM. J. INT'L L. 232, 312 (1992); BURCK & FLOWERREE, *supra* note 69, at 548-50; KATHLEEN C. BAILEY, DOOMSDAY WEAPONS IN THE HANDS OF MANY: THE ARMS CONTROL CHALLENGE OF THE '90s, at 75-78 (1991); Amy Smithson, *Conventional Wait*, BULL. ATOM. SCIENTISTS, Sept. 1993, at 10; THE CHEMICAL WEAPONS CONVENTION HANDBOOK 40-41 (Amy E. Smithson ed. 1993) [hereinafter SMITHSON HANDBOOK]; BERNAUER, *supra* note 69, at 27-28.

Other groups of countries have also crafted interim restraints against chemical weaponry in anticipation of the CWC, notably the Mendoza Agreement of 1991, under which Argentina, Brazil, Chile, and Uruguay jointly foreswore the development, production, retention, use, and transfer of CW. *Id.* at 29.

93 BERNAUER, *supra* note 90, at 11-32; Amy E. Smithson, *Chemical Weapons: The End of the Beginning*, BULL. ATOM. SCIENTISTS, Oct. 1992, at 36; Carl-Magnus Hyltenius et al., *Symposium on the Chemical Weapons Convention*, 16 DISARMAMENT 82 (1993). George Bush had taken a substantial personal interest in the CWC negotiations, both as vice-president and as president. The United States, however, adopted a number of controversial negotiating positions (on verification, the timetable for dismantling, and the retention of some residual CW stockpiles) that inhibited more rapid progress toward a treaty. In the endgame, movement on many of these key issues finally produced the complete package of balanced compromises. Amy E. Smithson, *Tottering Toward a Treaty*, BULL. ATOM. SCIENTISTS, July-Aug. 1992, at 9; R. Jeffrey Smith & John E. Yang, *Bush Pushes for Chemical Arms Treaty*, WASH. POST, May 14, 1991, at A12; Paul Lewis, *U.S. Now Prefers Limited Inspection of Chemical Arms*, N.Y. TIMES, Aug. 14, 1991, at A1; Peter Grier, *US Stance on Inspections Roils Chemical-Arms Talks*, CHRISTIAN SCI. MONITOR, Aug. 19, 1991, at 1.

94 At the Paris summit, 130 countries signed the CWC; others joined in the succeeding months, so the current "scorecard" shows 151 signatories, four of which have already deposited an instrument of ratification. U.S. ARMS CONTROL AND DISARMAMENT AGENCY, FACT SHEET: CHEMICAL WEAPONS CONVENTION SIGNATORIES/PARTIES (1993); *The Prepatory Commission*, CWC CHRONICLE, May 1993, at 1, 3; U.S. ARMS CONTROL AND DISARMAMENT AGENCY, ISSUES BRIEF: RATIFICATION AND ADHERENCE TO THE CHEMICAL WEAPONS CONVENTION (1993).

95 The Arab League had indicated that its members would not sign the CWC until the problem of *nuclear* weaponry was resolved in the Middle East, too—specifically, with Israel adhering to the NPT. In the end, however, 10 League countries broke ranks and signed the chemical pact. Smithson, *supra* note 4, at 38.

96 The CWC will enter into force 180 days after the 65th country deposits its instrument of ratification with the United Nations Secretary General, but in no case sooner than 2 years after the January, 1993 signing ceremony. CWC, *supra* note 1, arts. XXI, para. 1, XXIII.

into force.[97] The CWC evokes a substantial new international bureaucracy, empowered to collect data, conduct on-site inspections, resolve disputes, and generally administer a cumbersome, complex system of international verification—and all of this must be invented from scratch.[98]

Overall, the CWC is widely regarded as a uniquely important accomplishment.[99] It aims to rid the world—completely and permanently—of a scourge that has claimed many lives and terrorized societies. It accomplishes actual disarmament, mandating the disposal of immense quantities of weapons of mass destruction that had worked their way into the active inventories of several countries. It eradicates, or at least greatly reduces, a substantial threat to the security of the United States, its allies, and others. It will materially aid in the process of degrading the offensive military capacity of Russia (where doubts persist about the physical security of weaponry and about the stability of the reformist civilian control) and of many other erstwhile threats (including renegade countries and those who sponsor international terrorism, but who might nonetheless find that the pressure to join the global CWC regime was becoming irresistible). For all its possible imperfections,[100] the CWC is an enormously valuable con-

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97 The CWC establishes an overarching Organization for the Prohibition of Chemical Weapons (OPCW), which will administer the convention via a Conference of States Parties, an Executive Council, and a Technical Secretariat. As a provisional matter, a Preparatory Commission (PrepCom) has convened to initiate operations, even prior to the CWC's entry into force, by hiring international civil servants, organizing the budget, starting the data collection process, and developing inspection methodologies. CWC, *supra* note 1, art. VIII and Text on the Establishment of a Preparatory Commission; U.S. ARMS CONTROL AND DISARMAMENT AGENCY, FACT SHEET: ORGANIZATION FOR THE PREVENTION OF CHEMICAL WEAPONS (1993); Lois R. Ember, *Chemical Arms Treaty Makes Unprecedented Demands of Industry*, CHEMICAL & ENGINEERING NEWS, June 17, 1993, at 7; Chantal de Jonge Oudraat, *The Chemical Weapons Convention and its Institutions*, UNIDIR NEWSL. (United Nations Institute for Disarmament Research, Geneva, Switzerland), Dec. 1992, at 18; Peter Herby, *Building the Chemical Disarmament Regime*, ARMS CONTROL TODAY, Sept. 1993, at 14.

98 The PrepCom has been charged with responsibility for some 40 discrete tasks concerning the entry into force of the CWC and its effective early operation—as well as for resisting the inevitable pressures to "renegotiate" controversial aspects of the treaty through strained interpretations of it. Peter Herby & Julian P. Robinson, *International Organization for Chemical Disarmament Begins*, CHEMICAL WEAPONS CONVENTION BULL., Mar. 1993, at 1; Counsellor Shahbaz, *A Perspective on the OPCW Preparatory Commission*, CHEMICAL WEAPONS CONVENTION BULL., Mar. 1993, at 5; CWC, *supra* note 1, Text on the Establishment of a Preparatory Commission.

99 Remarks by Secretary of State Eagleburger Upon Signing the Chemical Weapons Convention (Jan. 13, 1993), *in* FOREIGN POL'Y BULL., Jan.-Apr. 1993, at 38; Statement by President Bush on Chemical Weapons Convention (Jan. 13, 1993), *in* FOREIGN POL'Y BULL., Jan.-Apr. 1993, at 38; ACDA Occasional Paper: Chemical Weapons Convention: A Balance Between Obligations and the Needs of States Parties (Jan. 5, 1993), *reprinted in* U.S. DEP'T OF STATE DISPATCH, Jan. 18, 1993, at 30.

100 *See* Frank J. Gaffney, Jr., *A Big Hole in That Chemical Weapons Treaty*, WASH. POST, Sept. 8, 1992, at A21; Kathleen Bailey, *Problems with the Chemical Weapons Convention, in*

tribution to world security and international law, one the United States is appropriately pledged to support.[101]

2. Getting Rid of These Things: What the CWC Requires.—The new treaty contains many important and novel disarmament provisions, several of which are likely to result in major potential impacts upon the biosphere.[102] As a comprehensive regime, the CWC requires, among other things, that each party: (a) eliminate all its existing CW agents and weapons and promise never to re-acquire them;[103] (b) report on its production and consumption of other key chemicals and "precursors" that could be converted into weapons relatively easily, but that may also have substantial applications in ordinary, peaceful commerce;[104] and (c) dismantle its CW-related production facilities or convert them to peaceful applications.[105]

The timetable for accomplishing these eliminations is not leisurely. Destruction of the agents, other chemicals, weapons, and installations is to be initiated within one year of the treaty's entry into force and is to be completed within ten years;[106] if a party, in excep-

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SHADOWS AND SUBSTANCE: THE CHEMICAL WEAPONS CONVENTION 17 (Benoit Morel & Kyle Olson eds., 1993) [hereinafter SHADOWS AND SUBSTANCE].

101 Gerard Errera, *The Chemical Weapons Convention: An Historic Agreement*, UNIDIR NEWSL., Dec. 1992, at 3; Peter H. Oppenheimer, *A Chemical Weapons Regime for the 1990s: Satisfying Seven Critical Criteria*, 11 WIS. INT'L L.J. 1 (1993).

102 *See generally* UNIDIR NEWSL., Dec. 1992. In addition to the treaty provisions analyzed in this section, the CWC is expected to have other effects on the global environment, as considered *infra* text accompanying notes 250-77. For example, one purpose of the CWC is to facilitate more freely-flowing international commercial traffic in chemicals, equipment, and technology. CWC, *supra* note 1, art. XI.2(b). Such an expansion in economic activity would have multiple ecological impacts, some favorable, others less so.

103 CWC, *supra* note 1, art. I.1-2.

104 SMITHSON HANDBOOK, *supra* note 92, at 22-26. The CWC establishes a series of "schedules" on which regulated chemicals are grouped according to their toxicity, history as weapons, and suitability for other, civilian purposes. The more dangerous a particular chemical is, the greater the degree of record-keeping, international reporting, and inspection is required. CWC, *supra* note 1, art. VI.3-5. A "precursor" is defined in the treaty as a chemical reactant that takes part in the production of a toxic chemical. *Id.* art. II.3.

105 CWC, *supra* note 1, arts. I, para. 4, V, para. 13. Each party is permitted to retain a single, small-scale facility for producing regulated chemical weapon agents for industrial, agricultural, research, protective, or other permitted peaceful purposes. *Id.* art. II, para. 8(b)(iii). In addition, very limited (and tightly monitored) production of chemical weapons agents is permitted at other locations for specified peaceful purposes. CWC, *supra* note 1, Verification Annex, Part VI (C), para. 10-12. A party may seek special permission from the Organization to convert an existing chemical weapons production facility to other, benign purposes, subject to intensive verification safeguards. *Id.* Part V, para. D.

106 CWC, *supra* note 1, Verificatin Annex, Part IV(A), para. C.15-19; V, para. B.30. Destruction of any CW production *facility* is to begin within one year after the treaty's entry into force and be completed within nine years after that. Destruction of CW *agents* and weaponry is to begin within two years of entry into force (by which point testing of a party's first destruction facility is to be completed). At least one percent of the country's CW stockpile is to be destroyed within the first three years after entry into force; at least twenty percent within five

tional cases, experiences daunting technological, financial, ecological, or other inhibitions beyond its control, the time frame may be extended up to five additional years.[107]

Surrounding these basic treaty obligations is a plethora of verification commitments, through which each party incurs the responsibility for hosting a variety of types of inspections, to be conducted by an international corps of trained experts.[108] Their function is to confirm the accuracy of parties' required reports about their chemical activities, to identify any illicit CW-related operations, to document alleged diversions of percursor or other chemicals into military programs, to deter covert evasion attempts, and thereby to strengthen confidence in the constancy of mutual compliance with the underlying bans.[109] By guarding against the possibility of surprise "breakout" efforts, the mandatory[110] inspection apparatus attempts to reinforce the safety of the CWC, ensuring parties that their potential antagonists are not sustaining a one-sided military advantage.[111] Inspectors are authorized

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years; at least forty-five percent within seven years; and all of the chemical weapons are to be destroyed within ten years. *Id.*

107 CWC, *supra* note 1, Verification Annex, Part IV(A), para. C.20-28. A state seeking additional time to complete the destruction (to extend either the ultimate 10-year period, or any of the interim deadlines) must submit a request to the Executive Council of the treaty's Organization, and permission is granted only by the entire Conference of all parties. The requesting state must specify the reasons for the proposed extension, provide a detailed plan for conducting the required eliminations, and accept more frequent monitoring. *Id.*; Robert Mikulak, *Destruction of Chemical Weapons*, UNIDIR NEWSL., Dec. 1992, at 12.

108 Graham H. Cooper, *The Chemical Weapons Convention Verification Regime*, UNIDIR NEWSL., Dec. 1992, at 8; SMITHSON HANDBOOK, *supra* note 92, at 7-10, 26-34. Facilities where chemical weapons have been produced are subject to "systematic" inspection, including the most intrusive and continuous verification techniques. Many locations inside a state party to the CWC will be open for "routine" inspection, under which the inspectors are allowed entry for the purpose of confirming the accuracy of a facility's reports about its production and consumption of chemicals. Virtually all other locations in the country will potentially be subject to "challenge" inspection, designed to resolve doubts about treaty compliance. The Technical Secretariat, an operational arm of the CWC Organization, will be responsible for hiring, training, and supervising the inspectors. CWC, *supra* note 1, arts. IV.3, V.3, IX, VIII.D, & Verification Annex.

109 *See* John Barrett, *Verification of a Chemical Weapons Ban: The On-Site Inspection Burden*, *in* ARMS CONTROL VERIFICATION AND THE NEW ROLE OF ON-SITE INSPECTION 139 (Lewis A. Dunn ed., 1990); DAVID GUALTIERI ET AL., CHEMICAL WEAPONS CONVENTION INSPECTIONS OF PRIVATE FACILITIES—APPLICATION OF UNITED STATES ENVIRONMENTAL AND SAFETY LAWS 8-18 (1993).

110 Inspectors are to be accorded "unimpeded access" for most CWC inspection functions, and "managed access" (under which the host facility is allowed to remove or shroud certain sensitive materials, providing that other methods or procedures will satisfy the inspectors' mission) for other inspections. CWC, *supra* note 1, Verification Annex, Part II, para. E.45, Part X, para. C.46-52.

111 Critics of the CWC have argued that the treaty is imperfectly verifiable, allowing some countries to sustain a covert CW capability despite the inspection apparatus, while the United States and others unilaterally disarm. Gaffney, *supra* note 100, at A21; Bailey, *supra* note 100, at 17.

to snoop into a variety of "declared" and "undeclared" facilities[112] (including the unprecedented opportunity to inspect virtually any public or privately owned location anywhere in the United States[113]); to take, analyze, and remove samples of selected chemical substances encountered in the inspection;[114] and to demand that certain types of chemical operations be carried out in their presence.[115]

As a result of this verification imperative, CWC parties will be somewhat constrained in their choices about methodologies for accomplishing the required eliminations. It is not enough that the former CW production facilities be destroyed—they must be destroyed in a fashion amenable to confirmatory international inspections.[116] Likewise, merely disposing of the lethal agents, even disposing of them in a scientifically reliable and comprehensive way that precludes their reconstitution, is insufficient; for the treaty to "look good" as well as "be good," the eliminations must be conducted with a fastidious attention to the established protocols and with exacting opportunities for external corroboration—even if that punctiliousness takes longer, costs more, and generates independent environmental or safety hazards.[117]

The Convention also addresses the importance of secrecy.[118] Since chemical weapons are so intimately connected to legitimate

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112 The CWC requires parties to report national aggregate and plant-specific data regarding the production of scheduled chemicals, but the treaty also permits certain types of on-site inspection even at locations that are not "declared" for reporting purposes. CWC, *supra* note 1, Verification Annex, Parts VII-IX. Some industry experts estimate that as many as 50,000 sites in the United States may be subject to inspection on the basis of producing or consuming relevant chemicals. Olson, *supra* note 64, at 21; Lois R. Ember, *Chemical Weapons Treaty Ratification Races Clock in Congressional Hearings*, CHEMICAL ENGINEERING NEWS, Mar. 21, 1994, at 16 (estimating that 5000 sites will be subject to the closest monitoring, but only about 200 inspections will be conducted per year).

113 A challenge inspection may be initiated for "any facility or location in the territory or in any other place under the jurisdiction or control" of a state party. CWC, *supra* note 1, art. IX.8-10. This scope would permit inspection of privately-held chemical facilities, other private business operations, and even individual dwellings, although it is anticipated that challenge inspection of locations far removed from actual chemical operations would be extremely rare.

114 Inspectors are authorized to take samples (or to have samples collected for them); where possible, samples are to be analyzed on-site, but they may also be transported for analysis at outside laboratories selected by the international organization. CWC, *supra* note 1, Verification Annex, Part II, para. E.52-58; GUALTIERI ET AL., *supra* note 109, at 8-18.

115 CWC, *supra* note 1, Verification Annex, Part II, para. E.40.

116 CWC, *supra* note 1, Verification Annex, Part IV(A), para. C.14.

117 CWC, *supra* note 1, Verification Annex, Part IV(A), para. C.13-14. Of course, no treaty verification apparatus can ever be 100% successful in deterring and detecting possible violations, but the more robust the treaty's terms (and the more vigorous their implementation), the more attractive and successful the treaty regime will become. Conversely, where a treaty does not provide the United States with sufficient and reliable information regarding weapons-related activities inside Russia or elsewhere, consternation arises. Martin Sieff, *Moscow Balks at Verification of Scrapped Nukes*, WASH. TIMES, Sept. 30, 1993, at A17.

118 CWC, *supra* note 1, Annex 3 (Confidentiality Annex).

commercial chemical activity, any inspections that probe intrusively into the possible existence of the former may simultaneously jeopardize the hidden trade secrets of the latter.[119] Private chemical firms jealously guard their production processes, their customer and supplier lists, their nonpatented operational innovations, and many other aspects of their respective enterprises, but the international inspectors must be given substantially free rein to ensure that only legitimate business is occurring.[120]

Similarly, participating countries' concerns about national security secrecy may also be implicated, since chemical weapons operations are often intimately associated with other sensitive military programs that are unregulated by the CWC and that ought to be immune from inspection under it.[121] If international visitors, under the guise of a CWC inspection, could probe unrelated defense activities and release the acquired data to neighboring countries, security could be lessened, not strengthened, in the transaction. Therefore, the CWC's stringent limitations upon access to non-CW related materials, and its injunction upon the unauthorized release of data, apply equally to national

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119 Olson, *supra* note 64. The Chemical Manufacturers Association (CMA), the leading American industry group, was an active participant in advising the U.S. government about private firms' perspectives concerning the evolving CWC. Foremost among industry's concerns was the necessity for protecting the privacy of confidential business information, which might be discovered or observed by the inspectors during an on-site visit and then illicitly shared with competitors. The CMA and its counterparts in other countries were quite active and successful in helping to shape the CWC provisions designed to protect those data. Will Carpenter, *The Perspective of the Western Chemical Industry*, *in* SHADOWS AND SUBSTANCE, *supra* note 100, at 115.

120 In many instances, a chemical company's competitive advantage depends upon small, subtle insights about factors such as variations in temperature or pressure that might drive a chemical reaction more efficiently. Many of these elusive edges in corporate know-how do not qualify for patent protection, and only by jealously guarding its research results and production processes can a company continue to benefit from its secrets. Detlef Mannig, *At the Conclusion of the Chemical Weapons Convention: Some Recent Issues Concerning the Chemical Industry*, *in* SHADOWS AND SUBSTANCE, *supra* note 100, at 127, 145-46; E.P. Yesodharan, *The Chemical Weapons Convention: A Point of View from Industry*, UNIDIR NEWSL., (United Nations Institute for Disarmament Research, Geneva, Switzerland) Dec. 1992, at 28.

121 Barry Kellman et al., Disarmament and Disclosure—How Arms Control Verification Can Proceed Without Threatening Confidential Business Information (1994) (unpublished paper, on file with the *Northwestern University Law Review*). Throughout most of the early CWC negotiations, the United States had rigidly insisted upon developing an "anytime, anyplace" inspection regime, authorizing unlimited access to all locations inside a state party, as a device for deterring cheating. Eventually, however, American officials became equally concerned about the potential loss of U.S. national security information if foreign inspectors were allowed under the auspices of a CWC inspection to peruse at will through sensitive American defense installations. The result was the negotiation of a regime of "managed access," through which inspectors are granted substantial—but limited—opportunities to inspect military locations. Paul Lewis, *U.S. Now Prefers Limited Inspection of Chemical Arms*, N.Y. TIMES, Aug. 14, 1991, at A1.

security classified materials and to private industry's confidential business information.[122]

Finally, it is noteworthy that the financial costs of the CWC structure will be substantial, with some estimates of the Organization's annual operating budget running as high as $200-300 million.[123] The cumbersome data reporting process will require time and energy; merely gathering the required information and filling in the official forms will consume resources.[124] Hosting an inspection will also impose a burden, both upon the specific firm or facility being visited, and upon the country receiving the visitors.[125] Any international bureaucracy can grow almost organically to become an expensive proposition, and the CWC Organization—which is projected to employ some 225 headquarters staff members and 163 inspectors[126]—augurs to be no exception.[127] Therefore, the sheer cost of completing the CWC's required reports, verification, and dismantlings—even if the world

122 The Confidentiality Annex prohibits the unauthorized publication or release of information and requires the Director-General of the Technical Secretariat to establish a "stringent regime" for ensuring the protection of confidential information. CWC, *supra* note 1, Confidentiality Annex, A.2.

123 Olson, *supra* note 64, at 24. It is difficult to estimate the true cost of implementing the CWC, since so much about the verification apparatus remains to be worked out, and so many basic parameters (*e.g.*, how many states will become parties to the convention, how many on-site inspections will be necessary) remain indeterminate. Ember, *supra* note 112, at 16. Official estimates of the likely annual budget for the Organization have ranged from $81 million (Dutch) to $120 million (Canadian) to $160-180 million (American). Oudraat, *supra* note 97, at 21; *Status of 1990 Bilateral Chemical Weapons Agreement and Multilateral Negotiation on Chemical Weapons Ban, Hearing before Senate Foreign Relations Comm.*, 102d Cong., 1st Sess., (statement of Walter Busbee) (1991) [hereinafter *Status of 1990 Bilaterals*]. The PrepCom approved an operating budget of $8.8 million for 1993, but the level of funding is expected to rise sharply prior to, and after, the treaty's entry into force, as hundreds of inspectors are hired, trained, and dispatched. *Id.*; Ember, *supra* note 97, at 7, 11. *See also Highlights of the Fourth PreCom Plenary*, CWC CHRON., Oct. 1993, at 1, 2 (PrepCom budget will be approximately $16 million for the period before the treaty enters into force, and almost $38 million immediately thereafter). *But see* Amy E. Smithson, *Implementing the Chemical Weapons Convention*, SURVIVAL, Spring 1994, at 80 (stating that OPCW will not develop into a bloated, inefficient organization, as some international institutions have).

124 Chemical industry spokespersons have concluded that the additional administrative burden imposed by the new CWC reporting obligations will be a relatively minor accretion to the regulatory burden already inflicted upon the American chemical industry by a plethora of other environmental, safety, and related laws. In other, less developed, countries, however, the treaty's new commitments could require a significant increase in governmental and private commitments of administrative resources. Carpenter, *supra* note 119, at 115, 120-21; Yesodharan, *supra* note 120.

125 Olson, *supra* note 64.

126 U.S. ARMS CONTROL AND DISARMAMENT AGENCY, FIRST ANNIVERSARY OF THE SIGNING CEREMONY OF THE CHEMICAL WEAPONS CONVENTION 2 (1994).

127 However, unlike some international organizations, the OPCW is charged with a starkly limited—and diminishing—mandate. As the CWC proceeds through its first 10 years, the world's chemical weapons arsenals will be destroyed and the relevant facilities closed or converted. It is possible that, as fewer items and locations require the closest scrutiny, the OPCW's

economy were not experiencing a global recession—would come as a deterring expense, on top of a ledger already burdened with red ink.[128]

3. What These Things Are: The Existing CW Arsenal.—The CWC implicates three basic categories of items to be destroyed, and each carries its unique challenges: stockpiled weapons, non-stockpile weapons, and CW production facilities.

a. The active stockpile.—The current United States arsenal of chemical weaponry is a diverse and far-flung witch's brew of lethality.[129] The Army has retained, in varying states of readiness, a range of types of chemical agents, stored in bulk form or in a variety of types of munitions. There are two major categories of agents: nerve agents (designated GA or Tabun, GB or Sarin, and VX), which are odorless, colorless, and tasteless organophosphorus esters that attack the human nervous system directly, in both liquid and vapor forms;[130] and vesicant or blister agents (including mustard agents designated H, HD, and HT, as well as small amounts of the arsenical agent Lewisite or L) which cause damage to exposed skin or through inhalation.[131]

These agents are contained in some three million chemical weapons or systems[132] of three basic types, including: (1) various caliber rockets, land mines, mortars, cartridges, and projectiles, which have

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inspection operations will eventually shrink, too—unless the organization then steps up the pace of its verification inspections of private industry.

128 Mounir Zahran, *The Chemical Weapons Convention and Economic and Technological Development*, UNIDIR NEWSL., (United Nations Institute for Disarmament Research, Geneva, Switzerland) Dec. 1992, at 24.

129 *See generally* Sam A. Carnes & Annetta P. Watson, *Disposing of the US Chemical Weapons Stockpile*, 262 JAMA 653 (1989); NATIONAL RESEARCH COUNCIL, ALTERNATIVE TECHNOLOGIES FOR THE DESTRUCTION OF CHEMICAL AGENTS AND MUNITIONS 37-53 (1993) [hereinafter NRC ALTERNATIVES].

130 PROGRAM MANAGER FOR CHEMICAL DEMILITARIZATION, CHEMICAL STOCKPILE DISPOSAL PROGRAM FINAL PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT 2.3-2.5 (1988) [hereinafter PEIS]. Nerve agents, developed nearly simultaneously by both sides during World War II, act via inhibition of the enzyme acetylcholinesterase, leading to blockage of the transmission of nerve impulses and to convulsions and death (within 10 minutes) through paralysis of the respiratory system. Of the agents in the American stockpile, VX is the most lethal, the most resistant to detoxification, and the most environmentally persistent. The United States retains only small quantities of GB, the first nerve agent developed. *Id.* App. B.5-68; Michael A. Dunn & Frederick R. Sidell, *Progress in Medical Defense Against Nerve Agents*, 262 JAMA 649 (1989).

131 PEIS, *supra* note 130, at 2-5. Agent H contains 30% sulphur impurities, agent HD is a purified form, and agent HT is a hybrid having a lower freezing point and a longer period of effectiveness. Blister agents can cause damage to eyes, skin, and other tissues and have a variety of carcinogenic effects. *Id.* App. A.3; B.68-157; Carnes & Watson, *supra* note 129.

132 Paul Doty, *The Challenge of Destroying Chemical Weapons*, ARMS CONTROL TODAY, Oct. 1992, at 25.

"energetic" components such as fuzes, bursters, or propellants;[133] (2) bombs, which do not include energetics;[134] and (3) bulk storage drums, principally ton containers and some spray tanks.[135]

The stockpile is currently housed at eight locations around the continental United States, plus Johnston Atoll, with the following locations containing the specified percentages of the total American stockpile: Tooele Depot, Utah (42.3 percent); Pine Bluff Arsenal, Arkansas (12 percent); Umatilla Depot, Oregon (11.6 percent); Pueblo Depot, Colorado (9.9 percent); Anniston Depot, Alabama (7.1 percent); Aberdeen Proving Ground, Maryland (5 percent); Newport Ammunition Plant, Indiana (3.9 percent); and Lexington Depot, Kentucky (1.6 percent).[136] Each location has its own mixture of types of ordnance. Pueblo, for example, houses only an array of mustard, in several different configurations, but no nerve agents, while Aberdeen holds only ton containers of HD and Newport manages only ton containers of VX. The other locations contain a more diverse array of agents and munitions.[137]

These stocks are all at least twenty-five to forty years old, and are now in disparate physical condition.[138] In virtually all cases, the chemical agent has retained most of its lethality—these resilient chemicals have proven to possess a remarkably long shelf life.[139] Many of the munitions, especially those of more recent vintage, are also still in good working order. But some categories of weaponry or bulk storage—especially the M55 rockets—are reported to be leaking, as cor-

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133 PEIS, *supra* note 130, at 2-7. Many of the chemical munitions exist in multiple types and come from different production runs; they have also been configured with a variety of types of agents. For example, there are three families of 155mm projectiles equipped with different types of nerve and mustard agents. *Id.* App. A.2-8.

A fuse is the initial mechanical detonation device used to trigger the weapon's main charge. A burster is the primary explosive component of a projectile, rocket, or mine, used to disperse agent and metal fragments. The propellant is the fuel material that powers the flight of the rocket or projectile. *Id.* App. A.9.

134 The overall quantity of each type of munition and agent, and the exact amount stored at each location, are classified, but much detail is available nonetheless. PEIS, *supra* note 130, at 2-6, App. A.3-14.

135 *Id.* at 2-6. The ton containers currently store 61% of the total U.S. stockpile of agent. *Id.* at 1-5. In addition, some sites house a small quantity of agent, now stored in bulk form, removed from leaking munitions in the Drill and Transfer System (DATS). DATS is a mobile apparatus for draining and decontaminating small quantities of CW materiel that are too fragile to transport safely. *Id.* App. E.3; Rouse, *supra* note 9, at 42.

136 PEIS, *supra* note 130, at 2-6.

137 *Id.* at 2-8.

138 *Id.* at 1-6. The United States has not manufactured any new unitary chemical weapons since 1968. *Id.*

139 *See* Avis Thomas-Lester & Brooke A. Masters, *25 Houses Evacuated as WWI Shells Found*, WASH. POST, Jan. 7, 1993, at B1 (stating that even very old chemical munitions do not lose their potency); PEIS, *supra* note 130, at 2-5 (stating that active mustard is still found in trench areas of Europe that have been sealed from sun and rain since World War I).

rosive components deteriorate the packaging and containers.[140] The Army, which had long ago branded most of the CW reserves as practically worthless,[141] has expressed grave reservations about the fragility, transportability, and stability of some of the weapons,[142] and even routine, secure storage has sometimes become problematic.[143]

On the other hand, similar concerns had also surrounded the $73 million project—pressed upon the United States by squeamish European allies—for removing from an American military base near Clausen, Germany some one hundred thousand nerve gas artillery

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140 PEIS, *supra* at 2-9, App. E.3; COMMITTEE ON REVIEW AND EVALUATION OF THE ARMY CHEMICAL STOCKPILE DISPOSAL PROGRAM, NATIONAL ACADEMY OF SCIENCES, RECOMMENDATIONS FOR THE DISPOSAL OF CHEMICAL AGENTS AND MUNITIONS 46-51 (1994) [hereinafter NAS STOCKPILE COMMITTEE]. The M55 rockets, manufactured during the 1950s, include some munitions (about two percent of the total production), which were filled with impure GB agent, resulting in unusual corrosion and a high percentage of "leakers." These munitions are housed in specially enhanced storage facilities and monitored regularly. PEIS, *supra* note 130, at 2-4; Rouse, *supra* note 9, at 20-22; *Department of Defense Appropriations for 1989: Hearings before Subcomm. on the Dep't of Defense of the House Comm. on Appropriations*, 100th Cong., 2d Sess. 23-24 (1988); U.S. CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, DISPOSAL OF CHEMICAL WEAPONS: ALTERNATIVE TECHNOLOGIES 7-8 (1992) [hereinafter OTA ALTERNATIVES].

141 The Army has concluded that only 10% of the CW stockpile is now truly "useful," 18% is of "limited use," 11% is of "no use," and 61% is "not in useful form." Rouse, *supra* note 9, at 17-18; STOESSEL COMM'N, *supra* note 75, at 19; *Hearings on National Defense Authorization Act for Fiscal Year 1989 and Oversight of Previously Authorized Programs before the House Armed Services Comm.*, 100th Cong., 2d Sess. 158, 168 (1988); *Disposal of Chemical Munitions, Hearings before Investigations Subcomm. of House Armed Services Comm.*, 99th Cong., 1st Sess. 12 (1985) [hereinafter *Disposal of Chemical Munitions Hearings*]. Several factors have contributed to this limited utility, including the age and fragility of the ordnance and the fact that some of the projectiles and other items are the wrong size for current Army weaponry. NAS STOCKPILE COMMITTEE, *supra* note 140, at 43-45.

Simply storing and safely maintaining this aging stockpile has become a delicate and expensive undertaking. Annual storage and security costs for the CW were formerly estimated at $64 million, Rouse, *supra* note 9, at 18, 19; more recent cost estimates have elevated the pricetag to the $100 million range. NAS STOCKPILE COMMITTEE, *supra* note 140, at 32; *Status of 1990 Bilaterals*, *supra* note 123, at 21; U.S. ARMY CHEMICAL MATERIEL DESTRUCTION AGENCY, ANNUAL STATUS REPORT ON THE DISPOSAL OF THE LETHAL CHEMICAL STOCKPILE 20 (1992) [hereinafter 1992 ANNUAL REPORT].

142 The questions about the usefulness, reliability and safety of the existing stockpile of chemical weapons became controversial in the context of the early 1980s debates regarding the production of modern binary CW arms. Some contended that the Army was deliberately downplaying the effectiveness of the residual stockpile as a political ploy to gain approval for the new production. *See* R. Jeffrey Smith, *Congress Questions Binary Weapons Plan*, SCIENCE, May 20, 1983, at 802; George G. Weickhardt & James M. Finberg, *New Push for Chemical Weapons*, BULL. ATOM. SCIENTISTS, Nov. 1986, at 28; David C. Morrison, *Chemical Weapons Rerun*, 18 NAT. J. 1778 (1986).

143 PEIS, *supra* note 130, at 2-28. At each of the eight storage bases, chemical munitions are housed in a special containment area, secure even from the remainder of the military facility. The individual munitions are contained in boxes, drums, or on pallets, usually inside an "igloo" magazine constructed of reinforced concrete, covered with dirt. Some bulk containers are stored in warehouses or in outside yards. *Id.* at 2.6-2.9.

projectiles in late 1990.[144] Despite fears that the weapons might prove vulnerable to accidents, terrorism or other mishaps en route, the United States did safely transport the entire cache via truck, train, and ship to Johnston Atoll for storage and disposal without incident.[145]

b. Non-stockpile material.—In addition to the diverse set of chemical ordnance still counted as part of the active U.S. stockpile, the CWC requires the dismantling of "non-stockpile" weaponry, as well. This category includes two important sub-elements: modern "binary" weapons, and obsolete or abandoned stocks.[146]

The binaries are the newest category of United States chemical arms, manufactured at Pine Bluff, Arkansas beginning in December, 1987.[147] The original objective of the program was to generate three entirely new types of advanced CW nerve gas weapons to be safer and easier to handle than previous sorts.[148] Technical difficulties, how-

144 Marc Fisher, *U.S. Starts Pullout of Chemical Arms*, WASH. POST, July 27, 1990, at A1; R. Jeffrey Smith, *U.S. Plans Early Removal of Nerve-Gas Shells*, WASH. POST, Oct. 15, 1989, at A26; Ember, *supra* note 9, at 10.

145 GENERAL ACCOUNTING OFFICE, CHEMICAL WARFARE: DOD'S SUCCESSFUL EFFORT TO REMOVE U.S. CHEMICAL WEAPONS FROM GERMANY, (1991); U.S. ARMY, RECORD OF DECISION, JOHNSTON ATOLL CHEMICAL AGENT DISPOSAL SYSTEM, SECOND SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR THE STORAGE AND ULTIMATE DISPOSAL OF THE EUROPEAN CHEMICAL MUNITION STOCKPILE (1990) [hereinafter RECORD OF DECISION]; GREENPEACE, GREENPEACE REVIEW JOHNSTON ATOLL CHEMICAL AGENT DISPOSAL SYSTEM, FINAL SECOND SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (Alfred Picardi et al. eds., 1990) [hereinafter GREENPEACE 9/90 REVIEW]; Memorandum from the Federated States of Micronesia, Memorandum with Regard to the United States Department of the Army's Plan to Incinerate the European Stockpile of Chemical Weapons on Johnston Island (Apr. 6, 1990) (on file with the *Northwestern University Law Review*) [hereinafter Micronesia Memorandum]. It should be noted that the stockpile removed from Germany included some of the newest, most modern, and best maintained types of chemical weapons in the American stockpile, presumably the easiest and safest to transport. *Id.*; U.S. ARMY, ANNUAL STATUS REPORT ON THE DISPOSAL OF THE LETHAL CHEMICAL STOCKPILE 4 (1990); Greenpeace v. Stone, 748 F. Supp. 749 (D. Haw. 1990), *appeal dismissed as moot*, 924 F.2d 175 (9th Cir. 1991).

146 The recently-reorganized Army Program Manager for Non-Stockpile Chemical Materiel divides the items into five categories, including buried chemical materiel, recovered chemical materiel, former CW production facilities, binary CW, and miscellaneous CW materiel. Owen Statement, *supra* note 4, at 13; Defense Authorization Act of 1993, 10 U.S.C. § 2687 (Supp. 1994).

147 R. Jeffrey Smith, *U.S. Ushers In New Era Of Chemical Weapons*, WASH. POST, Jan. 15, 1989, at A1. A binary chemical weapon is one in which two independent, relatively nontoxic chemical agents are manufactured, transported, and stored separately; they are combined to make a lethal mixture only when the bomb or projectile is enroute to its target. By maintaining the physical separation of the two components, a binary munition is safer and easier to store and deploy than are existing "unitary" chemical weapons, which are extremely hazardous at all times. U.S. ARMY CHEMICAL MATERIEL DESTRUCTION AGENCY, SURVEY AND ANALYSIS REPORT ON THE NON-STOCKPILE CHEMICAL MATERIEL PROGRAM 3-1 (1993) [hereinafter NON-STOCKPILE REPORT]; STOESSEL COMM'N, *supra* note 75, at 32-36, 45-49.

148 The Multiple Launch Rocket System underwent prototype development, but no full-scale development or production was undertaken, and the project was mothballed in October 1990.

ever, plagued two of the systems, and the entire operation was suspended in 1990.[149] While the Army has not yet determined what methodologies to employ for destroying the binary weapons and associated materials, there are several promising options.[150] The fact that only small quantities are involved, the fact that the items are new and in relatively good shape, and the fact that the binaries were the first chemical weapons manufactured with any conscious consideration given to how they might ultimately be disposed of, should make this portion of the overall destruction task relatively accessible.

Abandoned or obsolete CW and CW-related materials pose a larger, more complicated and mysterious challenge. Throughout the twentieth century, the United States had created—and then forgotten—a wide variety of CW elements, CW identification and test kits, CW-contaminated wastes, and unexploded weapons.[151] Much of this materiel was buried, dumped at sea, or simply abandoned, with shockingly poor recordkeeping.[152] A recent attempt by the U.S. Army to pry open this legacy of neglect has suggested that as many as 215 sites in thirty-three states may still contain hazardous CW materials or wastes, and the survey is admittedly incomplete.[153] Thousands of recovered CW weapons and materials—some in very unstable condition, and some with explosive devices still attached—have been retrieved, destroyed on site, or transported to military bases for storage, but many more of these things still lie out there someplace.[154]

A recent nonfatal incident, in which several active World War I-vintage chemical weapons were accidentally unearthed by a construction crew at a housing site in Northwest Washington, D.C. (near the campus of American University) highlighted the dangers of this hid-

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The Navy's Bigeye Bomb advanced further, with some 200 test weapons being manufactured, but it, too, was canceled prior to full production. The M687 155mm artillery projectile was the only binary weapon that reached the full production stage. NON-STOCKPILE REPORT, *supra* note 147, §§ 3.1-3.2.

149 Resumption of the production of chemical weapons, after a hiatus since 1969, was extraordinarily controversial. The executive branch, the Congress, and the public were embroiled in annual pitched battles over the program, resulting in acrimony which intensified when the new munitions did not seem to perform as well as anticipated. Blaine Harden, *The Gassing of Washington*, WASHINGTONIAN, Feb. 1984, at 125; Morrison, *supra* note 142.

150 NON-STOCKPILE REPORT, *supra* note 147, at 3-2. The various components of a binary weapon could be individually incinerated, neutralized, or (since key ingredients include sulphur and alcohol) resold to the public.

151 *Id.*

152 *Id.* §§ 2.1-2.6.

153 *Id.* § 2.6 (stating that Army undertook elaborate efforts to discover government records that might reveal CW sites, but cannot be confident that all CW-contaminated locations have been identified).

154 *Id.* §§ 4.1-5.10. The variety of substances included within the "abandoned" category and the poor condition of many of them, will make the dismantling task complex and hazardous. *Id.* *See* U.S. GOV'T, ENVIRONMENTAL IMPACT REVIEW OF THE CHEMICAL WEAPONS CONVENTION 15 (1994) [hereinafter ENVIRONMENTAL REVIEW].

den arsenal.[155] No one can be certain how much such materiel exists, where it lurks, or what its condition may be. The CWC imposes certain obligations to recover, store, or safely dispose of even this immeasurable danger[156]—and the cognate problem of abandoned CW outside the continental United States may loom even larger.[157]

c. CW-related facilities.—Under the CWC, the United States must eliminate or convert seven major former CW production facilities.[158] Many of these facilities involve multiple sites; some include both relatively new buildings (perhaps worth converting to other purposes) and decrepit, contaminated structures (posing complex dismantling and cleanup challenges).[159] Several of these installations are also locations where existing stockpiles of CW are currently housed (*e.g.*, Newport, Indiana (where nerve agent VX was manufactured) and Pine Bluff, Arkansas (where the binary weapons were produced)).[160] Other sites, however, no longer house any active CW (*e.g.*, Muscle Shoals, Alabama (where GB was produced) and Rocky Mountain Arsenal, Colorado (where GB was also manufactured)),[161]

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155 NON-STOCKPILE REPORT, *supra* note 147, at A-129; Martin Weil, *Some Staying Put in Spring Valley*, WASH. POST, Jan. 26, 1993, at D1; Thomas-Lester & Masters, *supra* note 139, at B1 (reporting that 131 munitions were retrieved and that 72 homes were evacuated repeatedly during the daylight hours to allow crews to search the site safely).

156 The CWC deals with "old" chemical weapons (*i.e.*, those produced before 1925 or produced between 1925 and 1946 that have deteriorated to such an extent that they can no longer be used as weapons), CWC, *supra* note 1, art. II.5, and imposes limited obligations to destroy them (*i.e.*, generally exempting weapons buried before 1977 or dumped at sea before 1985). *Id.* art. III.2, VI.17, Verification Annex, Part IV (B). Under the CWC, the United States is not generally obligated to excavate and recover the CW that might be buried on its territory. But if the United States does nonetheless elect to dig up old chemical weapons (during or after the initial 10-year destruction period), the government must declare the munitions, make them available for international inspection, and destroy them as either chemical weapons or toxic wastes. NON-STOCKPILE REPORT, *supra* note 147, at 9-12.

157 U.S. ARMY CHEMICAL MATERIEL DESTRUCTION AGENCY, INTERIM SURVEY AND ANALYSIS REPORT ON THE NON-STOCKPILE CHEMICAL MATERIEL PROGRAM (1993) (preliminary version of document subsequently issued as the NON-STOCKPILE REPORT, *supra* note 147, at 12, 16) (stating that the Army is collecting information about U.S. chemical weapons abandoned overseas during World War I and II eras, and about American and other sea burial of chemical weapons in 1945 and the late 1960s).

158 CWC, *supra* note 1, art. V. The relevant facilities are located at: Pine Bluff Arsenal, Arkansas; Newport Army Ammunition Plant, Indiana; the Edgewood Area of Aberdeen Proving Ground, Maryland; Northrup Carolina Corp. (Swannanoa), North Carolina; Marquardt facility, Van Nuys, California; Phosphate Development Works, Muscle Shoals, Alabama; and Rocky Mountain Arsenal, Colorado. NON-STOCKPILE REPORT, *supra* note 147, at 6-1.

159 NON-STOCKPILE REPORT, *supra* note 147, §§ 6.1-6.9; Robert Mikulak, *Destruction of U.S. Chemical Weapons Production and Filing Facilities*, *in* CHEMICAL WEAPONS: DESTRUCTION AND CONVERSION 57 (Stockholm International Research Institute ed., 1980).

160 Julian Perry Robinson, *Review: World CW Armament, Part I: The United States*, CHEMICAL WEAPONS CONVENTION BULL., Autumn 1988, at 12, 16; NON-STOCKPILE REPORT, *supra* note 147, at 6-3.

161 Robinson, *supra* note 160, at 16-17.

but the lingering hazards of CW contamination may be profound. Another complicating factor is the ownership of the sites: most are still the property of the U.S. government, but some are now privately owned, currently used for purposes unrelated to chemical weapons (but still subject to the terms of the CWC).[162] The Army has not yet developed site-specific plans for dealing with each of these diverse circumstances,[163] but the process of clean-up, demolition, and site abatement is already underway at some of them.[164]

In addition, the cost considerations of the CW destruction effort have become staggering. As noted, the current (and rapidly rising) estimate for destroying solely the stockpile elements of the total American CW inventory is $8.6 billion.[165] The projections regarding the non-stockpile components are even more unreliable, due to inadequate information about the size and extent of the problem,[166] but the Army currently estimates (on an order-of-magnitude basis) the final bill at $17.7 billion, with a completion date of 2034.[167]

Overall, then, the several categories of chemical weaponry, chemical weapons production facilities, and their associated items inherently pose some special problems for CWC dismantling and verification. The lethal agents can be quite concentrated, and even a fully weaponized package may be compact, easily portable, and concealable.[168] The "dual capability" of many chemical substances has already been noted—the same materials can be transformed relatively quickly, easily, and covertly into pharmaceuticals or weapons (and back again). The facilities for manufacturing or storing chemical weapons may likewise be multi-functional and practically indistinguishable from thousands of other light industrial or military build-

162 NON-STOCKPILE REPORT, *supra* note 147, at 6-6.

163 *Id.* §§ 6.1-6.9 (describing how some locations may require abatement of other hazards, such as asbestos, in addition to CW cleanup).

164 *Id.* at 6-6; ENVIRONMENTAL REVIEW, *supra* note 154, at 12-13 (describing how selected facilities at Aberdeen, Maryland, Muscle Shoals, Alabama, and Rocky Mountain Arsenal, Colorado are currently undergoing demolition or conversion, independently of the CWC requirements).

165 *See supra* note 4.

166 NON-STOCKPILE REPORT, *supra* note 147, §§ 9.1-9.15.

167 *Id.* at 9-1. The range of cost possibilities is $13-31 billion. *Id.* at 9-14. The portion of the non-stockpile mass that would have to be destroyed on an expedited basis in order to comply with the CWC would cost $1.1 billion, and the Army has concluded that this segment of the job could be accomplished by January 2005. *Id.* at 9-1. January 1995 is the earliest possible date upon which the CWC could enter into force, and if the United States were an original party, the American CW would have to be dismantled within 10 years after that. *See supra* text accompanying notes 106-07.

168 BURCK & FLOWERREE, *supra* note 69, at 6 (a quart jar of nerve gas would contain one million lethal doses).

ings.[169] Even the actual use of chemical ordnance on the battlefield may be hard to establish; conclusive evidence has often proven difficult to collect.[170]

All of this means that the inspection powers of the CWC must be exceptionally intrusive and robust, and that the elimination function must be thorough. The elusiveness of the chemical weapons, and the importance for international security of destroying them promptly and reliably, put unprecedented pressure on the treaty's dismantling provisions.

III. The Public Policy of Environmental Protection

The United States and other countries are much more conscious today about environmental protection[171] issues and dangers than ever before, and people have become much more willing (even insistent) to pay a price, in financial or other terms, in order to pursue ecological priorities.[172] A torrent of domestic environmental statutes and inter-

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169 Experts dispute how readily a particular facility could be covertly adapted to illicit CW production and then quickly and thoroughly cleaned up before international inspectors could arrive. *Id.* at 583-611; Gordon M. Burck, *Chemical Weapons Production Technology and the Conversion of Civilian Production*, Arms Control, Sept. 1990, at 122.

170 Storella, *supra* note 69, at 19-23; Lawrence K. Altman, *Poison Gas Attacks: Why a Diagnosis Is So Difficult*, N.Y. Times, Sept. 18, 1988, at 14; Paul G. Cassell, Note, *Establishing Violations of International Law: "Yellow Rain" and the Treaties Regulating Chemical and Biological Warfare*, 35 Stan. L. Rev. 259 (1983); Hu et al., *supra* note 82; CWC, *supra* note 1, Verification Annex, Part XI.

171 This Article adopts the broadest sense of the term "environmental protection," embracing a wide and dynamic range of statutes and other acts that promote and safeguard the biosphere. The Article, however, concentrates most heavily upon the core areas of environmental impact analysis and antipollution measures. *Cf.* John Cruden, *Environmental Law and National Security*, *in* National Security Law 1169 (John N. Moore et al. eds., 1990); Hanly v. Mitchell, 460 F.2d 640 (2d Cir.), *cert. denied*, 409 U.S. 990 (1972); Metropolitan Edison Co. v. People Against Nuclear Energy, 460 U.S. 766 (1983); *see also* Environmental Effects Abroad of Major Federal Actions, Exec. Order No. 12,114, 3 C.F.R. 356 (1980), *reprinted in* 42 U.S.C. § 4321 (1988); START I LEIS, *supra* note 47 (analyzing the treaty's possible effect upon air quality, noise, water resources, soil, cultural resources, visual resources, transportation, biological resources, human health and safety, and socioeconomics).

172 *See Fact Sheet: Global Environmental Issues*, U.S. Dep't of State Dispatch, Aug. 1993, at Supp. 23 ("The environmental challenges confronting the world today are greater than at any time in recent history. Threats to the global environment—such as climate change, stratospheric ozone depletion, and the loss of biological diversity and forests—affect all nations, regardless of their level of development. As a result, the environment is becoming an increasingly important part of the foreign policy agenda. The United States accords high priority to addressing global environmental problems and is pursuing a wide-ranging agenda of action to protect the environment and promote the goal of sustainable development."). *See also* Chemical Manufacturers Association, U.S. Chemical Industry Statistical Handbook 117 (1992) (stating that U.S. chemical industry's capital expenditures for pollution abatement equipment in 1991 totalled $2.4 billion (12% of the industry's total fixed capital investment that year) and the industry's gross operating costs for pollution control came to $4.5 billion in 1991, about 1.5% of the industry's value of shipments).

national treaties[173] has reflected this newfound interest, as wasteful or polluting practices and attitudes that were commonplace only a few years ago have suddenly become abhorrent and aberrational.[174] Environmentalism's international perspective, in particular, has emerged as a salient force, in recognition of the fact that the planet's natural resources are interconnected, oblivious to human political boundaries.[175]

In institutionalizing the elevated status of domestic and global environmental concerns, the United States government has promulgated a series of regulatory provisions that require federal officials to take the national and/or international ecology into account at the outset of any major governmental undertaking and to maintain a watchful eye on that set of priorities throughout the life of the project.[176] For example, Circular 175,[177] the basic State Department guidance for the initiation and conduct of treaty negotiations,[178] now directs diplomats to consider the environmental aspects of a proposed international agreement at the beginning of the bargaining and throughout the evolution of any text.[179] Similarly, the internal procedural rules of the

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173 Edith B. Weiss, *International Environmental Law: Contemporary Issues and the Emergence of a New World Order*, 81 GEO. L.J. 675 (1993) (noting that nearly nine hundred treaties are either primarily or partially directed at international environmental issues).

174 For example, prior to the Marine Protection, Research and Sanctuaries Act of 1972, 33 U.S.C. §§ 1401-45, 16 U.S.C. §§ 1431-34 (1988), "placement in the deep ocean was the preferred method for large-scale disposal of chemical agents and munitions." PEIS, *supra* note 130, at 2-85. Today, that practice is widely regarded as inadmissible, and the Army has made no effort to revive it. *Id.*; Basel Convention on the Control of Transboundary Movements of Hazardous Waste and Their Disposal, Mar. 22, 1989, 28 I.L.M. 649 [hereinafter Basel Convention]; *infra* text accompanying notes 374-78.

175 Weiss, *supra* note 173, at 675 (noting that 20 years ago, there were barely 3 dozen international agreements related to environmental law, but today, progress has been so rapid that international environmental law "is arguably setting the pace for cooperation in the international community in the development of international law," and that "[t]his proliferation of legal instruments is likely to continue"); POTENTIAL USES, *supra* note 58, at 4-5 (noting "the vulnerability of different parts of the world to each other's environment").

176 *See* 40 C.F.R. §§ 1500-1508 (1993). CEQ regulations are binding upon other federal agencies and impose substantive and procedural obligations upon them. 40 C.F.R. §§ 1500.2, 1500.3, 1501.1, 1501.2 (1990).

177 U.S. DEP'T OF STATE, HANDBOOK ON TREATIES AND OTHER INTERNATIONAL AGREEMENTS § 720 (1985) (discussing the negotiation and signature of treaties and other international agreements) [hereinafter HANDBOOK].

178 The Circular 175 Procedure is designed "to facilitate the application of orderly and uniform measures and procedures for the negotiation, signature, publication, and registration of treaties and other international agreements of the United States" and to ensure that "the making of treaties and other international agreements for the United States is carried out within constitutional and other appropriate limits." *Id.* §§ 711.a, 720.2.a.

179 A request for authorization to begin treaty negotiations or to sign an international agreement takes the form of an "action memorandum" addressed to the Secretary of State under the Circular 175 Procedure. The rules now provide that "[a]n action memorandum dealing with an agreement that has a potential for adverse environmental impact should contain a statement

key bureaucratic elements in the foreign affairs community—State,[180] the Department of Defense,[181] and the Arms Control and Disarmament Agency[182]—each contain elaborately detailed procedures for ensuring that environmental issues and dangers are not overlooked in the conduct of national security deliberations.

Arms control is a prototypical field in which the concerns about environmental protection are finally gaining a firm hold. As surveyed above,[183] the early generations of disarmament pacts were essentially oblivious to environmental responsibilities[184]—the treaties contained no provisions related to safeguarding the environment, and the nego-

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indicating whether the agreement will significantly affect the quality of the human environment." *Id.* § 722.3.g.

180 22 C.F.R. § 161 (1993). Notably, Section 161.5 requires the State Department to incorporate attention to environmental concerns "at the earliest practicable stage" in the evolution of a project, and Section 161.7(c)(3) provides that normally an environmental assessment will be required for actions involving "[o]cean dumping, control of toxic substances, disposal and storage of wastes and radioactive substances." *Id.*

181 In the Pentagon, the Office of the Secretary of Defense has promulgated department-wide regulations to ensure adequate attention to environmental concerns. 32 C.F.R. §§ 187-88 (1993). Each of the three main military services has developed its own substantive and procedural standards for implementation of the overall directives. 32 C.F.R. § 651 (1993) (Army); 32 C.F.R. § 775 (1993) (Navy); 32 C.F.R. § 989 (1993) (Air Force).

The U.S. Army is the acknowledged leader in complying with NEPA and Exec. Order No. 12,114, often forging ahead of the civilian agencies in developing internal environmentally conscious procedures. Nicholas Robinson, *Environmental Impact Assessment Abroad*, *in* SELECTED CONTRIBUTIONS TO THE PROCEEDINGS OF A CONFERENCE ON NEPA 90, 111 (1989); John S. Doyle, Jr., The Department of the Army and NEPA, Address to the Conference on the Preparation and Review of Environmental Impact Statement (Nov. 1987), *in* ENVIRONMENTAL IMPACT ASSESSMENT 19, 20 (Nicholas Robinson ed., 1988) (indicating that the Army Civil Works program has prepared nearly 4,000 draft, revised, final and supplementary environmental impact statements).

182 Environmental Impact Statements, 42 Fed. Reg. 5115-17 (1977) (Arms Control and Disarmament Agency) (outlining internal procedures for evaluating environmental aspects of agency activities). The agency procedures note, *inter alia*, that "projects such as the destruction of weapons in accordance with the provisions of an international arms control agreement would be the subject of environmental impact statements, if otherwise required, prepared by the Department of Defense, the Department of State, or other lead agency." *Id.* at 5116.

183 *See supra* text accompanying notes 10-54 (discussing the early arms control agreements).

184 At least one earlier arms control treaty was partially affected by NEPA procedures. In 1977, the multilateral Environmental Modification Convention (EnMod Convention), *see supra* note 22, was concluded, outlawing the application of certain techniques for manipulating the natural processes of the earth in international conflict. When the U.S. government failed to provide any official analysis pursuant to the then-new NEPA, the Natural Resources Defense Council sued the U.S. Arms Control and Disarmament Agency. The settlement of that case required the agency to prepare a draft and (after responding to public comments) final "environmental assessment" of the EnMod Convention. That document, however, does not technically conform to the modern requirements of an official "environmental assessment," because it contains neither a "finding of no significant impact" nor a conclusion that a full EIS is necessary. ARMS CONTROL AND DISARMAMENT AGENCY, ENVIRONMENTAL ASSESSMENT FOR THE CONVENTION ON THE PROHIBITION OF MILITARY OR ANY OTHER HOSTILE USE OF ENVIRONMENTAL MODIFICATION TECHNIQUES (undated document; published in 1978).

tiators seemingly considered those kinds of issues to be outside the scope of their mandate.[185] More recently, however, an encroachment has begun, with the national security community at last beginning to acknowledge the linkage between weaponry and the environment, especially where dismantling of excess arms is being required.[186]

The 1991 START I accord was the first arms control instrument for which something approaching a full-scale environmental impact statement[187] (EIS) was prepared.[188] Although this tome did not quite meet the formal requirements expected in other areas,[189] it was un-

185 The LTBT, *supra* note 13, banning nuclear weapons explosions in the atmosphere, in outer space, or under water, was motivated at least in part by the desire to stem the environmental hazards associated with above-ground nuclear testing, known to spew radioactive materials around the globe. In fact, the treaty may have been more successful as an environmental protection measure than as an arms control tool because it allowed continued testing underground and because the parties sustained and even accelerated their testing programs in unmitigated pursuit of additional types of nuclear devices. *See* ACDA TREATY BOOK, *supra* note 7, at 37-44 (describing the treaty and the negotiations and activities preceding its signing).

186 Upon the conclusion of the 1987 INF Treaty, *see supra* note 33, the Army prepared a partial environmental assessment, evaluating the contemplated elimination of several hundred U.S. missiles, examining alternative methods and sites for the destruction activities, and finding that the program would have "no significant impact" on the environment. The document, however, studied only the weapons destruction aspect of the treaty, overlooking any other potential (probably more minor) effects. DEPARTMENT OF THE ARMY, ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED ELIMINATION OF INTERMEDIATE-RANGE AND SHORTER-RANGE MISSILES PURSUANT TO THE INF TREATY (1988) [hereinafter INF TREATY ENVIRONMENTAL ASSESSMENT]; Corps of Engineers, Dep't of the Army, Pershing Missiles Elimination, Pueblo, Colo., et al., Finding of No Significant Impact, 53 Fed. Reg. 6189 (1988). *See also* DEPARTMENT OF THE ARMY, SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED ELIMINATION OF INTERMEDIATE-RANGE AND SHORTER-RANGE MISSILES AT PUEBLO ARMY DEPOT ACTIVITY PURSUANT TO THE INF TREATY (1988).

187 *See infra* part III.A (describing NEPA and the EIS requirements).

188 START I LEIS, *supra* note 47, *passim.*

189 The document was a "legislative" EIS. Pursuant to CEQ regulations, a legislative EIS ("LEIS") is appropriate when an agency submits a proposal to Congress (other than a budgetary submission) for a major federal action, including a treaty. The content and format of an LEIS should be the same as those of a regular EIS, but in recognition of the expedited legislative timetable, a more streamlined production process is applicable in which the agency may omit the customary steps of "scoping" (outlining the issues to be addressed in the EIS) and preparing a revised final EIS pursuant to public comments. An LEIS is to be submitted within 30 days after the transmittal to Congress of the relevant legislative proposal, including a request for ratification of a treaty. 40 C.F.R. §§ 1506.8, 1508.17 (1993). *See also* KEN LERNER & EDWARD A. TANZMAN, PRODUCTION OF A LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT FOR THE CHEMICAL WEAPONS CONVENTION (1992); Andrus v. Sierra Club, 442 U.S. 347 (1979) (holding that no EIS is necessary for appropriations bill).

In the case of the START I LEIS, the document was prepared and submitted on a timely basis by the Air Force. The LEIS, however, did not quite acknowledge that the executive branch was legally required by NEPA to provide the document, and it is also not clear whether the LEIS received the full range of interagency evaluation and clearance that would ordinarily be required. The Air Force was designated as the "Lead Agency on behalf of the Department of Defense," and the Department of the Navy was acknowledged as a "cooperating agency," but there is no showing that the Department of State, the Department of Energy, the Arms Control

doubtedly a serious, substantial effort to supply the type of investigation, analysis, and disclosure demanded by statute.[190] The document elaborately compared the contemplated environmental impact of the treaty (especially the provisions requiring the United States to retire and dismantle hundreds of strategic nuclear systems[191] and the associated verification arrangements) with the alternative status quo option and provided an impressive, sensitive discussion of the range of relevant considerations.[192] A similar, albeit smaller, document (styled as a supplemental legislative EIS)[193] was prepared in connection with the 1993 START II accord.[194]

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and Disarmament Agency, the Environmental Protection Agency, or other potentially affected agencies participated, too. START I LEIS, *supra* note 47, title page. The START II Supplementary LEIS explicitly notes that it is "a DOD document and does not provide detailed analysis of Department of Energy operations and procedures." DEPARTMENT OF THE AIR FORCE, U.S. DEP'T OF DEFENSE, START II SUPPLEMENTAL LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT cover sheet (1993) [hereinafter START II SLEIS]. *See also* 40 C.F.R. § 1501.5-6 (1993) (describing the duties of lead and cooperating agencies); JOHN E. BONINE & THOMAS O. MCGARITY, THE LAW OF ENVIRONMENTAL PROTECTION 112, 131-33, 137 (2d ed. 1992) (describing the duty to prepare legislative EIS and the procedures for preparation, including interagency cooperation and designation of a "lead agency" where applicable).

190 The START I LEIS outlined the dismantling work that would involve the Army and Navy, as well as the Air Force, and would affect 30 communities in 20 states. The contractors who drafted the document drew upon 27 people of diverse interdisciplinary expertise to compile the 200-page document. It assessed the aspects of the environment that might be affected by the project, including air quality, noise, water resources, soil, cultural resources, and visual resources. START I LEIS, *supra* note 47, *passim.*

191 The treaty limits each side to 1600 strategic nuclear systems, containing a total of 6000 warheads. *Id.* § 2.1, at 2-1.

192 The LEIS concluded that the "no-action alternative" (a failure to ratify the START I agreement) was itself a dynamic option under which the United States would undertake a variety of weapons eliminations, regardless of possible Soviet actions. The treaty would require more of these eliminations, and at a faster pace, so the comparative impact upon the environment was evaluated. The document did not evaluate any other possible options, such as renegotiating portions of the treaty. *Id. passim.*

It is also noteworthy that the U.S. Senate, in providing its advice and consent to the treaty, attached to the resolution of ratification an additional proviso that in implementing the treaty, the United States would initiate deliberations with Russia regarding methods for eliminating missile silo launchers "in ways that would minimize the impact of such elimination on the environment, including the impact on water wells and aquifers." 102d Cong., 2d Sess., 138 CONG. REC. 15955 (1992). *See also* Paul Hoversten, *Treaty's 'Big Risk,'* USA TODAY, Sept. 17, 1992, at 3A (discussing fears of farmers near missile sites that silo destruction will affect their water supply).

193 START II SLEIS, *supra* note 189, *passim.* The document is much shorter than the START I LEIS, reflecting the fact that most of the START II environmental impacts were identical or cumulative to those already evaluated. The START II accord requires more extensive dismantlings than did the START I, but the activities, and their likely effects on soil, water, and air are cognate.

194 The most important potential environmental impact of START II that was not anticipated in the START I LEIS concerned the new requirements for de-activating the Peacekeeper missile system at Warren Air Force Base in Wyoming, so the supplemental LEIS addressed that item in more detail. *Id.*

The CWC, however, raises the stakes—and the potential clash between disarmament and environmentalism—by an order of magnitude. The chemical accord implicates such a vast array of ecological concerns, and the destruction requirements go so directly to the heart of the transaction, that environmentalism is inextricably implicated. The two social forces of arms control and environmental protection—public policy worlds that had previously only barely begun to interact at all[195]—are now drawn into full-fledged confrontation and/or collaboration. Interest communities that have previously followed either one set of issues or the other will now require a crash course in the opposite discipline, in the hope that the combination of national concerns can be managed in a mutually supportive, rather than an entirely hostile, fashion.[196]

This Article cannot hope to provide a thorough overview of environmental protection law and practice.[197] Instead, it aims to supply

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195 *See* Theresa Hitchens, *Safety Fear Clouds U.S. Nuke Proliferation Plan*, DEF. NEWS, Dec. 13-19, 1993, at 8. Most of the significant occasions to date where these two fields collided have involved military-related activities (such as testing weaponry, training troops, constructing installations, or fighting wars) in locations that jeopardized sensitive natural ecosystems. *See* Cruden, *supra* note 171, at 1169; POTENTIAL USES, *supra* note 58, at 5-7. Some of the other previous intersections between environmentalism and national security have been quixotic, to say the least. *See In Brief: Clean Bombs*, BULL. ATOM. SCIENTISTS, July-Aug. 1993, at 4 (observing that in response to EPA's plan to ban chlorofluorocarbons (CFCs) by 1996, Air Force is replacing its nuclear missile cooling systems with CFC-free models). If one adopts somewhat broader definitions of the concepts of both "environmentalism" and "national security," then a larger set of overlaps appears, due to the nation's long-run interest in sustainable, fair, and safe activities. *See* JOHN HOLDREN ET AL., ENVIRONMENTAL DIMENSIONS OF SECURITY (1992); Peter H. Gleick, *Environment and Security: The Clear Connections*, BULL. ATOM. SCIENTISTS, Apr. 1991, at 16 (arguing that certain enviromental concerns are appropriately considered national security interests); Daniel Deudney, *Environment and Security: Muddled Thinking*, BULL. ATOM. SCIENTISTS, Apr. 1991, at 22 (analyzing analogies between enviromental problems and national security concerns).

196 *See generally* David C. Morrison, *No Easy Out*, 23 NAT'L J., 1100-01 (1991) (quoting Greenpeace spokesperson Sebia A. Hawkins as commenting on CW elimination that "[i]t's not a matter of 'green versus peace'; you don't have to compromise on either mission. They are not mutually exclusive"); Susan E. Davis, *The Battle Over Johnston Atoll*, WASH. POST HEALTH MAG., Apr. 9, 1991 (quoting Brookings Institution expert Elisa Harris as saying that, "[i]n the past, arms control people and environmentalists have been on the same side . . . . With [CW] incineration, these groups are on opposing sides").

197 Among the growing literature on environmental law are BONINE & MCGARITY, *supra* note 189, *passim*; Cruden, *supra* note 171; ROGER W. FINDLEY & DANIEL A. FARBER, ENVIRONMENTAL LAW IN A NUTSHELL (3d ed. 1992); JAN G. LAITOS & JOSEPH P. TOMAIN, ENERGY AND NATURAL RESOURCES LAW IN A NUTSHELL (1992). On the special subject of the CWC and the environment, see GUALTIERI ET AL., *supra* note 109, *passim*; J. AROESTY ET AL., DOMESTIC IMPLEMENTATION OF A CHEMICAL WEAPONS TREATY (1989); BARRY KELLMAN ET AL., MANUAL FOR NATIONAL IMPLEMENTATION OF THE CHEMICAL WEAPONS CONVENTION 84-98 (1993) [hereinafter IMPLEMENTATION MANUAL]; DEPARTMENT OF THE ARMY CHEMICAL WEAPONS TREATY OFFICE ET AL., CHEMICAL WEAPONS TREATY VERIFICATION TECHNOLOGY RESEARCH AND DEVELOPMENT (1991) [hereinafter VERIFICATION TECHNOLOGY]; Paul Doty, *The Challenge of Destroying Chemical Weapons*, ARMS CONTROL TODAY, Oct. 1992, at 25.

only a basic primer, introducing those elements of substantive and procedural environmental jurisprudence that will carry the greatest impact (*i.e.*, cause the most potential problems) for timely and effective implementation of the CWC.

A. National Environmental Policy Act (NEPA)

Any survey of American environmental law must begin (both chronologically and in importance) with the National Environmental Policy Act of 1969,[198] America's "environmental constitution."[199] For our purposes, the most important NEPA provision is the mandate that a government agency contemplating a "major federal action" must study the likely environmental impacts; the agency must collect a diverse range of data, analyze alternative courses of action, consider possibilities for avoiding or mitigating untoward environmental effects, and publish findings for public comment prior to making a final decision.[200] NEPA itself is not "substantive" in the sense of establishing standards for permissible levels of emissions or other disruptions, and it does not require the agency to select the policy option that is determined to have the least adverse environmental effects.[201] But the statute and the EIS process have nonetheless revolutionized the field, according environmental issues a much higher visibility than ever before and forcing agencies, through the glare of publicity (and litigation), to become more environmentally conscious and responsible.[202]

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198 42 U.S.C. §§ 4321-4370(a) (1988 & Supp. 1994) (codifying Pub. L. No. 91-190 et seq. (1970), as amended). *See generally* BONINE & MCGARITY, *supra* note 189, ch. 1 (beginning casebook on environmental law by considering NEPA); JACOB I. BREGMAN & KENNETH M. MACKENTHUN, ENVIRONMENTAL IMPACT STATEMENTS chs. 1, 2 (1992) (beginning consideration of EISs by discussing NEPA); VERIFICATION TECHNOLOGY, *supra* note 197, § 4 (beginning analysis of enviromental impact documents required for the CWC with a consideration of NEPA); FINDLEY & FARBER, *supra* note 197, at 23; LAITOS & TOMAIN, *supra* note 197, at 218.

199 David A. Wirth, International Decision Note, *Environmental Defense Fund v. Massey*, 87 AM. J. INT'L LAW 626, 627 (1993) (citing City of Roswell v. New Mexico Water Quality Control Comm'n, [1973] 3 ENVTL. L. REP. (Envtl. L. Inst.) 20,181, 20,183 (N.M. Ct. App. 1972)).

200 42 U.S.C. § 4332 (1988). *See also* FINDLEY & FARBER, *supra* note 197, at 47; LAITOS & TOMAIN, *supra* note 197, at 220, 235; LERNER & TANZMAN, *supra* note 189, § 2.1 at 1-4 (discussing NEPA procedures for creating an EIS); Cruden, *supra* note 171, at 1174-75.

201 Robertson v. Methow Valley Citizens Council, 490 U.S. 332 (1989); Strycker's Bay Neighborhood Council v. Karlen, 444 U.S. 223 (1980) (per curiam); Cruden, *supra* note 171, at 1180.

202 BONINE & MCGARITY, *supra* note 189, at 17-27 (noting that NEPA has been called an "environmental bill of rights"); FINDLEY & FARBER, *supra* note 197, at 56; LAITOS & TOMAIN, *supra* note 197, at 218. *But see* Lance D. Wood, In Preparing, Using, and Defending Environmental Impact Statements, Do Federal Agencies Exalt Form Over Substance, Address to the Conference on the Preparation and Review of Environmental Impact Statements (Nov. 1987), *in* Environmental Impact Assessment, *supra* note 181, at 196-97 (suggesting that too often an EIS is a mere "paper exercise" or "post hoc rationalization," not treated as an important component of an agency's real planning process).

Several aspects of the international reach of NEPA, however, have never been completely clear,[203] and judicial cases have periodically tested the extraterritorial application of the statute, its relevance to treaties, and its role in national security matters.[204] The D.C. Circuit, for example, has recently ruled that the National Science Foundation (NSF) must prepare an EIS regarding its intention to emplace a food waste incinerator at its McMurdo research station in Antarctica.[205] The court did not rule that NEPA automatically applies to all U.S. government activities outside the country, and it focused on the special jurisprudential status of Antarctica.[206] However, the court

203 The Supreme Court has established a general presumption against the extraterritorial application of ordinary legislation, holding that unless the Congress clearly specifies otherwise, a statute is to be construed as applying only within the territorial boundaries of the United States. Equal Employment Opportunity Comm'n v. Arabian Am. Oil Co., 499 U.S. 244, 248 (1991) (calling the presumption "a long-standing principle of American law"). *See* RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 403 cmt. g (1987).

204 The statutory language of NEPA is extremely broad in outlook, directing that "to the fullest extent possible," federal agencies shall "recognize the worldwide and long range character of environmental problems and, where consistent with the foreign policy of the United States, lend appropriate support to initiatives, resolutions and programs designed to maximize international cooperation in anticipating and preventing a decline in the quality of mankind's world environment. . . ." 42 U.S.C. § 4332(2)(F) (1988). *See* Environmental Impact Assessment, *supra* note 181, at 105-07.

In several cases, courts have insisted upon the production of a suitable EIS even when much of the studied activity occurs outside the territory of the United States. *See* BONINE & MCGARITY, *supra* note 189, at 82; Cruden, *supra* note 171, at 1213-17; Wirth, *supra* note 199, at 630-35; Douglas E. Baker, Note, *Anticipating* Lamm v. Weinberger II (Romer v. Carlucci): *The Political Question Doctrine, MX Missiles, and NEPA's Environmental Impact Statement*, 21 CREIGHTON L. REV. 1245 (1988); *see also* National Org. for the Reform of Marijuana Laws v. Department of State, 452 F. Supp. 1226, 1232-33 (D.D.C. 1978) (deciding that NEPA applies to U.S. participation in Mexican government's program to spray paraquat and 2,4-D herbicides onto marijuana and poppy plants inside Mexico based upon the effects of the spraying in the United States); Wilderness Soc'y v. Morton, 463 F.2d 1261 (D.C. Cir. 1972) (per curiam) (permitting Canadian environmental groups to intervene in U.S. lawsuit regarding adequacy of EIS for Trans-Alaska natural gas pipeline where American and Canadian environmentalists had antagonistic interests); Sierra Club v. Coleman, 405 F. Supp. 53 (D.D.C. 1975), *motion granted*, 421 F. Supp. 63 (1976), *vacated sub nom.*, Sierra Club v. Adams, 578 F.2d 389 (D.C. Cir. 1978) (enjoining U.S. participation in construction of a highway in Panama and Columbia until a satisfactory EIS is prepared); Enewetak v. Laird, 353 F. Supp. 811 (D. Haw. 1973) (holding that NEPA is applicable to U.S. weapons testing program conducted on Pacific Trust Territory).

205 Environmental Defense Fund v. Massey, 986 F.2d 528 (D.C. Cir. 1993). The National Science Foundation (NSF), a federal government agency that operates the largest American year-round installation in Antarctica, planned to improve its environmental program at McMurdo by halting open pit burning of food wastes in favor of a state-of-the-art incinerator. The Environmental Defense Fund argued that the incinerator might produce toxic pollutants that the NSF had failed to evaluate. *Id.* at 529-30.

206 The court stressed that Antarctica is not a "foreign country," nor is it subject to American or other claims of sovereignty. At the same time, the United States exercises a great deal of practical control over large portions of the continent, so the usual reasons to avoid extraterritorial application of a statute (such as a desire to avoid interfering with another country's possible assertion of jurisdiction) do not apply. *Id.* at 533-34.

also stressed the fact that, wherever the NSF's actual *construction* activity might eventually occur, the NEPA EIS requirement was principally addressed to informing the foundation's *decision-making* activity, which naturally took place inside the United States at the agency's headquarters—so there was really no question of extraterritoriality in this application of the statute.[207] By this logic, virtually all major federal actions worldwide could be amenable to NEPA coverage, but other cases over the years have left unresolved the extent to which the statute should be applied internationally.[208]

Supplementing the statutory obligations of NEPA regarding the international environment is Executive Order 12,114 of 1979.[209] It requires an agency to produce appropriate documentation[210] prior to undertaking any major federal action significantly affecting the quality of the human environment: (1) in the "global commons"[211] or (2)

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207 The court concluded that NEPA's "action forcing" strategy required only the evaluation and deliberation necessary for the preparation of an EIS and that all this activity would be undertaken inside the United States. The statute itself did not prohibit or limit any government activity inside Antarctica, so the case was not about extraterritoriality. *Id.* at 532-33.

208 The U.S. Government considered appealing the circuit court's decision, but resolved instead to issue a press statement acquiescing in the judgment but attempting to limit it to the precise facts of the case. Wirth, *supra* note 199, at 633. *See also* Natural Resources Defense Council v. Nuclear Regulatory Comm'n, 647 F.2d 1345 (D.C. Cir. 1981) (refusing to require NRC to prepare an EIS regarding the export of a nuclear reactor to the Philippines where the environmental consequences would be felt exclusively inside the recipient state); Greenpeace U.S.A. v. Stone, 748 F. Supp. 749 (D. Haw. 1990), *appeal dismissed*, 924 F.2d 175 (9th Cir. 1991) (holding that NEPA is inapplicable to Army program for removing chemical weapons from Germany, and that the Army's Global Commons Environmental Assessment satisfies the NEPA requirements with respect to the ocean transport of chemical weapons given the transoceanic shipment's relation to the removal of the weapons from West Germany).

209 Exec. Order No. 12,114, 3 C.F.R. § 356 (1980), *reprinted in* 42 U.S.C. § 4321 (1988 & Supp. 1994). The purpose of the order is "to enable responsible officials of Federal agencies having ultimate responsibility for authorizing and approving actions . . .to be informed of pertinent environmental considerations and to take such considerations into account, with other pertinent considerations of national policy, in making decisions. . . ." *Id.* § 1-1. Each relevant federal agency is required to create its own internal procedures to implement the order. *Id.* § 2-1. *See, e.g.*, 32 C.F.R. §§ 187-88 (1993) (regulations of the Office of the Secretary of Defense); *see also* Robinson, *supra* note 181, at 107-08 (critiquing the executive order for stifling agency creativity in approaching international environmental problems).

210 The executive order identifies three distinct types of environmental documents appropriate for different circumstances: the usual EIS; a bilateral or multilateral environmental study, undertaken jointly by the United States and one or more foreign countries or an international organization; and a "concise review" of environmental issues, such as an environmental assessment or a summary environmental analysis. Exec. Order No. 12,114 § 2-4, 3 C.F.R. § 356.

211 The global commons is the area outside the national jurisdiction of any country, such as Antarctica or the high seas. A major federal action affecting the global commons requires preparation of a full EIS. Exec. Order No. 12,114 §§ 2-3(a), 2-4(b)(1), 3 C.F.R. § 356. *See* RECORD OF DECISION, *supra* note 145, at 2 (describing the Army's Global Commons Environmental Assessment examining the potential consequences of ocean shipment of chemical weapons from Germany to Johnston Atoll).

under specified circumstances, inside a foreign country.[212] The executive order provides a number of categorical exemptions and other limitations, several of which relate to national security matters, but none of which is directly relevant to the CWC.[213] Importantly, however, unlike NEPA, the executive order does not provide for judicial review of agency noncompliance.[214]

The most recent major international NEPA-related controversy concerns the legislation's applicability to treaties. The statute,[215] combined with CEQ regulations,[216] presumptively requires the submission of a legislative environmental impact statement to accompany the transmittal to Congress of an international agreement,[217] and the executive branch has sometimes conformed to this expectation.[218] However, regarding the North American Free Trade Agreement (NAFTA),[219] a monumental tariff-reducing and trade-enhancing arrangement among the United States, Canada, and Mexico,[220] the

212 The executive order distinguishes two situations in which a major United States action may affect the environment of a foreign country in a manner that ought to be studied: first, where the foreign country is not participating or otherwise involved with the American action; and second, where the U.S. action provides to the foreign country a toxic product (or a project that produces such a product) that is strictly controlled under U.S. law because of environmental risks. Exec. Order No. 12,114 § 2-3(b) to (c), 3 C.F.R. § 356. Under either situation, the executive order requires the U.S. government to prepare either a bilateral or multilateral environmental study or a "concise review" of environmental consequences. *Id.* § 2-4(b)(ii) to (iii).

213 The executive order excludes, *inter alia*, actions undertaken by the president, intelligence activities, and arms transfers. *Id.* § 2-5(a). It also allows agencies to modify the required environmental documents in order to "ensure appropriate reflection" of diplomatic factors and national security considerations. *Id.* § 2-5(b).

214 The executive order states that its requirements are "solely for the purpose of establishing internal procedures for Federal agencies . . . and nothing in [the] Order shall be construed to create a cause of action." *Id.* § 3-1. *See* Enviromental Defense Fund v. Massey, 986 F.2d 528, 530 (D.C. Cir. 1993).

215 42 U.S.C. § 4332(2)(C) (1988) (requiring an environmental impact statement for major environment-related legislative proposals).

216 40 C.F.R. §§ 1508.17 & 1508.18(b)(1) (1993) (including international treaties among the legislative proposals for which an EIS is appropriate). *See* 40 C.F.R. § 1500.3 (1993); Exec. Order No. 11,991 § 2(q), 3 C.F.R. 123 (1993) (CEQ regulations are binding on all federal agencies); *see also* Andrus v. Sierra Club, 442 U.S. 347, 358 (1979) (stating that CEQ regulations are "entitled to substantial deference" in interpreting NEPA).

217 LERNER & TANZMAN, *supra* note 189, § 2.3 at 2-3.

218 *See* Brief for Appellees at 22-24, Public Citizen v. Office of the U.S. Trade Rep., 970 F.2d 916 (D.C. Cir. 1992) (citing numerous instances in which the Department of State and other foreign affairs agencies prepared EIS documentation to accompany the submission to Congress of an international agreement) [hereinafter Brief for Appellees]; LERNER & TANZMAN, *supra* note 189, § 2.3 at 3 (citing LEISs prepared for Panama Canal Treaty and other international agreements).

219 North American Free Trade Agreement, Dec. 1992, U.S.-Can.-Mex., 32 I.L.M. 605 [hereinafter NAFTA].

220 NAFTA will create the largest international tariff-free zone in the world, embracing 360 million people and $6 trillion in annual output. It builds upon both the U.S.-Canada Free Trade Agreement and the General Agreement on Tariffs and Trade, integrating the economies of the

American government has produced voluminous publications and environment-related argumentation, but no EIS documentation.[221] When sued over the failure to study and advise adequately about the manifest, complex environmental effects, the government asserted a number of alternative defenses in court.[222] Some of these arguments were NAFTA-specific, and largely irrelevant to the CWC context,[223] but others presented a more general challenge. To some extent, the executive branch seemed to be asserting that NEPA was not intended to apply to treaties at all; alternatively, it asserted that even if the statute does attempt to reach international agreements, the president's foreign affairs powers under the Constitution preclude the legislature from imposing any such preconditions upon the conclusion and submission to Congress of an international bargain.[224]

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three already-close trading partners. *See generally* David S. Cloud, *Sound and Fury Over NAFTA Overshadows the Debate*, CONG. Q. WKLY. EDITION, Oct. 16, 1993, at 2791 (describing the general effects of the treaty on tariffs, investment, health and the environment, industry safeguards, services, and intellectual property to counteract the confusions created by the "bewildering array of pseudo-facts, figures, classes, and countercharges" issued by NAFTA proponents and their opponents).

221 The three negotiating countries supplemented the main NAFTA text with "side agreements" on safety and environmental issues. Public debate in the United States focused on the possibility that lax Mexican enforcement of environmental protection laws and incentives for American businesses to locate in the low-wage areas south of the border would generate environmental decay. The executive branch—while resisting any requirement to prepare a full EIS studying the problem—produced a "review" of the issue and began compiling another "voluntary" assessment. *U.S. Trade Representative, NAFTA Supplemental: Agreement on Environmental Cooperation and Summary of the Agreement on Enviromental Cooperation, reprinted in* 4 U.S. DEP'T OF STATE DISPATCH 34, 590, 594 (1993); U.S. GOV'T, REVIEW OF U.S.-MEXICO ENVIRONMENTAL ISSUES (1992); Brief for Appellants at 10-12, Public Citizen v. U.S. Trade Rep., 822 F. Supp. 21 (D.D.C.), *rev'd*, 5 F.3d 549 (D.C. Cir. 1993) [hereinafter Brief for Appellants]; Brief for Appellees, *supra* note 218, at 7-8. *See also* Keith Schneider, *Environmental Groups Are Split on Support For Free-Trade Pact*, N.Y. TIMES, Sept. 16, 1993, at A1; Keith Bradsher, *Court Ruling Lets Trade Agreement Move to Congress*, N.Y. TIMES, Sept. 25, 1993, § 2, at 1.

222 There were two separate court challenges. In Public Citizen v. Office of U.S. Trade Rep., 970 F.2d 916 (D.C. Cir.), *aff'g*, 782 F. Supp. 139 (D.D.C. 1992), the circuit court dismissed the challenge as premature, since the complete text of the NAFTA had not yet been concluded, so there was no "final" action requiring an EIS. In the second case, Public Citizen v. Office of U.S. Trade Rep. (NAFTA case), 822 F. Supp. 21 (D.D.C.), *rev'd*, 5 F.3d 549 (D.C. Cir. 1993), *cert. denied*, 114 S. Ct. 685 (1994), brought after the agreement had been signed, but before it was transmitted to the Congress, the district court ruled for the plaintiffs, ordering that the executive branch prepare an EIS "forthwith." The Circuit Court, however, reversed, Public Citizen v. Office of U.S. Trade Rep. (NAFTA case), 5 F.3d 549 (D.C. Cir. 1993), *cert. denied*, 114 S. Ct. 685 (1994).

223 For example, the government challenged the plaintiffs' standing to sue under the applicable definition of a cognizable "injury," Brief for Appellees, *supra* note 218, at 34-40, asserted that the trade legislation establishing the NAFTA negotiations constituted a de facto exemption from NEPA, *id.* at 45-49, and argued that the full environmental consequences of a treaty as massive and complex as NAFTA were too remote and speculative to be the subject of an EIS.

224 NEPA itself does not provide for judicial review of EIS documentation, so any claim must be brought under the Administrative Procedure Act, 5 U.S.C. §§ 701-706 (1988), which applies only to the "final" act of an "agency," and explicitly exempts the president from coverage.

The district judge ruled for the plaintiffs, ordering the federal government to prepare a prompt EIS, but in September 1993, the D.C. Circuit reversed. In so doing, the court still seemed to not quite have accepted the widest versions of the government's case, and the court denied that it was sounding the "death knell of the legislative EIS."[225] But the court reasoned that the only "final action" in the case had been the President's decision to transmit the treaty to the Congress, which was not the action of an "agency" and was therefore unreviewable under NEPA and the Administrative Procedure Act. Whether under this logic there is still any scope for litigation to compel the production of an EIS for a future treaty such as the CWC remains unsettled.[226]

In any event, the executive branch has not produced (or even begun work toward) a full legislative EIS[227] for the CWC.[228] Various parts of the bureaucracy have, however, undertaken intensive projects

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NAFTA case, 5 F.3d at 551. In the NAFTA case, the government asserted that: (1) the president had undertaken so much personal negotiation regarding the treaty that it was a final action of the White House; (2) even if the U.S. Trade Representative had played a key role in the negotiations, the Trade Representative was located "within the executive office of the president," and was therefore not an "agency" for NEPA purposes; and (3) even if the Trade Representative was an agency, its work on the treaty was completed when it submitted the document to the president, and it was the president who decided to take the "final action" of transmitting it to the Congress. Brief for Appellants, *supra* note 221, at 19-26.

Under the third alternative argument, virtually all international agreements would be exempt from NEPA since the negotiating agency's release of the signed document is not truly "final" because the president could still order additional negotiations or simply decline to advance the agreed text. Thus, the only action that is ever "final" regarding a treaty is the president's transmittal of the completed text to the Congress, an event to which NEPA does not apply. *See* Franklin v. Massachusetts, 112 S. Ct. 2767 (1992) (holding that an agency's completion of a statutorily-required report is not subject to judicial review, where the report is initially submitted to the White House, and the President transmits it to Congress).

225 NAFTA case, 5 F.3d at 552. The concurring opinion by Judge Randolph goes still further in casting doubt upon the continued viability of the NEPA legislative EIS, noting that any proposal for ordinary legislation is not truly "final," because the agency cannot ensure passage (or even introduction) of the bill in the form it proposes. He adds that "the nub of the problem" is that judicial review requires a "final agency action," while the statutory duty to begin to prepare an EIS arises at an earlier point. *Id.* at 554.

226 One irony of this result would be that sometimes a less important international agreements would receive closer scrutiny, in the form of a full legislative environmental impact statement, than would a more significant, formal international document. A formal treaty concluded by the President and transmitted to the Senate for advice and consent would require no LEIS under the NAFTA precedent. But a smaller, less significant accord, such as an executive agreement concluded on the sole authority of the chief executive (and therefore requiring no Congressional approval) or an executive agreement signed in implementation of a prior treaty (and therefore not triggering any additional legislative participation), might be deemed a final action of the State Department, especially if it were signed by the Secretary or some lower-ranking official instead of by the President and would require an LEIS.

227 The executive branch has voluntarily prepared a brief "Environmental Review" to accompany the submission to Congress of the CWC. This document, however, is essentially a survey of the existing literature regarding the environmental effects of the treaty; it does not contain any

that provide at least partial substitutes for the analysis—or that could readily be incorporated by reference in a subsequent umbrella document.[229]

For example, the largest single environmental impact of the CWC will undoubtedly be the actual dismantling of stockpiled chemical weapons. However this elimination is ultimately accomplished, the operation of the destruction facilities will have enormous and diverse potential environmental consequences, it will likely produce a wide range of routine and nonroutine emissions and residues (as well as stimulating a new risk of accidents),[230] and it is therefore precisely the type of major federal action that demands concerted study.[231] Fortunately, work on just that sort of investigation and documentation is already well under way. By statute,[232] the Army was ordered in De-

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original investigation or analysis as required for a full LEIS. ENVIRONMENTAL REVIEW, *supra* note 154, *passim.*

228 The remedy for violation of NEPA's EIS requirements can be an injunction, temporarily arresting the agency's proposed action pending the completion of the mandatory environmental documentation. Cruden, *supra* note 171, at 1181; FINDLEY & FARBER, *supra* note 197, at 19; Massachusetts v. Watt, 716 F.2d 946 (1st Cir. 1983); People Against Nuclear Energy v. U.S. Nuclear Regulatory Comm'n, 678 F.2d 222, 234-35 (D.C. Cir. 1982), *rev'd on other grounds sub nom.*, Metropolitan Edison Co. v. People Against Nuclear Energy, 460 U.S. 766 (1983). In the NAFTA case, however, the district court merely ordered the U.S. government to prepare an LEIS "forthwith," and did not explicitly prohibit the submission of the treaty prior to the completion of a satisfactory LEIS. NAFTA case, 822 F. Supp at 31.

229 CEQ regulations favor "tiering" of environmental documents (*i.e.*, preparation of one over-arching "programmatic" EIS to assess the nationwide impact of a broad program, to be augmented by localized "site-specific" studies), 40 C.F.R. §§ 1500.4(i), 1502.20 (1993), and incorporation by reference of existing documents, 40 C.F.R. § 1502.21 (1993), to save time and space in the EIS.

230 *See* LERNER & TANZMAN, *supra* note 189, § 3.2.

231 Even if a major federal facility is committed to operating entirely within the constraints imposed by all applicable federal and state substantive anti-pollution laws, an EIS is still required; conformity with another agency's permitting standards does not excuse the NEPA evaluation requirements. BONINE & MCGARITY, *supra* note 189, at 181-82; Calvert Cliffs' Coordinating Comm. v. Atomic Energy Comm'n, 449 F.2d 1109, 1122-27 (D.C. Cir. 1971).

232 Defense Authorization Act of 1986, 50 U.S.C. § 1521 (1988 & Supp. 1994) (codifying Pub. L. No. 99-145). This legislation effectuated a delicate political compromise under which the existing U.S. stockpile of older unitary chemical weapons was to be destroyed by 1994 and a new arsenal of modern binary chemical weapons was to be produced. The statute identifies the program's dismantling goals as: (1) protecting the environment, the public, and workers; (2) providing adequate and safe facilities for the sole function of destroying the CW stockpile; and (3) cleaning up the sites and destroying the equipment when the stockpiles are eliminated. Carnes & Watson, *supra* note 129, at 653. In fact, however, the binary CW production program was aborted shortly thereafter, *supra* note 148-49, and the timetable for dismantling the unitary weapons has repeatedly slipped. Owen Statement, *supra* note 4; THE COMMITTEE FOR NATIONAL SECURITY, PUBLIC TRUST AND TECHNOLOGY: CHEMICAL WEAPONS DESTRUCTION IN THE UNITED STATES 1 (1993) (discussing destructions delay and increased costs with Dr. Mark Brown) [hereinafter PUBLIC TRUST AND TECHNOLOGY]; Pub. L. No. 100-456 § 118(a)(5), 102 Stat. 1918, 1943 (codified as amended at 50 U.S.C. § 1521 (Supp. 1994)); Pub. L. No. 102-190 § 151(a), 105 Stat. 1290, 1313 (codified as amended at 50 U.S.C. § 1521 (Supp. 1994)); Pub. L.

cember, 1985 to begin disposal of the entire existing American CW stockpile—independent of any treaty obligation to do so—and the service dutifully began making plans, including the preparation of a nest of EISs.[233] To date, a "programmatic" EIS (studying the nationwide dismantling operation as a whole)[234] and some of the follow-up "site specific" EISs (addressing the local options and impacts at the particular locations where incinerators are to be constructed)[235] have been crafted.[236] These documents could be incorporated by reference (and updated, where necessary, by a brief supplement) to constitute the heart of an effective EIS for the treaty.

But the environmental documentation prepared to date is fundamentally defective in two crucial respects. First, the existing EISs fully discuss only the *location* of the proposed elimination facilities, not the *technology* selected to perform the destruction. The Army has studied (on a programmatic basis) whether to build eight, two, or one incinerators and (on a site specific basis) exactly where, within a specified base or local plant site, to emplace each particular structure.[237] And

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No. 102-484 § 171, 106 Stat. 2315, 2341 (codified at 50 U.S.C. § 1521 (Supp. 1994)) (moving deadline for the destruction of older weapons to 2004).

233 Rouse, *supra* note 9, at 30-34. This statutory dismantling obligation was conceptually just a major expansion of the pre-existing Army program for dismantling obsolete or leaking weaponry. *Id.*

234 PEIS, *supra* note 130, at 1-7. A "programmatic" EIS is designed to assess the general or nationwide environmental impact of a broad government program; it may be supplemented by "site specific" EISs which delve into the particular circumstances, problems, and options available at an individual locale. LAITOS & TOMAIN, *supra* note 197, at 230; *Army's Chemical Demilitarization Record of Decision: Hearings Before the Subcomm. on Investigations of the House Comm. on Armed Services*, 100th Cong., 2d Sess. 4-28 (1988) (statement of Brig. Gen. David Nydam, Project Manager for Chemical Demilitarization Program, Dep't of the Army).

235 PROGRAM MANAGER FOR CHEMICAL DEMILITARIZATION, DEP'T OF THE ARMY, DISPOSAL OF CHEMICAL AGENTS AND MUNITIONS STORED AT TOOELE ARMY DEPOT, TOOELE, UTAH, FINAL ENVIRONMENTAL IMPACT STATEMENT (1989); PROGRAM MANAGER FOR CHEMICAL DEMILITARIZATION, DEP'T OF THE ARMY, DISPOSAL OF CHEMICAL AGENTS AND MUNITIONS STORED AT UMATILLA DEPOT ACTIVITY, HERMISTON, OREGON, FINAL PHASE I ENVIRONMENTAL IMPACT STATEMENT (1990); PROGRAM MANAGER FOR CHEMICAL DEMILITARIZATION, DEP'T OF THE ARMY, DISPOSAL OF CHEMICAL AGENTS AND MUNITIONS STORED AT ANNISTON ARMY DEPOT, ANNISTON, ALABAMA, FINAL ENVIRONMENTAL IMPACT STATEMENT (1991); RECORD OF DECISION, *supra* note 145, at 24. The process of "tiering" environmental impact statements via the production of programmatic and site-specific EISs in this fashion has become routine. *See* BONINE & MCGARITY, *supra* note 189, at 128 (noting that several cases required agencies to prepare tiered EISs).

236 A site-specific EIS for the CW dismantling program is prepared in two phases. The Phase I report collects local data to confirm the applicability of the programmatic EIS to the specific locality. The Phase II report is a full site-specific EIS. Phase I reports have been compiled for most of the eight intended locations; Phase II has been completed only for Tooele, Utah and Anniston, Alabama. Owen Statement, *supra* note 4.

237 The programmatic EIS was intended to evaluate the advantages and disadvantages of: (1) continued storage of the CW at their current locations (the "no-action" alternative); (2) on-site disposal of the stocks at their current locations (the option ultimately selected); (3) relocation of the stockpile to two regional destruction facilities (at Tooele, Utah, and Anniston, Alabama); (4)

in this regard, the EISs do seem quite thorough and deliberative. But the Army has not, in these documents or elsewhere, adequately addressed the underlying determination that incineration, rather than any of the other candidate technologies (such as neutralization, bioremediation, and cryofracture),[238] should be the mode of choice.[239] By merely *assuming* that burning is the sole relevant option for accomplishing the destruction, the Army has evaded a central function of the NEPA exercise.[240] This omission is all the more crucial because recently, additional information and analysis have independently surfaced[241] that: (1) challenge the Army's conclusions about the safety, reliability, and effectiveness of the incineration process[242] and (2) suggest that other candidate technologies may be more promising (and closer to fruition) than the Army had previously determined.[243]

It may still be possible, however, to rescue the adequacy of the Army's existing dismantling EISs on the basis that *other* documents, integral to the Army's ongoing analytical and decision-making processes, could be incorporated by reference to bolster the studies

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relocation to a single national facility at Tooele; and (5) a variety of other partial relocation schemes. PEIS, *supra* note 130, at 1-1, 1-3, 2-1.

238 *See infra* part V (discussing possible technologies for chemical weapons disarmament).

239 The PEIS notes that it was not intended to evaluate in detail the technologies that could be applied to the destruction process, but it does briefly consider some alternatives to the baseline incineration approach. PEIS, *supra* note 130, at 1-3, 2-73-86. Essentially, the Army was resting upon earlier National Academy of Sciences and other assessments that supported incineration and was assuming that those studies remained valid.

240 An EIS must consider the full range of reasonably available alternatives, not solely the agency's preferred outcome. *See* Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, 435 U.S. 519 (1978); New York v. U.S. Dep't of Transp., 715 F.2d 732, 741-46 (2d Cir. 1983), *cert. denied*, 465 U.S. 1055 (1984); BONINE & MCGARITY, *supra* note 189, at 146-59.

241 An agency is obligated to prepare a supplemental EIS when "[t]here are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." 40 C.F.R. § 1502.9(c)(ii) (1993). *See* LAITOS & TOMAIN, *supra* note 197, at 241; BONINE & MCGARITY, *supra* note 189, at 182-84; GREENPEACE 9/90 REVIEW, *supra* note 145, *passim*; Marsh v. Oregon Natural Resources Council, 490 U.S. 360, 370-85 (1989); Environmental Defense Fund v. Marsh, 651 F.2d 983, 991-97 (5th Cir. 1981); Sierra Club v. Marsh, 714 F. Supp. 539, 565-72, *amended*, 744 F. Supp. 352 (D. Me. 1989).

242 *See infra* text accompanying notes 425-34 (evaluating JACADS and argument that incineration is more polluting than Army has indicated); PEIS, *supra* note 130, at 2-88 (evaluating environmental impact of baseline incineration technology); PAT COSTNER, CHEMICAL WEAPONS DEMILITARIZATION AND DISPOSAL 4 (May 12, 1993) (unpublished paper on file with author) (indicating that when the Army first selected incineration as the method of choice for CW disposal, there was a dearth of information regarding furnace performance and safety, but additional—mostly negative—data has since become available); GENERAL ACCOUNTING OFFICE, CHEMICAL WEAPONS: STOCKPILE DESTRUCTION COST GROWTH AND SCHEDULE SLIPPAGES ARE LIKELY TO CONTINUE 21 (1991) (indicating that "factors have changed" since the Army's decision to rely upon incineration) [hereinafter LIKELY TO CONTINUE].

243 *See infra* text accompanying notes 464-87 (discussing alternative technologies).

already published.[244] Foremost among these is a series of reports on CW destruction methodologies prepared by the National Academy of Sciences' National Research Council (NRC), widely recognized as an independent, authoritative source of expertise on CW stockpile issues.[245] In fact, it was largely a 1984 NRC report that drove the Army to favor incineration in the first place.[246] More recently, two independent NRC committees have prepared detailed monographs (in June 1993[247] and February 1994[248]) analyzing alternative technologies that the Army could graft onto the existing incineration plan or adopt to displace it.[249]

Even beyond that important defect, however, the existing EIS library is insufficient in a second key respect to support the CWC as a whole because it fails to consider *all* of the treaty's potential environmental impacts. For example, as noted above, the United States will be required to dismantle not only the existing stockpile of active weapons, but also the non-stockpile materiel (including a small quantity of modern binary munitions and equipment, and a much larger, more diverse, and deteriorating mass of older and obsolete arms and other CW-related items), as well as the former CW production facili-

244 The CWC Environmental Review notes that it is based upon some 62 published studies, totaling 17,000 pages, of the potential environmental impact of the treaty. ENVIRONMENTAL REVIEW, *supra* note 154, at 1. *See* 40 C.F.R. § 1502.21 (1993) (stating that CEQ regulations favor the practice of making an EIS more concise by incorporating by reference, rather than recapitulating, other relevant documents).

245 The National Research Council (the operating arm of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine) has established two prominent committees relevant to chemical weapons matters. The Committee on Review and Evaluation of the Army Chemical Stockpile Disposal Program (the Stockpile Committee) has been operating since 1987 to provide the Army with technical advice regarding the disposal of CW agents and munitions. The Committee on Alternative Chemical Demilitarization Technologies (Alternatives Committee) was created in 1992 for the sole purpose of drafting a report on alternatives to the existing JACADS-style "baseline" incineration methodology. NATIONAL RESEARCH COUNCIL, NATIONAL ACADEMY OF SCIENCES, PRESS RELEASE FOR ALTERNATIVE TECHNOLOGIES PUBLIC FORUM OF JUNE 30 (1993) [hereinafter PRESS RELEASE]. *See also* PEIS, *supra* note 130, at 1-6 (describing impact of 1984 NAS study).

246 PEIS, *supra* note 130, at 1-23.

247 NRC ALTERNATIVES, *supra* note 129.

248 NAS STOCKPILE COMMITTEE, *supra* note 140. The NRC's Stockpile Committee was originally scheduled to issue its report (building upon the June 1993 Alternatives Committee report) in November 1993, PRESS RELEASE, *supra* note 245, at 2, but the process was delayed.

249 Pursuant to the 1993 Defense Authorization Act, Pub. L. No. 102-484, the Army was to report to the Congress "on the potential alternatives to the use of the Army's baseline disassembly and incineration process for the disposal of lethal chemical agents and munitions" by December 31, 1993. Pub. L. No. 102-484 § 173(a), 106 Stat. 2315, 2342-43. The Army report also includes its official reactions to the reports of the NRC Alternatives Committee and the NRC Stockpile Committee. PRESS RELEASE, *supra* note 245, at 2; PROGRAM MANAGER FOR CHEMICAL DEMILITARIZATION, DEP'T OF THE ARMY, U.S. ARMY'S ALTERNATIVE DEMILITARIZATION TECHNOLOGY REPORT FOR CONGRESS (1994) [hereinafter ARMY ALTERNATIVES].

ties.[250] Because the 1985 statute dealt exclusively with disposal of the active stockpile, the Army's original EIS mandate did not address the non-stockpile arms, which have become relevant only upon the conclusion of the CWC. The Army has recently prepared an initial report concerning the location and status of the non-stockpile items,[251] but has only barely begun a true analysis of the alternative disposal methods and their environmental effects.[252]

Moreover, the CWC will have other diverse environmental consequences of the sort that should be studied in an EIS or equivalent document.[253] For example, under the treaty and contemplated American implementation of it, numerous types of imposing structures may be built, adapted, and/or demolished. Foremost among these, of course, will be the incinerators themselves (or any other buildings and equipment that will be required by alternative destruction methodologies); the Army's programmatic EIS concludes that the impact of constructing and later decommissioning the incinerators will be minor, but admits that the issue has not yet been studied in detail.[254] Similarly, a number of former CW production facilities will be eliminated or converted and recycled.[255] This activity will involve the decontamination or destruction of medium- to large-scale industrial plants, but again, the Army has not yet studied the problem in detail—although perhaps other government programs have taken an initial look at some of the locations.[256] In addition, the treaty permits the United States to establish a "single small scale facility" for producing CW-related agents for permitted peaceful purposes, as well as certain other very limited types of CW-related installations. The eventual

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250 *See supra* text accompanying notes 146-57 (discussing non-stockpile items).

251 NON-STOCKPILE REPORT, *supra* note 147, *passim*.

252 *See id.* at iv. This document is not likely to be available in time to be relevant to the Congress's consideration of the CWC; Army regulations contemplate that 270-550 days are ordinarily required to prepare a full EIS. 32 C.F.R. § 651.12(3) Fig. 2 (1993).

253 *See* LERNER & TANZMAN, *supra* note 189, § 3.3.2 (suggesting that environmental impact could be studied in other official documents and cross-referenced in an LEIS).

254 PEIS, *supra* note 130, at 2-95, 4-16. The Army's projections of the costs for dismantling the planned incinerators and closing out the dismantling program have risen from $53 million in 1991 to $324 million in 1992. GENERAL ACCOUNTING OFFICE, CHEMICAL WEAPONS DESTRUCTION: ISSUES AFFECTING PROGRAM COST, SCHEDULE, AND PERFORMANCE 15 (1993) [hereinafter ISSUES AFFECTING].

255 *See supra* text accompanying notes 158-64 (discussing the elimination of former CW production facilities).

256 Some of the former CW production sites (in particular, Rocky Mountain Arsenal, Colorado) are already included on the National Priorities List for clean-up under the Comprehensive Environmental Response, Compensation, and Liability Act, *see infra* text accompanying notes 314-318, a process that involves a substantial amount of descriptive analysis of the site prior to remediation. Some of that investigation could be adapted for a CWC EIS. LERNER & TANZMAN, *supra* note 189, § 3.3.2; Stephen Gascoyne, *Slipcovering a Superfund Site*, BULL. ATOM. SCIENTISTS, Sept. 1993, at 33; LENNY SIEGEL, CHEMICAL WEAPONS DISPOSAL 18-19 (1991).

consequences of the construction and operation of any of these types of facilities would have to be studied independently and carefully.[257]

The anticipated conduct of the verification inspections under the CWC also raises environmental concerns that have not yet been fully evaluated in any official document.[258] These activities would not involve the handling of large quantities of agent or other toxins, but they will occur on such a widespread, repeated basis that their cumulative potential environmental impacts may be substantial.[259] For example, in visits to privately owned chemical factories,[260] the Organization's inspectors will generally be permitted to observe activities throughout the entire plant;[261] to take, analyze, and transport samples;[262] and to require that specified operations be conducted in their presence.[263] Each of these activities, together with the enhanced danger of ordinary industrial accidents (which could also have environmental implications) caused by the sheer presence of additional personnel, equipment, and operations, could be assessed and displayed to the public via an EIS.

Next, the CWC will have a potentially significant environmental impact to the extent that it achieves its anticipated objective of enhancing peaceful international commerce in civilian chemicals and related equipment.[264] Freedom from existing individual or collective

257 *See supra* text accompanying note 105 (considering single small-scale facility and other peaceful purposes facilities that parties are permitted under the CWC).

258 GUALTIERI ET AL., *supra* note 109, and IMPLEMENTATION MANUAL, *supra* note 197, are the most thorough explications of the environmental and safety consequences of the CWC's verification procedures.

259 *See* LERNER & TANZMAN, *supra* note 189, § 3.3.3.

260 The same analysis applies to inspections of government facilities (which are likely to be more frequent than visits to private chemical industry locations) and to challenge inspections of private businesses and dwellings unrelated to the chemical industry (which are expected to be quite rare).

261 CWC, *supra* note 1, Verification Annex, Part II, para. E.45 (stating how, in general, inspectors "have the right to unimpeded access to the inspection site. The items to be inspected will be chosen by the inspectors").

262 *See supra* text accompanying note 114 (samples). The procedures provided for by the treaty for collecting and analyzing samples will not be identical to the routine sampling that a chemical factory undertakes for its own quality-control purposes, and different types of environmental dangers might arise where the CWC inspectors seek samples from unusual parts of the facility, at different times and in different quantities from those permitted under existing state environmental standards. *See* GUALTIERI ET AL., *supra* note 109, § 3.7.1. *But see* Amy E. Smithson, *Implementing the Chemical Weapons Convention: Counsel from Industry*, HENRY L. STIMSON CENTER REPORT, Jan. 1994, at 16-17 (warning that regardless of treaty requirements, plant managers will refuse to allow sampling where the process might disrupt plant operations or interfere with health and safety precautions).

263 *See supra* text accompanying note 115 (requiring chemical operations).

264 The treaty's preamble describes the parties as "[d]esiring to promote free trade in chemicals as well as international cooperation and exchange of scientific and technical information in the field of chemical activities . . . in order to enhance the economic and technological development of all States Parties." CWC, *supra* note 1, at 804, pmbl. para. 9 (underline omitted). *See*

national programs of export controls, such as the restrictions maintained by the current "Australia Group" of chemical supplying countries,[265] has long been a key desideratum of the developing countries participating in the CWC deliberations, and the treaty commits its parties to encouraging the fullest possible civilian exchange.[266] While no EIS could foresee exactly how much increase in American and global chemical traffic will actually be realized under the treaty, a document could make some educated guesses about the probable levels of augmented chemical imports and exports and about their anticipated environmental consequences upon the United States and upon the "global commons," such as ocean shipping lanes.[267]

The CWC will also have a multiplicity of miscellaneous effects upon the American and global environment. The treaty provides, for example, that its parties are prohibited from producing, testing, possessing, or using chemical weapons;[268] from aiding others in doing so;[269] and from making any preparations for engaging in offensive

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Mounir Zahran, *The Chemical Weapons Convention and Economic and Technological Development*, UNIDIR NEWSL. (United Nations Institute for Disarmament Research, Geneva, Switzerland), Dec. 1992, at 24, 26.

265 The Australia Group is an informal cartel among the leading chemical exporting countries that has met regularly since 1985, but is not based upon a treaty. Participants undertake to align their individual national export control policies to prohibit the export of suspicious, weapons-related substances and to pool their intelligence-gathering activities in resistance to the threatened proliferation of chemical weapons. U.S. ARMS CONTROL AND DISARMAMENT AGENCY, FACT SHEET: AUSTRALIA GROUP EXPORT CONTROLS ON MATERIALS USED IN THE MANUFACTURE OF CHEMICAL AND BIOLOGICAL WEAPONS (1993); Brad Roberts, *Controlling Chemical Weapons*, 2 TRANSNAT'L L. & CONTEMP. PROBS. 435, 444 (1992); Jones & Wagner, *supra* note 69, at 604-06. *See also* BERNAUER, *supra* note 69, at 41 (the Leipzig Group of Eastern European countries also imposed comparable export controls on chemical weapons-related items). The Australia Group and its export control regime will not dissolve under the CWC, but the treaty is likely to result in substantial changes in members' behavior regarding proposed exports. U.S. ARMS CONTROL AND DISARMAMENT AGENCY, OCCASIONAL PAPER: THE AUSTRALIA GROUP (1993); EFFORTS TO BAN, *supra* note 62, at 8-10, 15-16; *The Australia Group and the Chemical Weapons Convention*, CHEMICAL WEAPONS CONVENTION BULL., Sept. 1993, at 5; Robert J. Mathews, *A Comparison of the Australia Group List of Chemical Weapon Precursors and the CWC Schedules of Chemicals*, CHEMICAL WEAPONS CONVENTION BULL., Sept. 1993, at 1 (arguing that there is a need to harmonize the export controls of the Australia Group and the CWC).

266 *See supra* text accompanying note 264 (describing CWC as committing parties to full commercial exchanges of chemicals).

267 An EIS need not address potential environmental effects that are unknown or unpredictable; speculation is not the basis for the analysis. *See* 40 C.F.R. § 1502.22 (1993); Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 354-56 (1989) (holding that a worst case analysis is not necessary where CEQ regulations no longer require it); Sierra Club v. Sigler, 695 F.2d 957, 970-71 (5th Cir. 1983); Sierra Club v. Marsh, 714 F. Supp. 539, 562 (D. Me. 1989); North Dakota v. Andrus, 483 F. Supp. 255 (D.N.D. 1980); BONINE & MCGARITY, *supra* note 189, at 85-86 (discussing the "reasonable foreseeability" test of *Andrus*); LAITOS & TOMAIN, *supra* note 197, at 238.

268 CWC, *supra* note 1, art. I.1.

269 *Id.* art. I.1(d).

chemical warfare.[270] While most of these activities are steps that the United States has not recently undertaken anyway—and has no current intention of resuming—the acceptance of a legal impediment against changing our national policy has some identifiable (positive)[271] effect on the environment that could be discussed in a suitable EIS. For that matter, the main object and purpose of the treaty, the abolition of chemical weapons and chemical warfare, is of profound benefit to the natural environment, as well as to the human inhabitants. Prompt elimination of CW arsenals will reduce the likelihood of disastrous accidents with the stockpile and of cataclysmic intentional uses of the poisons.[272]

Finally, the CWC, as a United States-led agreement with foreign sovereigns, will also have foreseeable international consequences for the quality of the global environment. At a minimum, the United States will continue to press other countries diplomatically to adhere to the treaty regime, and many will undoubtedly do so. Their own conduct of the dismantling functions, as well as their participation in the Organization's verification operations, the enhanced opportunities for international chemical commerce, and the rest of the activities surveyed above will also affect the biosphere.[273] In the case of Russia, in fact, where the existing arsenal of chemical weaponry and other materials to be cleaned up is even larger than in the United States, the probable environmental effects will be especially substantial.[274] While most of the countries will complete their CWC-required actions entirely autonomously (or with the assistance of the treaty's Organization),[275] it is also possible that direct American financial, technological, or other assistance[276] may also be forthcoming, again demonstrating a significant nexus to NEPA's core concerns.[277]

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270 *Id.* art. I.1(c).

271 NEPA requires the agency to examine in detail all aspects of a program's environmental impacts, even those which may be unambiguously beneficial to the environment. Environmental Defense Fund v. Marsh, 651 F.2d 983, 993 (5th Cir. 1981); 40 C.F.R. § 1508.8 (1992).

272 ENVIRONMENTAL REVIEW, *supra* note 154, at 21, 31.

273 Other countries have increasingly crafted their own environmental protection legislation, frequently adapting the United States' NEPA standards and procedures. Robinson, *supra* note 181, at 93, 97 (citing 15 countries that now employ some version of official environmental impact analysis).

274 *See infra* text accompanying notes 493-520 (discussing the dismantling of Russian weapons).

275 The CWC Organization is authorized to assist parties in resisting chemical aggression by providing advice, equipment, and other resources. CWC, *supra* note 1, art. X. In some circumstances, the Organization and individual parties may also assist needy states in the recovery and destruction of abandoned CW. *Id.* Verification Annex Part IV(B), para. C.16.

276 *See infra* text accompanying notes 506-12 (discussing the use of Nunn-Lugar funds for CW dismantling in Russia).

277 A major federal action may fall within NEPA's requirements even if the government merely authorizes or finances actions primarily conducted by other parties or other countries. Scientists' Inst. for Pub. Info. v. Atomic Energy Comm'n, 481 F.2d 1079, 1088-89 (D.C. Cir.

B. Clean Air Act (CAA)

The Clean Air Act of 1970, as amended,[278] is a second major piece of federal legislation affecting the implementation of the CWC. The statute establishes a comprehensive regulatory scheme for limiting and monitoring discharges into the atmosphere.[279] It directs the designation of primary and secondary National Ambient Air Quality Standards,[280] fixing ceilings on the emission of specified pollutants[281] in order to protect human health with "an adequate margin of safety" and to guard the public welfare more generally by focusing on "any known or anticipated adverse effects."[282] Uniform national standards are intended to deal with the diversity of air pollution sources: vehicles, new or modified stationary structures, and existing facilities, taking into account each local area's conformity to federal air quality standards.[283] New stationary sources of air discharges such as hazardous waste incinerators, in particular, are held to the most stringent pollution abatement standards, requiring the adoption of the most effective (even if the most costly) available control technologies.[284]

Under the 1990 amendments, each state is to establish a permit system, and every stationary source of air pollution is required to seek, and conform its discharges to, such a permit—as well as to in-

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1973); Silva v. Romney, 473 F.2d 287 (1st Cir. 1973); National Org. for the Repeal of Marijuana Laws v. Department of State, 452 F. Supp. 1226 (D.D.C. 1978) (per curiam); BONINE & MCGARITY, *supra* note 189, at 39, 52-53; LAITOS & TOMAIN, *supra* note 197, at 225-26.

278 42 U.S.C. §§ 7401-7642 (1988); 42 U.S.C.A. §§ 7651-7671 (West Supp. 1994) (containing 1990 amendments). *See generally* FINDLEY & FARBER, *supra* note 197, at 97-132; VERIFICATION TECHNOLOGY, *supra* note 197, at 30-35.

279 *See* GUALTIERI ET AL., *supra* note 109, at 19-23.

280 42 U.S.C. § 7409 (1988); 40 C.F.R. § 50 (1993). In establishing these standards, the exclusive concern is to be for protecting and promoting health; financial constraints such as cost or technological feasibility may not be considered. Lead Indus. Ass'n v. Environmental Protection Agency, 647 F.2d 1130, 1148-56 (D.C. Cir.), *cert. denied*, 449 U.S. 1042 (1980); FINDLEY & FARBER, *supra* note 197, at 107; LAITOS & TOMAIN, *supra* note 197, at 154.

281 NAAQSs exist for six "criteria pollutants": sulfur dioxide, particulates, carbon monoxide, ozone, nitrogen oxide, and lead. 40 C.F.R. § 50 (1993).

282 42 U.S.C. § 7409 (1988).

283 42 U.S.C.A. §§ 7411(d), (f) (West Supp. 1994) (discussing standards for new and existing structures); 42 U.S.C.A. Parts C and D (West Supp. 1994) (discussing standards applicable to geographic areas that have, and have not, already achieved compliance with applicable air quality criteria); BONINE & MCGARITY, *supra* note 189, at 417 (indicating that federal government establishes national criteria, subject to state augmentation).

284 42 U.S.C.A. 7411 (West Supp. 1994); 40 C.F.R. 60 (1993). New Source Performance Standards (NSPSs) also apply to existing sources that are "modified" in substantial ways. BONINE & MCGARITY, *supra* note 189, at 477-80.

In addition, new sources must comply immediately with the "maximum achievable control technology" standard, applicable to the discharge of 189 specified "hazardous air pollutants" under the 1990 amendments. 42 U.S.C.A. § 7661 (West Supp. 1994); FINDLEY & FARBER, *supra* note 197, at 104-22; LAITOS & TOMAIN, *supra* note 197, at 159-66.

stall devices that control and measure the exhaust.[285] A facility's emission of different types or quantities of pollutants is a violation of its permit and must be avoided, reported, and abated. There is also a mechanism allowing expedited modification of a permit for temporary aberrations.[286]

The biggest impact of the CAA on the CWC concerns the construction and operation of the incinerators or other equipment designed to destroy the chemical weapons.[287] Although the Army's current prototype is designed to operate with a minimum of air discharges (and the National Research Council committees have recommended modifications that could reduce the dangers still further),[288] the permitting process for each installation requires a detailed, laborious series of analyses.[289] Each state is allowed to establish its own procedures and criteria for issuance of permits,[290] and—especially in the case of hazardous waste incinerators—local opposition to new pollution sources has made the permitting process exceptionally lengthy and convoluted.[291] The Army's original schedule for obtaining the relevant permits has already slipped far behind the established benchmarks, and local political opposition suggests little prospect for more rapid approvals.[292]

In addition, the CWC's verification procedures may implicate the CAA in another way. That is, when the Organization's inspectors visit

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285 BONINE & MCGARITY, *supra* note 189, at 573-75.

286 Train v. Natural Resources Defense Council, 421 U.S. 60 (1975). *See* 40 C.F.R. § 70.7(e)(2) (1993); 57 Fed. Reg. 32307 (1992); FINDLEY & FARBER, *supra* note 197, at 115; GUALTIERI ET AL., *supra* note 109, at 21.

287 Rouse, *supra* note 9, at 81-84.

288 *See infra* text accompanying note 435-40 (discussing NRC suggestions for modifying JACADS).

289 The Army's process for obtaining the necessary state permits (related to the Clean Air Act and other statutes) has been criticized for inefficiency and delay. The Army has conceded that the management of the permitting process should be improved, but contends that tardy state procedures, rather than Army missteps, are the main impediments to acceleration. Owen Statement, *supra* note 4, at 7; ISSUES AFFECTING, *supra* note 254, at 13-14. *See also* MITRE, SUMMARY EVALUATION OF THE JOHNSTON ATOLL CHEMICAL AGENT DISPOSAL SYSTEM: OPERATIONAL VERIFICATION TESTING 3-8 (1993) [hereinafter MITRE] (recommending expedited Army procedures for seeking relevant permits for construction and operation of CW incinerators).

290 42 U.S.C.A. §§ 7412(d)(l), 7661a(d) (West Supp. 1994).

291 Even ordinary municipal waste incinerators have become controversial, with the East Liverpool, Ohio facility becoming a focus of national attention. Keith Schneider, *For Crusader Against Waste Incinerator, A Bittersweet Victory*, N.Y. TIMES, May 19, 1993, at A14; Keith Schneider, *Incinerator Trial Is Blocked, Leading to Test of New Administration*, N.Y. TIMES, Jan. 18, 1993, at A15. The Army has contended that its CW incinerators will be far safer and cleaner than municipal facilities, but those assurances have not quieted the opponents. *Army Moves Ahead with Plan to Burn Chemical Weapons*, WASH. TIMES, July 12, 1993, at A6.

292 *See infra* text accompanying note 452-55 (discussing the fact that several state laws have become so restrictive that some doubt whether the Army will ever be able to surmount local opposition and obtain the necessary permits for constructing and operating the incinerators).

a chemical facility for routine or challenge inspection and demand the taking of samples or the execution of specified chemical operations, those disruptions in the plant's ordinary operations could lead to unanticipated discharges, not covered by the applicable permit. Only if the host facility knows in advance about the inspection and about the inspectors' particular search algorithm could it even seek a temporary variance in the applicable permit; otherwise, any resulting discharge could be a violation of the facility's authority.[293]

Finally, any facility that houses any of one hundred specified hazardous substances must prepare a risk management plan to detect, prevent, and respond to any unplanned releases. Even if the facility does not ordinarily emit any of those chemicals (and no CAA permit is therefore mandatory), an emergency preparedness plan is nonetheless required where CWC inspections might cause an accidental discharge.[294]

C. Resource Conservation and Recovery Act (RCRA)

The Resource Conservation and Recovery Act of 1976[295] establishes a comprehensive "cradle to grave" system for controlling the generation, transportation, and disposal or treatment of hazardous wastes.[296] The act applies to a broad definition[297] of "solid" wastes that are "discarded" (*i.e.*, not part of an ongoing industrial process).[298] RCRA will thus presumptively apply to the elimination of most CW agents; CW munitions, delivery systems, and other paraphernalia; and samples taken by CWC inspectors during visits to American facilities. The process of obtaining a RCRA permit for any of these items or activities is a major undertaking—the application for the Tooele, Utah, CW incineration facility, for example, included some fourteen volumes of required data.[299]

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293 *See* 40 C.F.R. § 70.6(g)(1) (1993); 57 Fed. Reg. 32306 (1992) (providing criteria for response to "emergency" unplanned emissions); GUALTIERI ET AL., *supra* note 109, at 22 & n.145. Some plant managers would reportedly be prepared to resist the inspectors' requests for sampling if the procedure would violate accepted safety or other standards. Smithson, *supra* note 262, at 16-17.

294 42 U.S.C.A. § 7412(r) (West Supp. 1994); GUALTIERI ET AL., *supra* note 109, at 22.

295 42 U.S.C.A. §§ 6901-6991i (West 1983 & Supp. 1994). *See* LAITOS & TOMAIN, *supra* note 197, at 193-202; FINDLEY & FARBER, *supra* note 197, at 231-39.

296 *See generally*, AROESTY ET AL., *supra* note 197, at 26; BONINE & MCGARITY, *supra* note 197, at 722-82; VERIFICATION TECHNOLOGY, *supra* note 197, at 36-41.

297 For RCRA purposes, solid waste can include liquids and gases, as well as ordinary solids. 42 U.S.C. § 6903 (27) (1988). To be designated as "hazardous," a substance must be identified by the EPA as being toxic, carcinogenic, or otherwise dangerous. 40 C.F.R. § 261 (1993).

298 40 C.F.R. § 261.2 (1993). RCRA applies to materials that are discarded or abandoned or that will not be used, reused, reclaimed, or recycled, and are being held only for future disposal. *Id.*

299 ISSUES AFFECTING, *supra* note 254, at 12.

As with other federal pollution control laws, enforcement of RCRA is partially delegated to the individual states, which may develop their own hazardous waste programs, provided that the standards are at least as stringent as Congress's.[300] Even federal facilities are covered by RCRA state standards and are subject to substantive standards, fines, and criminal penalties for noncompliance.[301]

Under an ongoing permit system, anyone who generates hazardous wastes must keep detailed records, use and label appropriate containers, and either process the material on-site according to the best available technology, or suitably prepare it for off-site transportation.[302] Those who transport the wastes must comply with a rigid system of manifests, to ensure delivery only to permissible locations. Facilities that treat, store, or dispose of the wastes are also bound by detailed safety and containment regulations.

In the CWC context, the mandatory elimination of the stockpile, the non-stockpile materials, and the various CW-related facilities will immediately qualify a huge inventory of items for RCRA coverage.[303] Federal and state permits will thus be required for the handling, including destruction, of the items, an elaborate undertaking. Any transportation or even temporary holding of chemicals or CW-contaminated materials will require approval by various tiers of governmental authorities.[304]

Moreover, since most proposals for the destruction of the inventory—including even the JACADS incineration system—contemplate the creation of a substantial quantity of irreducible solid wastes,[305] eventual permanent storage at a suitable waste management location will be required and will also be governed by RCRA.

RCRA also constrains the operation of the projected incinerators in other important ways. That is, the physical construction activity related to any new hazardous waste management facility cannot be initi-

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300 Hazardous Waste Treatment Council v. Reilly, 938 F.2d 1390 (D.C. Cir. 1991); ENSCO v. Dumas, 807 F.2d 743 (8th Cir. 1986); BONINE & MCGARITY, *supra* note 189, at 769-80.

301 42 U.S.C.A. § 6961 (West Supp. 1994); United States v. Dee, 912 F.2d 741 (4th Cir. 1990); Ohio v. Department of Energy, 689 F. Supp. 760 (S.D. Ohio 1988); Maine v. Department of Navy, 702 F. Supp. 322 (D. Me. 1988); BONINE & MCGARITY, *supra* note 189, at 779-80.

302 Somewhat relaxed standards apply to facilities that produce only small quantities of waste products. BONINE & MCGARITY, *supra* note 189, at 736-37.

303 The Army has begun working on the question of precisely when the CW materials to be destroyed will be designated as RCRA hazardous wastes. 58 Fed. Reg. 25,045 (Apr. 26, 1993) (containing projected rule; final action expected Sept. 1994); GUALTIERI ET AL., *supra* note 109, at 1, n.2; Rouse, *supra* note 9, at 84-89.

304 NON-STOCKPILE REPORT, *supra* note 147, at ii, 8.1-8.3.

305 Irreducible wastes include ash, salts derived from the chemicals, and possibly some partially decontaminated metal parts from the munitions. *See infra* text accompanying notes 409-414 (discussing types of wastes produced by baseline incineration).

ated without a RCRA permit.[306] In addition, before any CW incinerator may lawfully be operated to destroy munitions in a routine process, it must pass a RCRA "trial burn," and the federal "destruction removal efficiency" (DRE) standard requires the successful eradication of at least 99.99 percent of the input agent.[307] Some states have further heightened this standard, requiring a DRE of 99.9999 percent.[308] Reportedly, the JACADS facility regularly achieved (or, in one case, almost achieved) these levels of operation,[309] and the Tooele, Utah unit is now undergoing trial burn certification.[310]

In addition, the inspection functions of the CWC may also trigger RCRA concerns, where the inspectors elect to collect samples, wipes, or other substances from the production process. If these are assembled, analyzed, and disposed of at the inspected facility, then the facility itself becomes the "generator" of the resulting waste products and is responsible for disposal of them, presumably as part of its regular (permitted) waste stream.[311] If the inspectors decide, however, to re-

306 ISSUES AFFECTING, *supra* note 254, at 11-13. The process for obtaining an RCRA permit includes: submitting an application to the appropriate state agency, responding to the agency's sequential notification of deficiencies in the application, submitting the state-approved application to the federal EPA, incorporating EPA comments; providing a 45-day period for public comments and a public hearing, and allowing possible public appeal of the state decision to issue a permit. The entire process can take 16-36 months. *Id. See also* GENERAL ACCOUNTING OFFICE, GAO/NSIAD-90-155, OBSTACLES TO THE ARMY'S PLAN TO DESTROY OBSOLETE U.S. STOCKPILE 22-23 (May 1990) [hereinafter OBSTACLES TO THE PLAN]; *Department of Defense's Chemical Weapons Destruction Program: Hearing Before Environment, Energy, and Natural Resources Subcomm. of the House Comm. on Gov't Operations*, 102d Cong., 2d Sess. 86 (1992) (testimony of Jeffrey D. Denit) [hereinafter *Government Operations Hearings*].

307 MITRE, *supra* note 289, at C.6-7; Owen Statement, *supra* note 4, at 296; RECORD OF DECISION, *supra* note 145, at 14. There are also RCRA standards for various non-agent smokestack emissions. MITRE, *supra* note 289, at 3-4. *See also* PAT COSTNER & JOE THORNTON, PLAYING WITH FIRE 9 (1990) (critiquing the concept of using destruction removal efficiency as the key criterion of incinerator effectiveness).

308 MITRE, *supra* note 289, at C-7. Kentucky and Indiana have established an agent DRE standard of 99.9999%, and Utah has an agent DRE of 99.9999% for the liquid incinerator (see *infra* text accompanying notes 398-406 for a discussion of the different JACADS incinerators), and 99.999% for the other incinerators.

309 *Id.* at 3-4, 3-11, C.6-7 (reporting that JACADS achieved 99.9999% DRE or better in most tests; the metal parts furnace achieved 99.9996% DRE, due to inadequate sensors and a low rate of agent input).

310 Owen Statement, *supra* note 4, at 297 ("systemization" of Tooele facility—involving integration of different components of the plant, training the operating crews, etc.—started in Aug. 1993 and will last 18 months; toxic operations are scheduled to begin in Feb. 1995); *Tooele Systemization Effort Only 4 Months Away*, CHEMICAL DEMILITARIZATION UPDATE, Apr. 1993, at 1 [hereinafter *Tooele*]; *What About TOCDF?*, CHEMICAL DEMILITARIZATION UPDATE, July 1993, at 4 [hereinafter *TOCDF*].

311 The handling of a different type of waste product may require a modification of the facility's existing RCRA permit. GAULTIERI ET AL., *supra* note 109, at 30-32.

As with the Clean Air Act, there are procedures for temporary or emergency modifications of the RCRA permits, and if the inspected facility has sufficient advance notice, these may be applicable. However, in the case of short-notice challenge inspections, and where the inspectors

move the samples from the facility for analysis in an independent laboratory, then the receiving laboratory may be the location where the chemical is ultimately converted into "waste." In that scenario, the laboratory, as the generator, would be responsible for RCRA compliance.[312]

Under RCRA, the EPA or any private citizen may commence a civil action against a party whose hazardous waste activities constitute an "imminent hazard"; even a risk of harm, as distinguished from actual damage, is sufficient, and a strict liability standard has been applied.[313]

D. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980,[314] as revised by the Superfund Amendments and Reauthorization Act of 1986,[315] provides requirements, mechanisms, and funding for the cleanup of old hazardous waste disposal sites.[316] In general, the parties who created the leaking mess are financially responsible for stabilizing and remediating it; if they are not available to do so, the statute creates a federal trust account (the

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elect not to provide advance warning of their intention to collect particular samples, the host facility may have difficulty staying within its RCRA permit or meeting the time standards for a modification. *See* 40 C.F.R. § 270.42 (1993).

The Army did receive important RCRA variances from the regional and national EPA offices, easing the standards for the test operation of the JACADS facility and also allowing site preparation for construction at the Anniston, Alabama location to proceed more promptly than would ordinarily be allowed. GAO auditors, however, have cautioned that the Army should not count upon being able to obtain similar procedural or substantive RCRA modifications in the future. *Government Operations Hearings*, *supra* note 306, at 15-18 (testimony of Richard Davis); ISSUES AFFECTING, *supra* note 254, at 30-31. The regional EPA may also have granted JACADS a novel interpretation of allowable "exceedances" beyond the RCRA permit in the operation of the incinerators during the testing process, approving emissions that would not likely be tolerated at facilities inside the mainland United States. *Government Operations Hearings*, *supra* note 306, at 133 (testimony of Walter L. Busbee); COSTNER, *supra* note 242, at 12.

312 *See* GUALTIERI ET AL., *supra* note 109, at 26, 28-30.

313 United States v. Aceto Agric. Chem. Corp., 872 F.2d 1373 (8th Cir. 1989); United States v. Northeastern Pharmaceutical & Chem. Co., 810 F.2d 726 (8th Cir. 1986), *cert. denied*, 484 U.S. 848 (1987); United States v. Price, 688 F.2d 204 (8th Cir. 1982); Dague v. City of Burlington, 733 F. Supp. 23 (D. Vt. 1990); United States v. Vertac Chem. Corp., 489 F. Supp. 870 (E.D. Ark. 1980).

314 42 U.S.C.A. §§ 9601-9675 (West 1988 & Supp. 1994). *See generally* BONINE & MCGARITY, *supra* note 189, at 907-1028; FINDLEY & FARBER, *supra* note 197, at 240-59; AROESTY ET AL., *supra* note 197, at 27.

315 42 U.S.C.A. §§ 9601-9675 (West 1988 & Supp. 1994); AROESTY ET AL., *supra* note 197, at 28.

316 CERCLA applies more broadly than RCRA, and covers any concentration of broadly-defined "hazardous substances," even some that might not meet the RCRA definition. B.F. Goodrich Co. v. Murtha, 697 F. Supp. 89 (D. Conn. 1988); LAITOS & TOMAIN, *supra* note 197, at 202-03.

"superfund") to bear the expense. The act may be enforced through litigation brought by the EPA, a state, or a citizen.

The primary applicability of CERCLA to the CWC concerns the disposal of former CW production facilities and the identification and neutralization of locations where non-stockpile CW items have long been buried or abandoned. The treaty imposes obligations to eliminate these items promptly and under international inspection; the statute creates some impediments (but also some facilitating measures) that might affect the destruction process. CERCLA also applies in creating an obligation to clean up hazardous wastes after spills or other accidents, such as a CW agent leak or a transportation mishap,[317] and it also covers the disposal of old and obsolete CW-related materials, even those no longer suitable for weapons applications.[318]

E. Clean Water Act (CWA)

The Clean Water Act of 1972, as amended, articulates the goals of eliminating the discharge of pollutants into navigable waters and of generally preserving the purity of America's water supply.[319] Structured similarly to the Clean Air Act, the CWA authorizes the EPA to establish effluent limits and instructs the states to define ambient water quality objectives. Dischargers must hold a permit, satisfying both sets of standards.[320]

The Army's current incineration-based model for destroying the CW arsenal does not generate any liquid wastes that would be governed by CWA standards.[321] Therefore, under the current plans, the greatest intersection between CWA and the treaty would, once again, concern the operation of the verification functions. If, as above, an inspection resulted in the discharge of liquids directly or indirectly into a river or groundwater, and if the release were not authorized by a permit, there would be a violation. As with other pollution abatement systems, there is a procedure for temporary and exigent variances in a permit.[322] If some novel methodology other than incineration is eventually adopted for destruction of portions of the

317 BONINE & MCGARITY, *supra* note 189, at 742-44; NON-STOCKPILE REPORT, *supra* note 147, at 8.1-8.3.

318 ENVIRONMENTAL REVIEW, *supra* note 154, at 14.

319 33 U.S.C.A. §§ 1251-1387 (West 1986 & Supp. 1994). *See generally* FINDLEY & FARBER, *supra* note 197, at 132-52; VERIFICATION TECHNOLOGY, *supra* note 197, at 42-45.

320 *See* BONINE & MCGARITY, *supra* note 189, at 258-60; LAITOS & TOMAIN, *supra* note 197, at 170-83.

321 UNITED STATES ARMY CHEMICAL MATERIEL DESTRUCTION AGENCY, SAFELY DESTROYING AMERICA'S CHEMICAL WEAPONS: QUESTIONS AND ANSWERS 13 (explaining that the only water discharge from the JACADS-style facility is from the sanitary sewer system, which does not come into contact with chemical agents).

322 40 C.F.R. §§ 124.5, .62 (1993). *See* GUALTIERI ET AL., *supra* note 109, at 25; LAITOS & TOMAIN, *supra* note 197, at 176.

CW arsenal, and if that alternative technology involves a quantity of liquid discharges, then the CWA restrictions could play a major role in shaping the implementation of the operations.[323]

F. Other Environmental Laws Relevant to the CWC

Depending upon the exact technology or combination of technologies that are ultimately selected to conduct the CW eliminations required by the treaty, a variety of other environmental laws might be implicated. For example, the Toxic Substances Control Act of 1973 (TSCA)[324] regulates the production and marketing of some one hundred thousand chemicals,[325] including several CW precursors.[326] If any of the elimination methodologies produces new hazardous chemical substances as an intermediate stage or by generating recycled chemicals for commercial availability, this legislation would be directly applicable. Moreover, TSCA regulates the burning of hazardous substances such as PCBs (some of which are embedded in the fiberglass shipping and firing tubes for the M55 CW rockets)[327] and, like RCRA, it establishes percentage removal criteria for incinerators.[328] Similarly, the Federal Insecticide, Fungicide, and Rodenticide Act[329] would become applicable to the production and handling of any chemicals with pesticide uses.

In more extended circumstances, implementers of the CWC may brush up against diverse other statutes, including the Noise Control Act of 1972,[330] the National Historic Preservation Act of

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323 *See generally* BONINE & MCGARITY, *supra* note 189, at 255-375; LAITOS & TOMAIN, *supra* note 197, at 168-89.

324 15 U.S.C.A. §§ 2601-2692 (West 1982 & Supp. 1994). *See* AROESTY ET AL., *supra* note 197, at 23-24; BONINE & MCGARITY, *supra* note 189, at 707-21; VERIFICATION TECHNOLOGY, *supra* note 197, at 15-16.

325 Kyle Olson, *Domestic Regulation of the U.S. Chemical Industry and Its Application to a Chemical Weapons Ban*, *in* NATIONAL IMPLEMENTATION OF THE FUTURE CHEMICAL WEAPONS CONVENTION 102-03 (Thomas Stock & Ronald Sutherland eds., 1990). Roughly 1000 new chemicals are added to the TSCA coverage each year. *Id.*

326 Chemical weapons themselves may be exempted from TSCA under the waiver provisions of 15 U.S.C. § 2621 (1988).

327 PEIS, *supra* note 130, at 1-19. PCBs are polychlorinated biphenyls, found to be carcinogenic. *Id.* Not all of the projected eight incinerators in the continental United States will handle the M55 rockets, so this aspect of TSCA will not be relevant everywhere. Rouse, *supra* note 9, at 40.

328 TSCA's DRE standard for PCBs requires 99.9999% removal. During the JACADS trial burn, the monitors were not sufficiently sensitive to confirm the achievement of this level of destruction, but the Army concluded that comparisons with commercial incinerators revealed JACADS to perform far better, and the Department of Health and Human Services reported that any PCB emissions were not a health hazard. PEIS, *supra* note 130, supp. D.11. Critics, however, contest those conclusions. *See infra* text accompanying notes 425-34.

329 7 U.S.C.A. §§ 136-136y (West 1980 & Supp. 1994). *See* AROESTY ET AL., *supra* note 197, at 25; BONINE & MCGARITY, *supra* note 189, at 671-86.

330 42 U.S.C. §§ 4901-4918 (1988).

1966,[331] the Safe Drinking Water Act of 1974,[332] and others.[333] While none of these provisions is likely to impact upon the chemical weapons disarmament operations in a major way, the CWC will spawn a large volume of construction, demolition, and other environment-affecting actions, especially at the eight current storage locations, and these events could have diverse consequences implicating a host of statutory regimes.

Of special note is the Hazardous Materials Transportation Act,[334] which regulates the interstate movement of dangerous substances. The Army's current plan—to destroy the CW stockpile *in situ*, by constructing incineration facilities at each of the eight locations where munitions are currently housed—largely avoids this topic.[335] But if, as some have proposed, the sites having the smallest concentration of weaponry were treated differently—and, in any event, as non-stockpile materials are delicately transported to disposal locations—the national and local regulations regarding interstate shipments will become more important.[336] The transport of even very small samples collected by the inspectors would be problematic under this Act,[337] and the difficulties would multiply if the CWC's implementing Organization sought to ship hazardous samples internationally.[338]

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331 16 U.S.C.A. §§ 470-470x(6) (West 1988 & Supp. 1994).

332 42 U.S.C. §§ 300(f)-300(j)(26).

333 *See generally* PEIS, *supra* note 130, at 1-21, supp. F.3.

334 49 U.S.C.A. 1801-1819 (West 1976 & 1994 Supp.); 49 C.F.R. 171-80 (1992). The statute requires that the Army consult closely with the Department of Transportation, the Department of Health and Human Services, and the Environmental Protection Agency regarding any shipments of CW hazardous materials. PEIS, *supra* note 130, at 1-18, 1-21, supp. G.3-23. In addition, the Center for Environmental Health and Injury Control, a constituent of the National Center for Disease Control, has statutory responsibility for review and oversight of any Defense Department plans to transport or dispose of CW, under 50 U.S.C.A. § 1512 (West 1991) (containing Armed Forces Appropriation Authorization of 1970), Carnes & Watson, *supra* note 129, at 658. *See generally* VERIFICATION TECHNOLOGY, *supra* note 197, at 46-54; GUALTIERI ET AL., *supra* note 109, at 42-43; *see also* 42 U.S.C.A. § 6923 (West Supp. 1994) (containing RCRA provisions regarding transport of hazardous materials); 50 U.S.C.A. § 1512 (West 1991) (restricting transportation of CW and BW agents between military installations).

335 In fact, Congress has by statute prohibited the Army even from further study of relocation options, so no additional evaluation of the methodologies for safely transporting CW away from any of the eight continental locations has been undertaken since the PEIS. 1992 Department of Defense Appropriations Act, Pub. L. No. 103-139 § 8075A(a); S. Rep. No. 154, 102d Cong., 1st Sess. (1991); H.R. Rep. No. 328, 102d Cong., 1st Sess. (1991) (containing amendment 167).

336 The statute and regulations provide that these types of hazardous materials may not be transported on aircraft or on passenger-carrying trains and must be wrapped in special protective packaging. GUALTIERI ET AL., *supra* note 109, at 42-43.

337 States as well as the federal government regulate the carriage of hazardous substances, but the Department of Transportation may override any contrary state regulations. National Tank Truck Carriers v. Burke, 535 F. Supp. 509 (D.R.I. 1982); BONINE & MCGARITY, *supra* note 189, at 778 n.j.

338 BONINE & MCGARITY, *supra* note 189, at 742; GUALTIERI ET AL., *supra* note 109, at 43; IMPLEMENTATION MANUAL, *supra* note 197, at 89, 96. Regulations pursuant to RCRA also gov-

G. *Other Relevant Legislation*

Largely beyond the scope of this Article, but important nonetheless to the effective implementation of the CWC, are a range of other social laws that may circumscribe certain treaty operations.[339] For example, the statutory and regulatory network established under the Occupational Safety and Health Act[340] will affect the conduct of verification inspections and the operation of CW disposal facilities. Inspectors and their equipment cannot be allowed to jeopardize the safety of the workers in the facilities being inspected, and designated prudential standards must be followed. In the same vein, the design and functioning of the CW destruction installations will have to proceed with OSHA requirements in mind, lest the federal government run afoul of its own regulations.[341]

In addition, the Emergency Planning and Community Right-to-Know Act[342] has acknowledged the importance—especially for facilities that deal with selected dangerous materials—of adequate emergency preparedness and response. Under this law, the operators of covered facilities housing "extremely hazardous substances"[343] must divulge relevant information, and states are empowered to ensure that

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ern exports of hazardous wastes, 40 C.F.R. §§ 262.50-57 (1993), and there is a growing international law restricting transport of those products. Basel Convention, *supra* note 174; GENERAL ACCOUNTING OFFICE, *supra* note 145, at 11-15 (explaining that most of the containers that the Army had intended to use for transporting the CW stockpile from Germany to Johnston Atoll in 1990 could not meet the standards established by the International Maritime Organization's applicable codes for the shipment of dangerous goods); VERIFICATION TECHNOLOGY, *supra* note 197, at 51-54. See also *id.* at 62-64 for the more general U.S. laws restricting exports of weapons-related items and materials.

339 Data reporting and control have been key issues in many U.S. environmental laws, as statutes require chemical or other industries to submit to the federal government detailed accounts of their production processes, statistics, and safeguards. At the same time, these regulatory regimes provide stringent protections against the unauthorized release of this confidential business information to competitors or others. The CWC, too, will mandate the submission of detailed, voluminous—and commercially sensitive—information, and one of industry's key concerns about the treaty was the importance of ensuring that adequate controls would be in place to prevent the release of proprietary data that could compromise a firm's competitive advantages. The treaty negotiations exhausted considerable time and attention on this issue, producing a detailed "Confidentiality Annex" to the treaty to specify the procedures for safeguarding the reports, but some industry spokespersons remain skeptical about the stringency of the regime in operation. CWC, *supra* note 1, Annex on the Protection of Confidential Information; Olson, *supra* note 325, at 106; Olson, *supra* note 64 at 21-25. *See supra* text accompanying notes 118-22 (regarding protection of secrecy).

340 29 U.S.C.A. §§ 651-673 (West 1985 & Supp. 1994); 29 C.F.R. § 1910 (1993); AROESTY ET AL., *supra* note 197, at 25-26; VERIFICATION TECHNOLOGY, *supra* note 197, at 17-21.

341 GUALTIERI ET AL., *supra* note 109, at 38-42; VERIFICATION TECHNOLOGY, *supra* note 197, at 19; Exec. Order No. 12,196, 45 Fed. Reg. 12,769 (1980); 29 C.F.R. § 1960.16 (1993).

342 42 U.S.C. §§ 11001-11050 (1988); BREGMAN & MACKENTHUN, *supra* note 198, at 151-54; VERIFICATION TECHNOLOGY, *supra* note 197, at 55-61 (discussing several federal and state laws relevant to notification and cleanup of accidents involving hazardous materials).

343 42 U.S.C. § 11002(a) (1988).

procedures exist, and that people are trained, to recognize potentially dangerous situations, to react to them, and to inform the neighbors about the hazards.[344] Again, the chemical weapons disposal operations under the CWC are not any type of a special case under this statute, but the generally applicable standards will be relevant during the process of disposing of CW materials and during the conduct of CWC inspections.[345]

IV. Resolving Legal Conflicts: The Supremacy Clause

The conjunction of the Chemical Weapons Convention with the pre-existing corpus of American environmental jurisprudence poses two separate areas of potential doctrinal conflict: treaty vs. statute and federal vs. state. This section of the Article briefly analyzes both these legal antagonisms, under the rubric of the Constitution's Supremacy Clause.[346]

A. Treaties and Statutes

It is now well settled that international agreements and congressional enactments are instruments of equivalent legal dignity beneath the Constitution.[347] Therefore, the newer pronouncement—the later document in time—will prevail.[348] In this instance, the CWC will provide the *lex posterior* (at least for now),[349] and in the event of an intractable conflict, any prior United States environmental protection statutes would recede.[350]

American courts confronted with this type of conflict, however, have been reluctant to invalidate either category of instrument and have strained mightily to weave a construction of the sequential docu-

344 The Army has increased from $114 million in 1988 to $337 million in 1991 its estimate of the costs for adequate emergency preparedness programs at the CW destruction sites. The funds will provide improved communication, protection and warning equipment, and will support biennial emergency response exercises at the sites. Likely to Continue, *supra* note 242, at 14-15; Obstacles to the Plan, *supra* note 306, at 29-32.

345 Gualtieri et al., *supra* note 109, at 33-37; PEIS, *supra* note 130, at supp. L.3-29.

346 U.S. Const. art. VI, § 2.

347 *See* Restatement, *supra* note 203, §§ 115, 302(2).

348 A subsequent statute will supersede a prior treaty for purposes of domestic U.S. law, but does not invalidate the treaty on the international plane or constitute a valid excuse for breach. *Id.* § 115.

349 The instability of the last-in-time rule suggests that there could, in principle, be a rotating cycle of recency, especially if a statute were periodically re-enacted and if a treaty were amended or supplanted by a newer agreement.

350 The subsequent treaty does not quite "amend" or "repeal" the inconsistent prior statute; it simply displaces it as the binding source of internal U.S. law. Therefore, if the treaty were for some reason deemed inapplicable (*e.g.*, if it were suspended or terminated), the prior statute would automatically re-emerge as the binding provision.

ments that would allow both to be effectuated simultaneously.[351] Rather than supersede wholesale the provisions of existing United States environmental law, therefore, courts reviewing the CWC would be more likely to find or create a sufficient harmony of interests such that all the relevant bodies of law could be accommodated.

Regarding the CWC, that accommodation should not be too difficult to find, at least in many instances. The CWC, in fact, contains explicit references requiring its parties to comply with their applicable national environmental protection requirements, including obtaining the relevant permits, in the conduct of verification inspections—a seeming submission to the concerns of state and local governments.[352] On the other hand, the treaty also does require that the dismantlings and inspections actually be conducted as specified—local environmental impediments would not provide a valid excuse for bovine nonperformance.[353]

For their part, United States environmental protection laws are not intended to stand up rigidly against overriding foreign affairs imperatives, and they generally do not purport to make environmentalism any kind of absolute national priority.[354] On the other hand, NEPA and its progeny also do not automatically defer to ordinary foreign relations considerations, even when national security values are said to be implicated.[355] The statutory language of NEPA, for example, does not carve out any explicit or automatic exemptions for foreign affairs or national security concerns.[356] Occasionally, another

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351 United States v. Palestine Liberation Org., 695 F. Supp. 1456 (S.D.N.Y. 1988); RESTATEMENT, *supra* note 203, § 114.

352 CWC, *supra* note 1, Verification Annex, Parts II.B.11(d), II.E.43, IV.(A).C.32, VI.C.7.

353 In fact, the United States has a fundamental interest in ensuring that a party's domestic laws—even its important environmental protection statutes—do not provide an easy "escape clause," permitting the country to evade full compliance with all the details of the CWC's verification apparatus. The United States will be concerned to find a way to effectuate both its domestic environmental laws and its international obligations under the treaty, so it can credibly insist upon holding other countries to an equally high standard.

354 McQueary v. Laird, 449 F.2d 608 (10th Cir. 1971) (finding that NEPA does not create jurisdiction to challenge continued storage of chemical weapons at Rocky Mountain arsenal).

355 Catholic Action of Hawaii v. Weinberger, 643 F.2d 569 (9th Cir. 1980), *rev'd*, 454 U.S. 139 (1981) (holding that EIS would have to be prepared if the Navy proposes to store nuclear weapons in Hawaii); Romer v. Carlucci, 847 F.2d 445 (8th Cir. 1988) (holding that EIS is required for decisions regarding deployment of MX missiles); Concerned About Trident v. Rumsfeld, 555 F.2d 817 (D.C. Cir. 1977) (per curiam) (holding that Navy must comply with NEPA in making decisions regarding constructing a base for Trident nuclear submarines); Scientists' Inst. v. Atomic Energy Comm'n, 481 F.2d 1079 (D.C. Cir. 1973). *But see* Greenpeace USA v. Stone, 748 F. Supp. 749 (D. Haw. 1990), *appeal dismissed as moot*, 924 F.2d 175 (9th Cir. 1991) (holding that movement of chemical weapons from Germany only limited requires NEPA documentation); Cruden, *supra* note 171, at 1192-1213.

356 Congress drafted NEPA with sweeping language, not inserting any explicit exemptions directly relevant to a national security operation such as CW destruction, beyond the general commitment to pursue environmentalism "where consistent with the foreign policy of the United

subsequent statute has created an ad hoc exemption for a particular project, such as the Trans-Alaska Natural Gas Pipeline, when the legislature judged that compliance with the usual EIS procedures would be unduly burdensome or time-consuming.[357] Occasionally, too, the Council on Environmental Quality (CEQ) has authorized individual waivers of the ordinary NEPA processes, as for accelerated military emergency activities in 1990 and 1991 in conjunction with Operations Desert Shield and Desert Storm.[358] But in general, full EIS documentation and compliance with all the other trappings of American environmental law are required, even when that conformity threatens to delay, disrupt, or effectively preclude a commercially important enter-

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States." 42 U.S.C. 4332(2)(F) (West 1988). Nevertheless, courts have tended to read some types of self-restraint into the statute when paramount international relations considerations are at stake. Environmental Defense Fund, Inc. v. Massey, 986 F.2d 528, 535 (D.C. Cir. 1993); Natural Resources Defense Council v. Nuclear Regulatory Comm'n, 647 F.2d 1345, 1366 (D.C. Cir. 1981); Commission for Nuclear Responsibility v. Seaborg, 463 F.2d 796 (D.C. Cir. 1971) (finding that no EIS is necessary for decision to conduct nuclear test, where delay in detonation would jeopardize national security); Wisconsin v. Weinberger, 745 F.2d 412 (7th Cir. 1974) (limiting NEPA coverage of proposed submarine communications system).

In addition, agency regulations implementing NEPA reserve the right to modify the usual EIS requirements (such as by providing the documents on a delayed timetable, or by excerpting classified material or placing it into a nonpublic annex) when necessary to serve security functions. 40 C.F.R. § 1507.3(C) (1993); 42 Fed. Reg. 5115-16 (1977) (ACDA regulations); Cruden, *supra* note 171, at 1179.

357 *See* 15 U.S.C. § 719f (1988); Romer v. Carlucci, 847 F.2d 445 (8th Cir. 1988) (finding that statute limits the scope of EIS required for MX missile program, excluding certain factors from consideration); Friends of the Earth v. Weinberger, 562 F. Supp. 265 (D.D.C. 1983), *appeal dismissed*, 725 F.2d 125 (D.C. Cir. 1984); Colon v. Carter, 633 F.2d 964 (1st Cir. 1980); Earth Resources Co. of Alaska v. Federal Energy Regulatory Comm'n, 617 F.2d 775 (D.C. Cir. 1980); Cruden, *supra* note 171, at 1196-97; Brief for Appellees, *supra* note 218, at 28-29; *see also* Defense Base Closure and Realignment Act of 1990, 10 U.S.C.A. § 2687 note (West 1994) (largely exempting defense base modifications from NEPA coverage); Department of Defense Appropriations Act of 1983, 42 U.S.C.A. § 4332 (West 1994) (making NEPA less relevant to decisions regarding deployment of the MX missile).

A statute's exemption from NEPA must be explicit; courts have not favored the argument that ordinary legislation constitutes an implied waiver of the EIS requirements, unless a "clear and unavoidable conflict in statutory authority exists. . . ." Flint Ridge Dev. Co. v. Scenic Rivers Ass'n, 426 U.S. 776, 788-91 (1976). *See also* Izaak Walton League v. Marsh, 655 F.2d 346, 367 (D.C. Cir.), *cert. denied*, 454 U.S. 1092 (1981); 40 C.F.R. 1500.6 (1993).

Among the most recent proposals to waive NEPA by statute in favor of a military program is the pending bill which would allow the Navy to transport, store, and handle spent nuclear fuel in Idaho and elsewhere without first preparing an EIS. Keith Schneider, *Bill Would Exempt Navy From Environment Law*, N.Y. TIMES, July 22, 1993, at A19. Among the most recent administrative waivers was the decision to allow the import of spent nuclear fuel from Belgium without an EIS as an emergency measure to prevent Belgium and Britain from reprocessing the material. R. Jeffrey Smith, *Energy Dept. Waives Rules to Import Spent Nuclear Fuel*, WASH. POST, Oct. 27, 1993, at A15.

358 *Pentagon & CEQ Report* (National Public Radio Broadcast, Morning Edition, Feb. 19, 1991) (transcription on file with author) (discussing that Pentagon and CEQ waived NEPA compliance on two occasions: to allow additional takeoffs of transport aircraft from Westover Air Force Base in Massachusetts, and to test airborne equipment for clearing land mines).

prise or a project for which the federal government has a major responsibility and investment.

In a similar vein, CEQ and other agency regulations specify that no EIS documentation will be necessary where the agency's contemplated action is "mandatory," as where an international agreement imposes nondiscretionary obligations upon the United States and deprives the executive branch of any legal alternatives for executing those commitments.[359] The language of those escape clauses, however, suggests little relief in the case of the CWC. That is, although the United States will be legally bound to destroy the CW stockpile, and accorded no options about effectuating that policy, the treaty does not specify any particular methodology for accomplishing the eliminations. Therefore, the government may still logically be required under domestic law to prepare environmental impact statements regarding the specific dismantling technologies and locations that it has voluntarily selected.

Some of the environmental statutes surveyed above also contain explicit waiver provisions of other sorts, allowing the government to escape full compliance if specified overriding policies are at stake. For example, under RCRA,

> The President may exempt any solid waste management facility of any department, agency, or instrumentality in the executive branch from compliance with such a requirement if he determines it to be in the paramount interest of the United States to do so. . . . Any exemption shall be for a period not in excess of one year, but additional exemptions may be granted for periods not to exceed one year upon the President's making a new determination.[360]

While these variances may be useful to implementers of the CWC, they were surely not crafted for precisely that type of eventual-

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359 42 Fed. Reg. 5115-16 (1977) (ACDA regulations distinguishing "mandatory" actions required by an international agreement, for which no EIS would be prepared, from other treaty obligations, which still leave the United States a choice about alternative implementation procedures, for which an EIS would be appropriate).

360 42 U.S.C. § 6961 (1988); RECORD OF DECISION, *supra* note 145, at 30.

Cognate waiver provisions are included in the Clean Air Act, 42 U.S.C. § 7418(b) (1988) & 42 U.S.C.A. § 7412(i)(4) (West Supp. 1994), the Federal Water Pollution Control Act, 33 U.S.C.A. § 1323(a) (West Supp. 1994), and other statutes. Those two statutes contain, in addition, another waiver provision applicable to "weaponry," granting the President authority to grant more extended exemptions.

Exec. Order No. 12,088, 3 C.F.R. 243 (1979), *as amended by* Exec. Order No. 12,580, Jan. 23, 1987, reprinted following 42 U.S.C.A. § 4321 (1994), requires that federal agencies conform to the same federal and state environmental protection standards that are applicable to private persons. It also provides authority for the President to waive that compliance when necessary "in the interest of national security" or otherwise "in the paramount interests of the United States." *Id.* § 7.

See Cruden, *supra* note 171, at 1185, 1191 (indicating that the only occasion when this waiver authority has been exercised was to relieve Fort Allen, Puerto Rico, from compliance

ity, and they are at least partially inapt for it. The waivers were not designed to be triggered by important (but soon-to-be-commonplace) international events such as routine or challenge inspection of a wide range of public and private United States chemical facilities, and they do not seem to contemplate the type of widely occurring short notice and short duration exemptions that might soon become necessary.[361]

B. The States and the CWC

No state government would have a special interest in frustrating the effective implementation of the CWC, per se, but it is quite possible that a local community might weigh the balance between treaty compliance and environmental protection differently from the national leadership. Under the Constitution, national and international standards of the sort under consideration here would trump any contrary state and municipal provisions,[362] and the national government is empowered to pre-empt an entire topic, by explicitly excluding state legislation, or by occupying the field with comprehensive federal law.[363]

In fact, however, the strategy of much United States environmental law has been precisely the opposite: to establish minimum federal standards and procedures applicable nationwide, but also to allow the states to graft, on their own, more stringent provisions.[364] Under the Clean Air, Clean Water, RCRA and other programs, private or governmental entities that wish to engage in the regulated behaviors are required to conform to both the federal and the state constraints.[365] While it may seem odd for the national government to have ceded

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with the water, air, noise, and solid waste pollution abatement standards at the time of the 1980 Cuban-Haitian refugee operations).

361 Cruden, *supra* note 171, at 1188 (describing that in signing Executive Order 12,088 (requiring that federal facilities comply with federal, state, and local environmental protection requirements to the same extent as private persons), President Carter declared that he would personally review all requests for federal agency exemptions from environmental laws, and would approve waivers only when paramount national interests were at stake).

362 Longstanding case law powerfully excludes U.S. states from disrupting (and, in many respects, from participating at all in) the international life of the country. United States v. Belmont, 301 U.S. 324, 331 (1937) ("In respect of . . . our foreign relations generally, state lines disappear. As to such purposes the State . . . does not exist."); Zschernig v. Miller, 389 U.S. 429, 432 (1968) (barring "an intrusion by the State into the field of foreign affairs which the Constitution entrusts to the President and the Congress").

363 The federal government may displace state actions via statute, treaty, regulation, or simply a comprehensive statement of national policy; even if the state's putative lawmaking is not truly "inconsistent" with the federal government's international activities, the state involvement may be precluded under the concept of preemption. RESTATEMENT, *supra* note 203, § 1 reporters' note 5, § 115 cmt. e; FINDLEY & FARBER, *supra* note 197, at 59-85; Ray v. Atlantic Richfield Co., 435 U.S. 151 (1978).

364 BONINE & MCGARITY, *supra* note 189, at 382 n.e; Cruden, *supra* note 171, at 1184.

365 BONINE & MCGARITY, *supra* note 189, at 417-19.

such authority to the states, as it is inconsistent with the notion that ecological effects are interconnected nationally and internationally, and are not matters of strictly local concern, that type of delegation has been the recurrent pattern. The national government, of course, is empowered to alter that balance of power—to retrieve more decision-making authority for itself via ordinary legislation or regulation[366]—but that type of re-assertion of power ordinarily carries a political price, too.

Even more striking, the federal government itself has submitted to the jurisdiction and control of the state environmental agencies,[367] reversing the usual federalist presumption that state governments cannot hamstring the national leadership.[368] Via statute[369] and executive order,[370] the federal government is constrained to adhere to state substantive anti-pollution requirements to the same extent as a private person, across a wide range of activities, presumptively including facilities such as the Army's proposed CW incinerators.[371] Again, the national government would be constitutionally empowered to shuck off those restrictions, but has not yet found it expedient to do so.

Thus, under existing law, the governors, state environmental protection agencies, and even local administrators are empowered to set the pace and to create the conditions and impediments for the Army's construction, dismantling, and inspection functions required under the CWC.

V. Options for Dismantling Chemical Weapons

A. Failed Alternatives

For many years, the United States and other countries have exercised, or at least contemplated, a variety of CW disposal methods that are now widely viewed as foolish, impractical, or environmentally un-

366 *Id.* at 778 n.j, 779.

367 *Id.* 189, at 866-67; Cruden, *supra* note 171, at 1184.

368 Goodyear Atomic Corp. v. Miller, 486 U.S. 174, 180 (1988); Department of Energy v. Ohio, 112 S. Ct. 1627 (1992). *See also Navy Air Station Hit with Fine Under New Federal Law Provisions*, [May 1993-Apr. 1994] Env't Rep. (BNA) No. 4, at 190 (May 28, 1993) (explaining that Federal Facilities Compliance Act of 1992 waives federal sovereign immunity defense in actions brought by a state or the EPA).

369 42 U.S.C.A. § 7418 (West Supp. 1993) (Clean Air Act); 33 U.S.C.A. § 1323 (West 1986) (Clean Water Act); 42 U.S.C.A. § 6961 (West Supp. 1993) (RCRA).

370 Exec. Order No. 11,514, 35 Fed. Reg. 4,247 (1970); Exec. Order No. 11,991, 42 Fed. Reg. 26,967 (1977); Exec. Order No. 12,088, 43 Fed. Reg. 47,707 (1978); Exec. Order 12,580, 52 Fed. Reg. 2,923 (1987), *reprinted in* 42 U.S.C.A. § 4321 (West 1977 & Supp. 1993). *See also* Bregman & Mackenthun, *supra* note 198, at 18.

371 PEIS, *supra* note 130, at 1-19. Army regulations require that all the necessary permits be obtained prior to the start of construction. *Id.*

acceptable.[372] As noted above, substantial quantities of abandoned chemical munitions were simply buried, often in ordinary public or military landfills, with shockingly poor procedures for posting a hazard warning or permanently recording the activity.[373] Ocean dumping has also been a popular expedient, especially for disposing of captured Nazi stockpiles immediately following World War II,[374] and was pursued through the following decades, off the coasts of Alaska, California, and Florida.[375] Too often, these lethal weapons were scuttled in shallow, turbulent waters such as the North Sea and the Baltic Sea, and ordnance still occasionally percolates to the surface in an unlucky fishing vessel's nets.[376] Congress finally forbade United States ocean dumping of chemicals in 1972,[377] and the Arms Control and Disarmament Agency has recently commissioned a report concerning the location and current status of ocean-dumped CW.[378] Open pit burning of chemicals was also conducted as recently as twenty years ago, apparently oblivious to the hazards of the smoke plume and residuals.[379]

More prudent methods of disposing of unwanted CW have included attempts to chemically neutralize the agents by forcing them

372 Rouse, *supra* note 9, at 35, reports that the "Army has evaluated over 300 destruction concepts over the past several years in an attempt to find the safest, most practical method to dispose of these [chemical] agents and munitions."

373 *See supra* text accompanying notes 151-57 (discussing NON-STOCKPILE REPORT).

374 Allied forces disposed of some 250,000 tons of German chemical munitions by sea burial in 1945. U.S. ARMY CHEMICAL MATERIEL DESTRUCTION AGENCY, INTERIM SURVEY AND ANALYSIS REPORT ON NON-STOCKPILE CHEMICAL MATERIEL PROGRAM 16 (1993) [hereinafter DRAFT NON-STOCKPILE REPORT]. *See* Fredrik Laurin, *Scandanavia's Underwater Time Bomb*, BULL. ATOM. SCIENTISTS, Mar. 1991, at 11.

375 SIEGEL, *supra* note 256, at 12. From the 1940s through the 1960s, the U.S. program, denominated Operation CHASE (an acronym for "Cut Holes And Sink 'Em"), proceeded by loading excess chemical weaponry onto obsolete Liberty ships, towing them out to sea, and scuttling them into ocean trenches of the continental shelf. Satchell, *supra* note 4; Silton, *supra* note 9, at 18.

376 Laurin, *supra* note 374; Phillip Knightley, *Dumps of Death*, SUNDAY TIMES (LONDON) MAG., Apr. 5, 1992, at 26; Axel W. Krohn, *The Challenge of Dumped Chemical Ammunition in the Baltic Sea*, 25 SECURITY DIALOGUE 93 (1994).

377 The Marine Protection, Research, and Sanctuaries Act of 1972, Pub. L. No. 92-532, 86 Stat. 1052; Pub. L. No. 93-254, 88 Stat. 50 (codified as amended in scattered sections of 33 U.S.C.A.); 16 U.S.C.A. §§ 1431-39 (West 1985 & Supp. 1994). The statute was sparked by a report of the National Academy of Sciences' National Research Council, which concluded that the environmental effects of ocean dumping were unknown and should be avoided. PEIS, *supra* note 130, at 2-85. More recently, the related practice of "ocean incineration" (i.e., burning toxic wastes on a sea-based platform or vessel) has been outlawed, too. 39 Fed. Reg. 37,058 (1974) (interpreting Ocean Dumping Ban Act of 1988, Pub. L. No. 100-688; 33 U.S.C.A. 1414b); Seaburn Inc. v. Environmental Protection Agency, 712 F. Supp. 218 (D.D.C. 1989); Micronesia Memorandum, *supra* note 145, at 10.

378 *See* DRAFT NON-STOCKPILE REPORT, *supra* note 374, at 16.

379 Rouse, *supra* note 9, at 34-35; William F. Zorzi, Jr., *Army Is Learning to Destroy Chemical Weapons*, BALTIMORE SUN, Oct. 1, 1989, at K5; Morrison, *supra* note 196.

through a series of chemical reactions that denature the toxins.[380] The United States successfully destroyed armaments loaded with the nerve agent GB at Rocky Mountain Arsenal, Colorado during the middle 1970s in this way[381] and more recently the United States has experimented with advanced neutralization programs at the Chemical Agent Munitions Disposal System (CAMDS) at Tooele, Utah.[382] A total of over eight million pounds of chemical agent has been eliminated via this process.[383] However, many experts have concluded that chemical neutralization (at least when attempted through the prior generations of chemical technology) was defective, in being slow, possibly reversible, incompletely successful in destroying all the active agent, and producing substantial quantities of toxic waste products which—while not suitable for weaponry applications—still required expensive and environmentally problematic further treatment or storage.[384] Nonetheless, the concept of relying upon some form of chemical neutralization process to assist with the dismantling of chemical weapons is far from extinct.[385]

More exotic disposal mechanisms have also been propounded. For example, it might be thought possible to place chemical weapons into a large, solid cavern deep underground and then detonate a nuclear weapon in their midst, vaporizing the CW stockpile with an appealing "use a weapon to eliminate a weapon" irony.[386] Some have

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380 NRC ALTERNATIVES, *supra* note 129, at 54-62. The term "neutralization" is used in a generic sense to encompass all chemical reactions that counteract the toxicity of the agent, resulting in relatively innocuous products. Some of these are true "neutralizations," in which the resulting materials are inert salts. PEIS, *supra* note 130, at 2-85 to 2-86, supp. D.3-8.

381 A wide variety of chemical munitions was eliminated at Rocky Mountain Arsenal during two operations spanning Oct. 1973-Nov. 1976. In each case, the liquid GB was drained from the weapon or container, poured into a reaction vat, and mixed with a caustic solution of sodium hydroxide. The resulting brine was dried, and the salts were disposed of in a land fill. In some phases of the operation, an incinerator was also used to decontaminate metal parts and destroy scrap. PEIS, *supra* note 130, at supp. D.5-6.

382 Between Sept. 1979 and July 1982, almost 14,000 M55 rockets and almost 13,000 155mm and 105mm CW projectiles were demilitarized at Tooele, using procedures adapted from those developed at Rocky Mountain Arsenal. *Id.* supp. D.6-7; OTA ALTERNATIVES, *supra* note 140, at 31-33.

383 PEIS, *supra* note 130, supp. D.4.

384 *Id.* at 2.85-86; OTA ALTERNATIVES, *supra* note 140, at 31-33; Rouse, *supra* note 9, at 35-36. Neutralization produced five pounds of waste products for each pound of agent destroyed (as compared to 1.5 pounds of waste products generated by comparable incineration programs). PEIS, *supra* note 130. The Army has concluded that any neutralization methodology should be measured against four key criteria, including destruction of virtually all the input agent, and the inability of the resulting chemicals to be themselves used for CW purposes. ARMY ALTERNATIVES, *supra* note 249, at 13.

385 NON-STOCKPILE REPORT, *supra* note 147, at 9-7; OTA ALTERNATIVES, *supra* note 140; NRC ALTERNATIVES, *supra* note 129; NAS STOCKPILE COMMITTEE, *supra* note 140, at 109, 159, 1226.

386 PEIS, *supra* note 130, at 2-86. The Army has rejected this proposal as infeasible. *Id.* In addition, a 1992 statute restricts the types of nuclear explosions that the United States may con-

even pondered the concept of loading the unwanted munitions onto a rocket and firing it into space.[387]

B. The Army's Current Stockpile Destruction Program

In contrast to the above scenarios, the U.S. Army currently proposes to destroy the existing American CW stockpile via a state-of-the-art incineration process.[388] This process builds upon the Army's experience in furnace use gained at Rocky Mountain Arsenal in Colorado since 1972[389] and at CAMDS in Tooele, Utah since 1979.[390] These programs have been the basis for the design of the first full-scale, fully-integrated prototype incineration facility, the $240 million[391] Johnston Atoll Chemical Agent Disposal System (JACADS)

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duct, excluding this type of event, and President Clinton has additionally declared a moratorium on all nuclear explosions for any purposes. White House, Background Information: U.S. Policy on Nuclear Testing and a Comprehensive Test Ban (July 3, 1993). However, some inside Russia have become very interested in the possibility of selling nuclear explosion services, including adapting them for the purpose of eliminating nuclear weapons. Tariq Rauf, *Cleaning Up with a Bang*, BULL. ATOM. SCIENTISTS, Jan.-Feb. 1992, at 9, 47.

387 NRC ALTERNATIVES, *supra* note 129, at 33. The incalculable dangers of a rocket misfire or accident would rule out this option. The Army and others have also investigated other "novel concepts," but found none appealing. PEIS, *supra* note 130, at 2-86; NRC ALTERNATIVES, *supra* note 129.

388 *See generally*, PEIS, *supra* note 130, supp. C (describing the design of the demilitarization plant); Owen Statement, *supra* note 4, at 7-8.

389 PEIS, *supra* note 130, supp. D.8-10. Over six million pounds of mustard agents, mostly from ton containers, were destroyed at Rocky Mountain Arsenal between July 1972 and March 1974. *Id. See also Government Operations Hearings*, *supra* note 306, at 94 (statement of Walter L. Busbee) (indicating that a total of 7000 tons of CW agents have been destroyed—half by incineration and half by neutralization—over the past two decades).

390 PEIS, *supra* note 130, supp. D.10-14. Nerve agents GB and VX from rockets and ton containers, were destroyed in CAMDS experiments between March 1981 and August 1986. *Id. See also id.* supp. D.18-21; Vicki Kemper, *Deadly Debris*, COMMON CAUSE MAG., July-Aug. 1990, at 20 (experience with accidental releases of agent at CAMDS). CAMDS (which is approximately one-third the size of the facilities that the Army seeks to build at the eight current storage sites, Rouse, *supra* note 9, at 37) is still operational and is an important part of the Army's overall CW destruction program, as the location for cryofracture and other experiments. UNITED STATES ARMY CHEMICAL MATERIEL DESTRUCTION AGENCY, ANNUAL STATUS REPORT ON THE DISPOSAL OF THE LETHAL CHEMICAL STOCKPILE 14-15 (1992); *CAMDS Testing Resumes*, CHEMICAL DEMILITARIZATION UPDATE, Oct. 1992, at 3.

391 The true cost of a project such as JACADS is difficult to estimate, since analysts will disagree about which of the research, development, and operation costs ought to be allocated to the prototype and which should be charged to other aspects of the overall program—and since all the relevant costs have continuously escalated. *See* Ember, *supra* note 9, at 12; Morrison, *supra* note 196, at 1101 (asserting that JACADS will now cost $550 million to build and operate for five years); *Status of 1990 Bilaterals*, *supra* note 123, at 10 (testimony of Brig. Gen. Walter L. Busbee) (explaining that JACADS cost $170 million to build and equip, and its annual operating cost is $88 million).

on Johnston Island[392] in the Pacific Ocean, approximately eight hundred miles southwest of Hawaii.[393] Construction at JACADS was completed in 1988,[394] and the facility has undergone extensive "operational verification testing," in four "campaigns" between July 1990 and March 1993 to assess the ability to demilitarize various types of agents and munitions.[395] The Army's current plan is to replicate the JACADS concept at all eight facilities in the continental United States where the CW stockpile is currently housed.[396] The Army has concluded that on-site incineration is safe and efficient and carries environmental consequences that are "quite limited in scope and significance."[397]

JACADS consists of four distinct incineration systems, in which the separate elements of a chemical weapon are treated independently.[398] At the outset, a "reverse assembly" process occurs, in which any explosive component (fuse, burster, or propellant) is removed from the weapon.[399] Next, the wall of the munition is pierced, and the

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392 Johnston Island (also known as Kalama Island) is the largest island in the group identified as Johnston Atoll. The cluster of islands has no permanent population other than U.S. military personnel. *See* Silton, *supra* note 9, at 24 n.8.

393 PEIS, *supra* note 130, at 2-23 to 2-27; Ember, *supra* note 9, at 12. In addition, the Army constructed a specialized incineration system at Pine Bluff Arsenal, Arkansas, to destroy the incapacitating hallucinogenic agent BZ. Under current plans, this facility would be converted into a full JACADS-style system to eliminate the lethal CW arsenal now stored at Pine Bluff. PEIS *supra* note 130, at 2-25 to 2-26.

394 OBSTACLES TO THE PLAN, *supra* note 306, at 11-12.

395 Operational Verification Testing (OVT) is the method for assessing the ability of JACADS to perform its elimination functions according to design specifications. Successful OVT was a statutory precondition for proceeding with systematization and operation of the incineration facilities inside the continental United States. 50 U.S.C.A. § 1521(k) (West 1991). The MITRE Company conducted an evaluation of the OVT, producing detailed analyses of each campaign and an overall summary. MITRE, *supra* note 289. The OVT was designed to assess JACADS's ability to deal with a representative range of agents (GB, VX, and mustard) and of munitions (rockets, projectiles, and ton containers). *Id.* at 1-4.

396 PEIS, *supra* note 130, at 2-23, 2-131. Some local variations among the eight sites would be likely, to respond to differences in the particular stockpiles (*e.g.*, facilities that house only ton containers of agent would not need the specialized equipment to deal with destruction of rockets or bombs). *Id.* at 2.34-35, supp. C.3.

397 *Id.* at 4-1; ARMY ALTERNATIVES, *supra* note 249, at 6-3; United States Army Chemical Materiel Destruction Agency, *supra* note 321. The PEIS analyzes a wide range of likely impacts, including: construction activity, "normal" operations, plausible accident scenarios or other upset conditions, handling of waste products and other residues, and decommissioning the facilities. It also compares the on-site operations to the alternatives of transporting the chemical agents to central destruction locations. PEIS, *supra* note 130, *passim.*

398 PEIS, *supra* note 130, at 2-23 to 2-27; MITRE, *supra* note 289, app. A; United States Army Chemical Materiel Destruction Agency, *supra* note 321.

399 Weapons containing energetics are handled inside an Explosive Containment Room, separated from the rest of the facility by blast doors. PEIS, *supra* note 130, supp. C.9.

liquid agent is drained off.[400] Then the materials—handled by remote-controlled and automated machinery[401]—are separated into four streams: the deactivation furnace destroys the explosive components with a rotary kiln and an afterburner;[402] the liquid incinerator consumes the chemical agent at approximately 2700 degrees Fahrenheit;[403] the metal parts furnace decontaminates casings and containers, allowing them to be recycled;[404] and the dunnage incinerator destroys miscellaneous packaging materials and other waste products.[405] Each of the four incinerators consists of two separate combustion chambers,[406] and each is equipped with a Pollution Abatement System (PAS) to cool and scrub the exhaust gases and chemically neutralize remaining acids.[407] The facility is also equipped with an extensive monitoring system in order to sense the escape of any agent or other fugitive products.[408]

The JACADS facility normally produces four types of waste products. Decontaminated metal parts that can be certified agent-free may be sold publicly as scrap.[409] The PAS and some of the furnaces produce a liquid brine that is dried and transported to approved landfills.[410] Third, there is some solid residue from the dunnage and deactivation furnaces (including ash, fiberglass, etc.) that is also conveyed

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400 Each type of munition requires its own preparatory handling to drain the agent. Rockets, for example, are punched, drained, and then sheared into five sections. For different types of munitions, the wall that must be pierced is of varying thickness. *Id.* supp. C.11-12.

401 *Id.* supp. C.11-12; MITRE, *supra* note 289, at A-7.

402 The rotary kiln operates at temperatures of 1000-1800 degrees Fahrenheit; the afterburner operates at 2200 degrees Fahrenheit. PEIS, *supra* note 130, supp. C.18, 21. The deactivation furnace is also used to destroy spent decontamination solution and other fluids. *Id.* supp. C.18.

403 *Id.* supp. C.13. Natural gas or propane is used as fuel for the liquid incinerator. *Id.*

404 Metal parts (principally drained munition bodies and ton containers) and casings may be "surface decontaminated" to the "3X" level, meaning that the item is safe to handle, but cannot be released from government control. Alternatively, those materials may be decontaminated to the "5X" level (via thermal treatment at 1000 degrees Fahrenheit for 15 minutes), meaning that the item may be sold without restriction as commercial scrap. *Id.* at 2-78 to 2-80, supp. C-13, 18; MITRE, *supra* note 289, at C-16.

405 Dunnage includes wooden pallets, protective clothing, charcoal filters, polystyrene packing, and other materials, some of which have been contaminated by a chemical agent. PEIS, *supra* note 130, supp. A.9, C.21.

406 PEIS, *supra* note 130, supp. C.13-21.

407 For three of the incinerators, the PAS includes a quench tower and a variety of filters and scrubbers. The dunnage incinerator uses a somewhat different system. *Id.* supp. C.24-25.

408 MITRE, *supra* note 289, app. C. At JACADS, the agent monitoring system included 91 sampling stations inside the facility and 12 perimeter sampling stations outside its boundary. *Id.* supp. C-5.

409 PEIS, *supra* note 130, at 4-13.

410 The brine is analyzed to be sure it is agent-free then dried via evaporation. The operation of a typical CW elimination facility in the United States is expected to generate on the order of 10,000 tons of salt (50,000 tons for Tooele). *Id.* at 4-14, supp. C.26. *See also* MITRE, *supra* note 289, at 3-6 (discussing inadequacies of brine reduction and treatment program during JACADS OVT).

to a landfill.[411] Finally, the smokestack will emit carbon dioxide and water vapor, as well as much smaller quantities of sulfur dioxide, nitrogen oxides, carbon monoxide, and particulates.[412]

Whether the facility will also discharge into the air quantities of other unacceptable chemicals, including furans and dioxins,[413] as well as minute concentrations of unburned chemical agent, remains controversial. There is no water discharge from the JACADS facility, except for sanitary sewerage products which do not come into contact with chemical agents.[414]

The MITRE Corporation conducted detailed evaluations of the four-part 1990-93 Operational Verification Testing ("OVT")[415] of the JACADS facility.[416] MITRE concluded that the Army was essentially able to meet designated goals concerning the safety[417] and environ-

411 Each of the 8 projected incinerators is expected to generate 40 to 190 tons of ash and other residues. PEIS, *supra* note 130, at 4-14. The PEIS notes that the total solid wastes of the stockpile incineration program (including ash, brine, metal, etc.) would be approximately 115,000 metric tons, which would amount to 0.01% of the total hazardous waste managed in the entire country annually under RCRA and about 0.35% of the hazardous waste that is delivered to commercial landfills. The Army further noted that there are approximately 60 operating permitted commercial landfills in the United States (at least one in, or adjacent to, each state where there would be a CW incinerator), and that, at current fill rates, there is sufficient capacity for 10 to 15 years of additional deposits. *Id.* at 4-13. *See also* Craig Williams, *Making Waste*, BULL. ATOM. SCIENTISTS, July-Aug. 1993, at 54 (letter to the editor noting that the quantity of toxic wastes produced by JACADS was actually greater by weight than the quantity of weaponry incinerated).

412 MITRE, *supra* note 289, at C.8-13.

413 All incinerators generate some quantity of "products of incomplete combustion" (PICs), such as dioxins and furans, substances known to be extremely hazardous and bioaccumulative. COSTNER & THORNTON, *supra* note 307, at 26-29, 36-39. Supporters of JACADS argue that the furnaces will produce only minute quantities of PICs at such low concentrations as to be unproblematic and that some types of chemical agents (*e.g.*, nerve gases) do not contain the chlorine necessary for dioxin and furan production. Findlay, *supra* note 9, at 14; Silton, *supra* note 9, at 18-19; NRC ALTERNATIVES, *supra* note 129, at 85-86.

414 United States Army Materiel Destruction Agency, *supra* note 321, at 13.

415 OVT is a process, driven by the National Defense Authorization Act, Fiscal Year 1989, Pub. L. No. 100-456, 100 Stat. 1918, through which the army was required to demonstrate that the JACADS facility could demilitarize chemical munitions effectively and consistently with the program's safety and environmental protection standards.

416 MITRE, *supra* note 289. The report notes that there are significant differences between the OVT and the systematic operation of the eight planned facilities inside the United States. For example, JACADS operated only 8 to 12 hours per day, while the U.S. plants are intended to function 24 hours per day. In addition, the remote location of Johnston Atoll complicated the logistics and support operations. *Id.* at 1.7-9.

The National Academy of Sciences, in turn, reviewed the MITRE evaluation of the OVT, reaching similar conclusions. NATIONAL ACADEMY OF SCIENCES, NATIONAL RESEARCH COUNCIL, COMMITTEE ON REVIEW AND EVALUATION OF THE ARMY CHEMICAL STOCKPILE DISPOSAL PROGRAM, EVALUATION OF THE JOHNSTON ATOLL CHEMICAL AGENT DISPOSAL SYSTEM OPERATIONAL VERIFICATION TESTING: PART II (1994) [hereinafter NRC OVT].

417 Regarding worker safety, there were no injuries resulting from the processing of the munitions or agent, and other routine industrial injuries were within the range expected of other

mental performance[418] of the system. Meeting the process performance objectives, however, was more complex: JACADS was unable to operate as consistently and as long as anticipated, and the system experienced accidents, faults, and excessive down time, resulting in failure to dispose of munitions as quickly as projected.[419] Many of the difficulties were corrected during or between the four campaigns, and by the end of the OVT, JACADS was approaching at least the short-term through-put goals.[420] Overall, the thirty-two months of testing destroyed some forty thousand munitions, including a representative

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industrial processes employed in comparable tasks. MITRE, *supra* note 289, at 2.1. Regarding public safety, there was one occasion during the OVT when a shutdown of the liquid incinerator resulted in a very small amount of unburned agent escaping from the smokestack for about an hour in a concentration so small as to be beneath the legal notification requirement and reportedly posing insignificant risk to the public. *Id.* at 2-6. *See also* PEIS, *supra* note 130, at 2-88 to 2-112 (evaluating potential risks of facility accidents and failures). *But see* COSTNER, *supra* note 242, at 24 (explaining that during the GB destruction campaign at JACADS, 500 hours of incineration activity were accompanied by 1944 hours of work force lost time due to accidents; there were no OSHA inspections at JACADS, but comparable inspections at other hazardous waste incinerators have identified large numbers of serious safety violations).

418 MITRE, *supra* note 289, § 3. *See also* Lydia Thomas & Douglas Medville, *Dismantlement and Destruction of U.S. Chemical Weapons, in* 1993 SCIENCE AND INTERNATIONAL SECURITY ANTHOLOGY: TRENDS AND IMPLICATIONS FOR ARMS CONTROL, PROLIFERATION, AND INTERNATIONAL SECURITY IN THE CHANGING GLOBAL ENVIRONMENT 441, 445 (Elizabeth J. Kirk et al. eds., 1993). MITRE concluded that JACADS's OVT performance was in conformity with the substantive standards for agent air emissions, non-agent air emissions, and liquid and solid wastes. The facility was not in complete compliance with all the procedural and administrative requirements for environmental permits. Some of these aberrations did result in minor discharges of hazardous materials, but without major adverse environmental effects. *Id.* at 3.1. *See also Status of 1990 Bilaterals*, *supra* note 123, at 24-25 (providing technical specifications for OVT emissions). *But see* Silton, *supra* note 9, at 19 (asserting that there were six accidental releases of agent into the atmosphere at JACADS, which the Army admitted only after workers leaked the information to the public).

419 MITRE, *supra* note 289, § 4, app. D; ISSUES AFFECTING, *supra* note 254, at 17-25. The OVT established a variety of short-term and long-term benchmarks for system performance, and JACADS was generally unable to achieve the goals. A number of equipment failures and accidents (including, notably, an incident when an explosion in the deactivation furnace blew a 2x8 inch hole in the kiln wall) contributed to the delays. MITRE, *supra* note 289, at 4-8. Observers disagree about whether this shortfall was normal for a "shakedown" operation, constituting the type of "de-bugging" that the experimental facility was intended to undertake, or whether it was evidence of a more profound disability in the equipment and concept. *Status of 1990 Bilaterals*, *supra* note 123, at 10 (statement of Walter L. Busbee) ("We have experienced some technical difficulties with that facility [JACADS], though none that I would characterize as unique or different for a first of a kind prototype facility."). *See also News Briefs: Explosion Shuts Down Chemical Destruction Plant*, ARMS CONTROL TODAY, Jan.-Feb. 1993, at 31 (reporting on a second substantial explosion, within the explosive containment area of the facility).

420 The routine operation of the eight planned facilities will impose more severe, consistent demands upon the JACADS model, but those facilities will presumably benefit from the "lessons learned" by the Army through the OVT. MITRE, *supra* note 289, at 1.7-9, 4.27-5.7; *Government Operations Hearings*, *supra* note 306, at 107, 110 (statement of Walter L. Busbee); NRC OVT, *supra* note 416, at 29.

variety of types of agents and weaponry.[421] The official Army posture maintains that any glitches encountered during the OVT were merely the usual, expected anomalies inherent in testing any cutting-edge technology, and that, overall, the JACADS methodology is proceeding as scheduled.[422]

The next stage in the Army's dismantling program—the creation and operation of the first full stateside incineration facility, at Tooele, Utah—is now proceeding. Construction activity has been completed at a cost of $347 million,[423] and "systemization" testing is underway, with an eye toward initiation of operational CW burning in February 1995.[424]

At the same time, JACADS and the OVT in particular have come under critical scrutiny on a variety of points. The leading outside monitoring group, Greenpeace International, has prepared a detailed commentary challenging MITRE's (and the Army's) optimistic impressions of the facility's operations,[425] and other outside evaluators[426] have also asserted objections. Allegations include the charges that: (1) any JACADS-style facility—by accident or permissible design—will inevitably emit into the atmosphere at least small quantities of unburned agent, heavy metals, toxic combustion products, and other dangerous pollutants;[427] (2) especially regarding input materials

421 MITRE, *supra* note 289, at 5-6; Owen Statement, *supra* note 4, at 8-9.

422 Brig. Gen. Walter L. Busbee, *Letter to the Editor*, ARMS CONTROL TODAY, Oct. 1990, at 30-31; ARMY ALTERNATIVES, *supra* note 249, at 6-3; NRC OVT, *supra* note 416, at 14.

423 *TOCDF*, *supra* note 310, at 4 (indicating that construction costs were $153 million; equipment and installation costs were $194 million). The original contract for the Tooele facility had been $212 million. U.S. Army Program Manager for Chemical Demilitarization, Tooele Chemical Disposal Facility.

424 *Tooele*, *supra* note 310, at 1; *TOCDF*, *supra* note 310, at 4; *Tooele Ribbon Cutting Ceremony*, CHEMICAL DEMILITARIZATION UPDATE, Nov. 1993, at 1.

425 COSTNER, *supra* note 242. *See also* GREENPEACE 9/90 REVIEW, *supra* note 145; ALFRED PICARDI ET AL., ALTERNATIVE TECHNOLOGIES FOR THE DETOXIFICATION OF CHEMICAL WEAPONS 1-19 (1991) [hereinafter GREENPEACE ALTERNATIVES]; Sebia Hawkins, *Letter to the Editor*, ARMS CONTROL TODAY, Oct. 1990, at 30.

426 Silton, *supra* note 9; SIEGEL, *supra* note 256, at 5-8. For information on various aspects of the CW program, see all GAO reports, *supra* notes 242, 245, 306; Wylie, *supra* note 9, at 14-15.

427 MITRE, *supra* note 289, at 3-4, 3-5, c-17. Any incineration facility relying upon a smokestack is not a "closed system" and will inevitably release into the atmosphere at least some minute quantity of hazardous materials—and the danger of accidents or operational anomalies raises the specter of more substantial "agent excursions," as occurred with some frequency during the JACADS OVT. *Id.*; COSTNER & THORNTON, *supra* note 307, *passim*; COSTNER, *supra* note 242, at 6; Silton, *supra* note 9. In addition, JACADS's plan to rely upon waste storage facilities as a final repository for the ash, brine, and other solid residuals poses another (some would say inevitable) danger of leakage. *Id.* at 19 (quoting William Ruckelshaus, former director of the EPA, "of course all landfills will leak"). *But see Greenpeace Report on Incineration Called Erroneous, Outdated by Industry*, [May 1993-Apr. 1994] Env't Rep. (BNA) No. 7, at 327 (June 18, 1993) (critiquing COSTNER & THORNTON, *supra* note 307); NRC OVT, *supra* note 416, at 32 (indicating that only one agent emission occurred at JACADS; other incidents turned out to be false alarms).

in which the chemical agent is originally present in very low concentrations, such as the items to be burned in the dunnage and metal parts furnaces, incineration is inadequate to achieve a very high level of agent destruction;[428] (3) existing technology is not adequate to detect and to measure accurately the exact quantities of some of these likely emissions;[429] (4) the biological effects of smokestack exhausts are incompletely known, and even very low doses of unburned agent or other pollutants can have important consequences for delicate ecosystems such as the surface microlayer of the ocean, a key ingredient in the entire aquatic food chain;[430] and (5) the baseline incineration technology inevitably produces a large quantity of hazardous waste products that require further treatment or storage.[431]

In a nutshell, many critics assert that any incineration process is inherently an "open system," in which the smokestack and other release points will rely upon the natural environment (such as the wind or ocean currents) to dilute and dissipate the pollutants.[432] They argue that even small quantities of these lethal products (such as unburned agent and other incinerator-produced toxins) are unaccept-

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428 COSTNER, *supra* note 242, at 2, 5.

429 *Id.* at 2. *See also* Silton, *supra* note 9, at 19 (indicating that when JACADS was burning GB nerve gas, fugitive agent was detected on 32 occasions in the facility's corridors, on 15 occasions in the life support air systems, and on 5 occasions at the perimeter, although these may have been "false positive" alerts caused by sensors that were unable to distinguish minute quantities of agent from other atmospheric particles); COSTNER, *supra* note 242, at 20 (indicating that the analysis is comparable for the VX OVT campaign). One key NAS recommendation would require the Army to upgrade the sensitivity and accuracy of the monitoring system operating at JACADS before the baseline technology is replicated inside the continental United States in order to avoid excessive false positives in the alarm system and to assure the neighboring communities that dangerous situations will be promptly identified. NATIONAL ACADEMY OF SCIENCES, NATIONAL RESEARCH COUNCIL, COMMITTEE ON REVIEW AND EVALUATION OF THE ARMY CHEMICAL STOCKPILE DISPOSAL PROGRAM, REVIEW OF MONITORING ACTIVITIES WITHIN THE ARMY CHEMICAL STOCKPILE DISPOSAL PROGRAM (1994).

430 Ember, *supra* note 9, at 16. Dioxins and furans, among the most lethal potential atmospheric pollutants, cannot be formed in the absence of chloride, which is a component of mustard gas but not of a nerve agent. Greenpeace has hypothesized that the pollution abatement system itself could be a source of chloride, but the Army has posited that the temperatures at that part of the operation would be too low to allow the dangerous chemicals to form. Neither side, however, seems to have an adequate empirical basis for firm conclusions. *Id.*; Plaintiff's Declarations in Support of Plaintiff's Motion for a Preliminary Injunction, Greenpeace USA v. Stone, 748 F. Supp. 749 (D. Haw. 1990) (No. 90-00588 DAE) (containing the declaration of Dr. John T. Hardy); Hawkins, *supra* note 425; Findlay, *supra* note 9, at 15; ENVIRONMENTAL REVIEW, *supra* note 154, at 22-23.

431 COSTNER, *supra* note 242, at 8 (explaining that the JACADS VX campaign destroyed 134,961 pounds of agent but created some 1.2 million pounds of slag, brine, salt, ash, and residue (9.5 pounds of wastes for every pound of agent incinerated), all of which is classified as hazardous); SIEGEL, *supra* note 256, at 7.

432 COSTNER & THORNTON, *supra* note 307; SIEGEL, *supra* note 256, at 18; *Government Operations Hearings*, *supra* note 306, at 47 (statement of Craig Williams).

able,[433] and that in the event of an accident or even a more routine "upset condition" in an incinerator, the consequences could be catastrophic.[434]

The National Academy of Sciences' National Research Council (NRC) has also waded into this fray, issuing two reports on alternative technologies for accomplishing the CW dismantling function.[435] The first of these, released in June 1993, included recommendations regarding three relatively accessible modifications of the JACADS operation, which might substantially abate lingering concerns about air pollution.[436] The report suggested: (1) grafting onto the PAS an enclosed system for temporarily "holding" all exhaust gases, so they could be tested and any contaminants measured and removed prior to emission;[437] (2) installing a system of activated carbon (charcoal) absorbers into the smokestack as an additional cleansing safeguard;[438] and (3) using pure oxygen, instead of ordinary nitrogen-diluted air, in the incineration process in order to reduce the volume of waste gases produced.[439] The second NRC report also endorsed the baseline incineration technology, but concurred in the notion that additional investigation of alternatives was warranted.[440]

The Army, in its response to these National Academy of Sciences' studies, has accepted many of the NRC analyses and conclusions.[441] In particular, the Army promises to install the recommended charcoal filters in the pollution abatement system,[442] to monitor and support additional research inquiries into alternative destruction tech-

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433 COSTNER, *supra* note 242, at 5 (calculating that even if JACADS were able to achieve a destruction removal efficiency of 99.9999%, at least 3.5 grams of active agent GB was released from the liquid incinerator during the OVT; this would constitute a lethal dose for 24,000 people).

434 *Id.* at 9, 22; COSTNER & THORNTON, *supra* note 307. *See also* NRC OVT, *supra* note 416, at 45.

435 *See supra* note 245 (describing NAS committee structure and documents).

436 NRC ALTERNATIVES, *supra* note 129; NATIONAL RESEARCH COUNCIL PRESS RELEASE OF JUNE 10, MULTIPLE ALTERNATIVES STUDIED FOR CHEMICAL WEAPONS DISPOSAL (1993).

437 NRC ALTERNATIVES, *supra* note 129, at 88-89 (indicating that exhaust gases could be stored for one to eight hours for assessment and certification that they are free of agent and pollutants before being released through the smokestack). This type of gas storage is not typically undertaken for ordinary incinerators, where the quantity of exhaust gas is much larger, but it could be suitable for incinerators that are the size of the projected CW facilities.

438 *Id.* at 106-08, 194-95 (explaining that charcoal filters—as are used in gas masks—can be extremely successful at removing pollutants from the exhaust stream); NAS STOCKPILE COMMITTEE, *supra* note 140, at 148; *Carbon Filters Eliminate Risk of Toxic Emissions*, CHEMICAL DEMILITARIZATION UPDATE, Apr. 1994, at 5.

439 NRC ALTERNATIVES, *supra* note 129, at 102-03 (use of pure oxygen would greatly reduce the volume of gaseous wastes in incineration and many other technologies).

440 NAS STOCKPILE COMMITTEE, *supra* note 140, at 126.

441 ARMY ALTERNATIVES, *supra* note 249, *passim*.

442 *Id.* at 2-4, 3-14, app. E.

nologies,[443] and to explore the possibility of chemical neutralization as a CW elimination avenue with particular vigor.[444] But the Army has also made clear its profound interest in prompt action—it does not want to delay the CW destruction campaign in the elusive search for a still-better technology,[445] and it doubts that any alternative methods can be found or developed to complete the required eliminations in a timely fashion.[446]

Controversy over the cleanliness of the JACADS mechanism will doubtless continue, however, with partisans on one side contending that the environmentalists are unreasonably insisting upon an impossibly and unnecessarily high standard of purity for the emissions,[447] while others rejoin that the Army has systematically displayed insufficient attention to the ecological and safety hazards of the operation.[448]

Both sides, it would seem, are trapped between powerful opposing political and social forces. It is an inescapable fact that a huge quantity of American CW now exists in dispersed locations and in deteriorating condition. It must be disposed of—pursuant to statute, to the CWC, and to sound public policy—and the sooner the better. Just as there are environmental dangers in destroying the CW via incineration, there are offsetting risks in retaining the stocks in their current configuration, and the dangers associated with the status quo will only rise over time.[449]

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443 *Id.* at 3-30, app. F.

444 *Id.* at 1-13, 2-5, app. C.

445 *Id.* at 3-83.

446 *Id.* at 3-73.

447 *See* Trevor Findlay, *Green vs. Peace*, PAC. RES., May 1990, at 1; Ember, *supra* note 9, at 10. JACADS supporters cite the OVT ability to achieve a destruction removal efficiency of 99.9999% of the input chemical agent for the liquid incinerator and 99.9996% for the metal parts furnace. Similarly, non-agent air emissions were controlled by achieving (or almost achieving) a 99.9999% removal efficiency for most important hazardous substances. MITRE, *supra* note 289, at 3.4-5. Proponents assert that this level of safety exceeds federal and state regulatory limits and is sufficiently safe for the public and the environment.

448 Hawkins, *supra* note 425; Silton, *supra* note 9. *See also* SIEGEL, *supra* note 256, at 18 (indicating that Army has been reluctant to consider alternatives to incineration since the original decision to commit to the JACADS-style baseline technology); *Government Operations Hearings*, *supra* note 306, at 7, 36, 41-45 (indicating that Army has received special exemptions which allowed the JACADS activities to proceed, but which also somewhat undercut the value of the OVT as a model for the planned stateside installations).

449 Some analysts have concluded that the most risky option, in terms of long-term threat to public safety and the environment, would be continued storage of the chemical arsenal in its current locations, where it remains vulnerable to hazards such as earthquakes, airplane crashes, terrorist attacks, etc. *See* PEIS, *supra* note 130, at 4-54, 4-152 to 4-53, 4-161, supp. H, supp. K; NAS STOCKPILE COMMITTEE, *supra* note 140, at 61-77; *see also* Keir Lieber, *U.S. Chemical Weapons Destruction Program*, CWC CHRONICLE, July 1993, at 3, 5 (reporting the conclusion that the risk from leakage or other problems with the existing stockpile is fifty times greater than the risk associated with the baseline incineration technology); Centers for Disease Control, Final Recommendations for Protecting the Health and Safety Against Potential Adverse Effects of Long-Term Exposure to Low Doses of Agents: GA, GB, VX, Mustard Agent (H, HD, T) and

The ubiquitous political concerns of NIMBY ("Not In My Back Yard") have raised obstacles impeding any attempt to deal rationally with the stockpile. Most communities simultaneously: (1) do not want the CW to continue to be stored nearby; (2) do not want to host any on-site CW disposal operations; and (3) do not want CW to be transported through their locale enroute to some other recipient for destruction. Anything touching chemical weapons has become so politically reactive that the Army is now left with few viable options.

In fact, political factors, perhaps even more than technical or economic considerations, may have been responsible for the Army's decision to destroy all the CW on site, rather than transport it to one or two central locations.[450] Under the current plan, only eight "back yards" (and therefore only eight congressional districts) will be angered; any plan to transport the toxic dangers to regional or national collection points would surely traverse, and therefore aggravate, many more communities.[451]

In any event, the Army's eight-site plan has struck several barriers. First, the process of securing the necessary state permits and licenses has been extraordinarily extended.[452] State legislatures have erected new—and possibly insurmountable—impediments against CW furnaces;[453] local environmental protection agencies have scruti-

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Lewisite (L), 53 Fed. Reg. 8504-07 (1988); OTA ALTERNATIVES, *supra* note 140, at 28 (explaining that continued storage could be made safer by removing explosive components, repacking agents).

450 PEIS, *supra* note 130, at 2-113 to 2-131 (describing Army's process and criteria for comparing the available options and selecting on-site destruction). Currently, the Army is forbidden by statute from further consideration of the relocation options and modalities. Department of Defense Appropriations Act of 1994, Pub. L. No. 103-139, § 8075A(a), 107 Stat. 1457-58 (1993); S. REP. No. 54, 102d Cong., 1st Sess. 358-59 (1991); H.R. CONF. REP. No. 328, 102d Cong., 1st Sess. 201 (1991) (Amendment 167).

451 Keith Schneider, *U.S. Plan to Burn Chemical Weapons Stirs Public Fear*, N.Y. TIMES, Apr. 29, 1991, at A1. The Army's contemplated route for rail relocation of the entire continental United States CW stockpile to a national destruction center in Tooele, Utah would cross 20 states. PEIS, *supra* note 130, at 2-64.

452 The anticipated schedule for destroying the U.S. CW arsenal has slipped several times. The original 1985 timetable called for the Army to complete the destruction of the entire stockpile by 1994 (independent of any international obligation to do so); shortly after this self-selected deadline was written into law, the Army petitioned the Congress to extend the deadline to 1997. Similarly, the original deadline contemplated in the U.S.-U.S.S.R. bilateral agreement was 2002 for completion of the entire destruction process; this target, too, has slipped to coincide largely with that of the CWC. In 1991, the destruction program was extended to adopt an anticipated end date of 1999; currently the Army is aiming to complete the job by December 31, 2004. David C. Morrison, *Chemical Arms Aren't Easy to Destroy*, 24 NAT'L J. 2068 (1992); Ember, *supra* note 9, at 11; Owen Statement, *supra* note 4, at 2; *Government Operations Hearings*, *supra* note 306, at 95, 102 (containing Army rationales for the continuing delays).

453 Most of the eight states for which incinerators are planned have re-evaluated their applicable environmental protection statutes. Kentucky and Indiana have passed new laws, regarded by the Army as "prohibitively restrictive environmental standards," which "are so restrictive that a chemical demilitarization facility may be delayed or not be built." Maryland is contemplating

nized Army submissions with deliberate care, resulting in severe setbacks for the original schedules and in substantial increases in the projected budget.[454] Construction at the first of the eight planned facilities in the continental United States—at Tooele, Utah, where the largest share of the existing stockpile is held—was completed only in July 1993, with a further eighteen months of detailed testing required before it can be declared operational.[455] The other seven sites lag far behind.

Second, the project has run into severe local community opposition, especially at the sites that have the smallest CW stockpiles present, the largest population centers nearby, and the most vigorous grass-roots organizations.[456] Indigenous coalitions near the Lexington, Kentucky and Aberdeen, Maryland facilities have been particularly active, catalyzing community groups concerned about the proposed demolitions.[457]

One special aspect of the political tension is suggested by the fact that the Army is currently committed to dismantling the eight destruction facilities as soon as each unit's local CW disposal is completed. In

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an even stiffer enactment, and Alabama and Colorado have slowed their work on issuing the necessary environmental permits that would allow Army construction activities to continue apace. Owen Statement, *supra* note 4, at 6-7; Bruce Reid, *Bill Could Derail Plans to Incinerate Mustard Agent*, BALTIMORE SUN, Feb. 24, 1993; COMMITTEE FOR NATIONAL SECURITY, PUBLIC TRUST AND TECHNOLOGY: CHEMICAL WEAPONS DESTRUCTION IN THE U.S. 7 (1992). The Kentucky statute prohibits CW incineration unless the Army can establish that no alternative technology "is likely to exist or could be developed" before the stockpile becomes too unstable to store, and it requires epidemiological studies (which could take up to 30 years to complete) evaluating the health effects on the local population, before burning operations may commence. OTA ALTERNATIVES, *supra* note 140, at 4-5; *Government Operations Hearings*, *supra* note 306, at 113-15; Silton, *supra* note 9, at 21; KY. REV. STAT. ANN. § 224.50-130 (Baldwin 1993).

454 ISSUES AFFECTING, *supra* note 254, at 12, 26; LIKELY TO CONTINUE, *supra* note 242; OBSTACLES TO THE PLAN, *supra* note 306.

455 *Tooele Systemization Effort Only 4 Months Away*, CHEMICAL DEMILITARIZATION UPDATE, Apr. 1993, at 1; *Tooele Ribbon Cutting Ceremony*, CHEMICAL DEMILITARIZATION UPDATE, Nov. 1993, at 1.

456 Silton, *supra* note 9, at 20-21 (indicating that activists from all eight U.S. sites, Russia, and elsewhere met in 1991 to draft an International Citizens' Accord on Chemical Weapons Disposal, calling for a halt to CW incineration); *Government Operations Hearings*, *supra* note 306, at 63 (discussing text of the international accord); Jim Yardley, *Living Next to Nerve Gas: Alabama County Weighs Risks of Incineration Plan*, ATLANTA J. & CONST., July 26, 1992, at A3. In other locales, however, the community leadership has strongly supported the Army's incineration plan, and there appears to be little local agitation against the Army's program. Morrison, *supra* note 196, at 1103.

457 Eugene L. Meyer, *Army Disposal Plan Alarms Kent County*, WASH. POST, Apr. 28, 1992, at B1; *Disposal of Chemical Munitions Hearings*, *supra* note 141, at 47; *Army Disposal of Chemical Weapons: Hearing Before the Investigations Subcomm. of the House Armed Servs. Comm.*, 99th Cong., 2d Sess. (1986), *passim* [hereinafter *Army Disposal of Chemical Weapons Hearings*]; *Government Operations Hearings*, *supra* note 306, at 77 (statement of John E. Nunn, III) (noting that official documents estimate as many as 42,000 fatalities in the Aberdeen, Maryland area in the event of a catastrophic accident at the CW facility).

that way, nearby residents need not fear that the CW furnaces will be adapted for subsequent military or civilian incineration purposes, locking the community into a permanent future as a hazardous waste disposal site.[458] Nevertheless, some communities—or some elements within each community—distrust those assurances and continue to fear long term retention of the incinerator capacity.[459] On the other hand, some residents may ultimately come to favor that option, seeing it as an environmentally tolerable source of income and jobs.[460]

Third, Congress has recently gotten cold feet over some aspects of the project. Responding to increasing local opposition and scientific uncertainties, Congress has suspended construction and other CW-related operations at the three lowest-quantity sites: Lexington, Kentucky; Aberdeen, Maryland; and Newport, Indiana.[461] As the General Accounting Office and others continue to release critical appraisals of certain details of the JACADS operation and other aspects of the Army's overall demilitarization efforts—and as the program's

458 The original statute, Pub. L. No. 99-145, had required that the Army destroy the eight incinerators as soon as each had completed its assigned mission, and the Army undertook plans to do so (at a cost estimated at $324 million), *Government Operations Hearings*, *supra* note 306, at 115. A later enactment, however, (confirming fears of some residents) mandated that the Army instead study the feasibility and desirability of converting the incinerators after the CW is eliminated, to adapt them to other hazardous waste disposal operations. *See* Silton, *supra* note 9, at 20; OBSTACLES TO THE PLAN, *supra* note 306, at 33-35 (citing Congressional committee report for Department of Defense Appropriations Act of 1992, Pub. L. No. 102-172, 105 Stat. 1150, and other studies recommending conversion of the incinerators). The latest twist in the saga—heartening to many local activists—came when the results of that mandated evaluation suggested that the small size of the incinerators makes conversion of them less appealing, especially when the market for incineration services is in some turmoil. SIEGEL, *supra* note 256, at 19-20.

459 *See* GREENPEACE 9/90 REVIEW, *supra* note 145, at 4; Satchell, *supra* note 4; Silton, *supra* note 9.

460 Ronald Smothers, *Plan to Destroy Toxic Weapons Polarizes a City*, N.Y. TIMES, Sept. 24, 1992, at A14.

461 The National Defense Authorization Act for Fiscal Year 1993 suspended the Army's development of environmental impact statements and necessary state permit applications at the three "low volume sites," and the Army has essentially frozen development of the environmental impact documents at the other sites, pending the investigation of alternative destruction methodologies. The Act also requires the use of technologies other than high-temperature incineration, if they prove to be significantly safer, equally cost-effective, and timely. Pub. L. No. 102-484, 106 Stat. 2315. The Military Construction Appropriations Act of 1993, Pub. L. No. 102-380, 106 Stat. 1366, deleted all funding for the Anniston facility, until Congress reviews the Army's response to the NRC alternative technologies reports. Owen Statement, *supra* note 4, at 7, 12. Only the Utah site (which was nearing completion) and the Colorado site (which is testing an alternative technology, cryofracture) received full funding. Silton, *supra* note 9, at 23. In effect, therefore, activities are currently frozen at six of the eight intended locations. Thomas & Medville, *supra* note 418, at 452.

costs continue to escalate[462]—continued high levels of funding and general support must now be in doubt.[463]

C. Alternative Technologies for Destroying CW

Incineration is manifestly not the only conceivable method for eliminating the American CW stockpile; other technologies have been proposed and explored for some time, and now with increasing vigor.[464] But it may be the only candidate that could be available for full-scale operation within the time frames established by law. And there is, of course, no guaranty that other hypothetical techniques will prove more environmentally or economically sound, once they are exposed to the same light of detailed critique that has shaken the JACADS incinerators.

For example, one set of proposals has focused upon a possible "cryofracture" technique, through which an entire munition would be quickly frozen in a bath of negative 320 degrees Fahrenheit liquid nitrogen, fractured into manageable pieces, and then destroyed.[465] Advocates postulate that the freezing would make the CW easier to handle and safer to dispose of.[466] However, critics argue that a cry-

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462 Congressional attention to the inexorable increases in the Army's destruction budget has grown, too, over the years. Skepticism over the validity and reliability of the projected pricetags has proven warranted, as the total cost has leapt up to over four times the original estimates. *See Army Disposal of Chemical Weapons Heariangs*, *supra* note 457, at 46-47; OTA ALTERNATIVES, *supra* note 140, at 20; *Government Operations Hearings*, *supra* note 306, at 148.

463 The General Accounting Office has kept a close eye on the Army's CW destruction programs, responding to (and perhaps further stoking) Congressional interest in the program. ISSUES AFFECTING, *supra* note 254; LIKELY TO CONTINUE, *supra* note 242; OBSTACLES TO THE PLAN, *supra* note 306; GENERAL ACCOUNTING OFFICE, CHEMICAL WEAPONS: STOCKPILE DESTRUCTION DELAYED AT THE ARMY'S PROTOTYPE DISPOSAL FACILITY (July 1990).

464 *See* NRC ALTERNATIVES, *supra* note 129; GREENPEACE ALTERNATIVES, *supra* note 425; OTA ALTERNATIVES, *supra* note 140; *see also* James Borg, *Tending the Dragon's Fire: Shall We Dump, Crush or Cryofracture Our Obsolete Chemical Weapons?*, 15 APF REP. 12 (1992).

465 Thomas & Medville, *supra* note 418, at 449-51. Cryofracture concepts involve immersing the entire weapon or other item in the liquid nitrogen, shattering it in a mechanical press, and feeding the pieces into a single incinerator for destruction. It is not applicable to bulk containers. The technology has been tested in a prototype application at CAMDS and elsewhere. PEIS, *supra* note 130, at 2.75-77. Recently, the Army has been experimenting with transforming the Pueblo, Colorado facility from the "baseline" (*i.e.*, JACADS-style) incinerator into a cryofracture unit. Some initial testing has been completed, and the program is now being evaluated. Owen Statement, *supra* note 4, at 17; *Government Operations Hearings*, *supra* note 306, at 116; 1992 ANNUAL REPORT, *supra* note 141, at 13.

466 Under the baseline technology, chemical weapons and associated materials must be segregated into four separate streams for feeding into the appropriate incinerator. Cryofracture, on the other hand, would process everything through a single system, eliminating some of the time-consuming and hazardous preparatory handling. Ember, *supra* note 9, at 13; Kemper, *supra* note 390, at 25. By building only one incinerator instead of four, the cryofracture system may also be appreciably cheaper. *Hearings on National Defense Authorization Act for Fiscal Year 1989 and Oversight of Previously Authorized Programs before the House Armed Services Comm.*, *supra* note 141, at 37, 49-52.

ofracture system will also, ultimately, rely upon some sort of incineration mechanism for eliminating the frozen particles, and that JACADS' four specially-designed furnaces are more efficient and safe.[467]

Similarly, there has been a surge of interest in "molten metal" processes, in which the CW is destroyed through immersion in a three-thousand degree Fahrenheit bath of copper, iron, or cobalt.[468] The high temperatures break down the agent molecules and dissolve the inorganic components into a slag that rises to the top of the steel processing vessel and is skimmed off.[469] Potential corporate vendors have claimed that the intense thermal processing prevents the production of furans and dioxins, and that the system fosters the "harvesting" of recyclable materials from the CW inputs.[470] However, opponents can again contend that the system will still generate hazardous waste gases that must be cleansed and eliminated, that the proposed technology is unproven (at least on the scale that the CW dismantling program would need to establish), that it is expensive, and that it involves creation of a facility that could actually be much more hazardous than an ordinary incinerator in the event of a catastrophic failure.[471]

A third noteworthy alternative would be some system of biological remediation.[472] Researchers have suggested reliance upon some relatively familiar enzymes and bacteria—or alternatively, some genetically-modified variants—comparable to those that naturally break down pesticides in soil, or that have long been used to treat municipal

467 A cryofracture system, in which all sorts of different CW-related materials are fed into a single furnace, may be more vulnerable to explosions in the furnace than is the JACADS baseline technology, in which the explosives, agents, metal parts, and other materials are handled independently. Ember, *supra* note 9, at 13; 1992 ANNUAL REPORT, *supra* note 141, at 13. By incinerating all the weapon elements in a single furnace, moreover, cryofracture may also promote the formation of dioxins, furans, and other hazardous byproducts of complex combustion. SIEGEL, *supra* note 256, at 14. Finally, some components of chemical weapons (notably, the aluminum and fiberglass parts) do not become sufficiently brittle for optimum cryofracture. Doty, *supra* note 132, at 27.

468 NRC ALTERNATIVES, *supra* note 129, at 152-56.

469 *Id.* at 157.

470 *Id.* The two leading corporate sponsors, Molten Metal Technology and Elkem Technology, have developed a system that is capable of accepting a wide variety of types of inputs, including all CW agents and munitions. The proposed unit generates heat by passing an electrical current between electrodes in the bottom of the containment vessel, not via flame. *Id.*

471 *Id.* at 153-56. To some extent, the molten metals technology is comparable to that long used in steel production, so the basic properties are well known, and experiments have proceeded with a variety of specialized applications. However, before the molten metals approach could be adapted for CW destruction, much additional development would be required—probably beginning with a pilot plant, then a demonstration unit, and only later, a facility of operational scale. *Id.* at 156.

472 *Id.* at 126-36; NAS STOCKPILE COMMITTEE, *supra* note 140, at 176.

and industrial wastes and sewerage.[473] Critics of this approach concede that certain biological processes seem to work well on dilute solutions of hazardous materials, but they argue that the technique is still at an early stage of development and that it is currently simply too slow to accomplish a task of this magnitude within the allowable time.[474]

Numerous other possible CW destruction techniques—both exotic and pedestrian—have also been explored or at least identified.[475] The NRC Alternatives Committee analyzed no fewer than seventeen concepts, ranging from the use of ultraviolet light to plasma arc pyrolysis to wet air oxidation.[476] An earlier Greenpeace study evaluated thirty variations upon seven basic technological themes, again without making recommendations.[477] The Congressional Office of Technology Assessment reported on ten different proposals, describing four of the leading alternatives in greater depth.[478] And this is surely an area where scientific inquiry is evolving rapidly—additional suggestions may well be forthcoming in the next few years, especially if federal funds are allocated to support the research endeavors[479] and particularly if the Army promotes the investigations with true scientific zeal.[480]

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473 GREENPEACE ALTERNATIVES, *supra* note 425, at 20-39; Eric Nalder, *Enzymes Could Chomp Down on Nerve Poison*, SEATTLE TIMES, Feb. 18, 1991, at A8; Plaintiff's Declarations in Support of Plaintiff's Motion for a Preliminary Injunction, Greenpeace USA v. Stone, 748 F. Supp. 749 (D. Haw. 1990) (No. 90-00588 DAE) (containing the declaration of Dr. Wayne Landis). The biological methods currently seem more promising for eradicating nerve agents; mustard is less amenable to this approach. GREENPEACE ALTERNATIVES, *supra* note 425, at 24.

474 NRC ALTERNATIVES, *supra* note 129, at 126-27.

475 Evaluation of the technical merits of any of the alternative technologies is well beyond the scope of this Article, but any reviewer must be impressed by the wide variety of the potential approaches identified in the literature, the creativity of the researchers—and, unfortunately, in most cases, the early stage of development.

476 *Id.* The Alternatives Committee grouped the potential approaches into several broad categories: high-temperature, low-pressure oxidation (*e.g.*, baseline incineration); high-temperature, low-pressure pyrolysis (*e.g.*, molten metals); moderate-temperature, high-pressure oxidation (*e.g.*, burning diluted solutions at medium temperatures); low-temperature, low-pressure detoxification or oxidation (*e.g.*, biological processes). NATIONAL RESEARCH COUNCIL PRESS RELEASE OF JUNE 10, MULTIPLE ALTERNATIVES STUDIED FOR CHEMICAL WEAPONS DISPOSAL (1993).

477 GREENPEACE ALTERNATIVES, *supra* note 425.

478 OTA ALTERNATIVES, *supra* note 140.

479 *See id.* at 9-10 (discussing other programs for promoting research into hazardous waste disposal technologies).

480 Some critics have contended that the Army—despite its apparent exploration of a wide variety of technological alternatives—has become so wedded to the baseline incineration technology that it is now incapable of sincerely re-evaluating that fundamental approach. The Army initially selected incineration years ago when little was understood about the hazards of combustion and still less was known about potential alternatives. Now that so much time and money has been invested in the JACADS-style mechanisms, it would be extremely difficult for the

On the other hand, none of these technologies can credibly promise to produce a "magic bullet": a method for eliminating chemical weapons that is simultaneously economical, safe, environmentally secure, high-speed, capable of accepting a wide variety of inputs, and sufficiently mature to be able to accomplish the task within a decade. Regardless of which method or combination of methods is eventually implemented, hard choices will have to be made to resolve competing public values, especially given the enormously long lead times ordinarily required to develop a new technology, construct and prove out a prototype, and finally build and use one or more operational facilities.[481]

It is important to recall that even the "no action" alternative in this scenario carries profound environmental and other risks: continued storage of the aging chemical stockpile in its current configuration simply prolongs the actuarial danger of leakage, human error, natural accidents, or other dangerous mishaps.[482] Although existing Army safety and security procedures are adequate to minimize the likelihood of a catastrophic failure,[483] no alternative is truly risk-free.[484]

NEPA and the substantive antipollution statutes surveyed above are sometimes referred to as being controversially "action forcing" or "technology forcing,"[485] meaning that the legislative or administrative standards compel industry to implement the "best available" or "most

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Army to start the technology review process anew. SIEGEL, *supra* note 256, at 18; GREENPEACE ALTERNATIVES, *supra* note 425, at 5-7; LIKELY TO CONTINUE, *supra* note 242, at 21.

481 RECORD OF DECISION, *supra* note 145, at 28. The NAS Alternatives Committee estimated that for the technologies it considered, proceeding from the stage of laboratory data development through the stage of demonstration would require nine to twelve years, with a further five years required to design, construct, and systemize an operational facility. NRC ALTERNATIVES, *supra* note 129, 89-90. The Army projects that no acceptable alternative could be successful in destroying the existing CW, even if used only for the three "low volume" sites, before 2010. ARMY ALTERNATIVES, *supra* note 249, at 6-9. The second National Academy of Sciences committee was a bit more optimistic that the timetable could be foreshortened somewhat. NAS STOCKPILE COMMITTEE, *supra* note 140, at 119.

482 Morrison, *supra* note 196, at 1103 (indicating that Army officials have concluded that earthquakes or plane crashes are the most important dangers of continued storage, "so we can't sit and wait for the best technology to emerge"). *See also Recommendations for Protecting Human Health Against Potential Adverse Effects of Long-Term Exposure to Low Doses of Chemical Warfare Agents*, 259 JAMA 1453 (1988).

483 PUBLIC TRUST AND TECHNOLOGY, *supra* note 232, at 6.

484 *See* NRC ALTERNATIVES, *supra* note 129, at 27-29 (describing different types of risks involved in storing, transporting, and destroying CW).

485 40 C.F.R. § 1502.1 (1993) ("The primary purpose of an environmental impact statement is to serve as an action-forcing device to insure that the policies and goals defined in the Act are infused into the ongoing programs and actions of the Federal Government"). *See also* Chemical Mfrs. Ass'n. v. Environmental Protection Agency, 870 F.2d 177, *modified*, 885 F.2d 253 (5th Cir. 1989); BONINE & MCGARITY, *supra* note 189, at 216; LAITOS & TOMAIN, *supra* note 197, at 172-73 (discussing alternative statutory standards requiring industry to adopt various degrees of antipollution technology).

suitable" technology for achieving lowered emissions standards, regardless of—or putting strikingly low weight upon—economic feasibility or internal cost-benefit calculations.[486] This approach carries both advantages and disadvantages in coping with traditional corporate values and business incentives, but the problem of CW dismantling introduces yet a higher level of complexity. The applicable standards—both domestic United States law and the nascent Chemical Weapons Convention—suddenly impose an external clock: the agent elimination process is to begin within two years of the treaty's entry into force and is to be completed within eight years after that.[487] Whether we intend to force technology, to finance it, or to simply adapt what we already have developed, there is not very much time available.

VI. International Ramifications

Each of these political machinations and technological options would be sufficiently difficult to resolve, even if the United States could proceed unilaterally with its CW elimination efforts inside a global vacuum. In fact, however, our CW-related choices and what we say about them will strongly influence and be influenced by events in other parts of the rapidly changing, politically malleable world community. This section considers some of the likely international factors that will interact with American policies about CW destruction and environmental protection.

The first important reality is that if the United States is unable to comply in a timely fashion with the disarmament obligations of the CWC, then the treaty itself will be profoundly jeopardized.[488] Other countries will, understandably, be reluctant to submit to the expensive and cumbersome verification and confidence-building functions unless it is clear that the United States and Russia will continue the rapid

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486 *See* Bonine & McGarity, *supra* note 189, at 215-16; Findley & Farber, *supra* note 197, at 143-52; Laitos & Tomain, *supra* note 197, at 172-73 (discussing environmental laws that either: (1) focus on the desired level of quality or purity in the particular medium (*e.g.*, air, water), without overtly considering technological or economic feasibility at all; or (2) set a particular standard requiring industry to adopt the "best available" (or "best practicable" or "best conventional") technology, the "lowest achievable emissions rate," etc.).

487 CWC, *supra* note 1, Verification Annex, Part IV (A).C.17.

488 Herby, *supra* note 97, at 14. When, during a crucial stage of the CWC negotiations, the United States and France each proposed that the existing CW-possessing states should be allowed to retain a small "security stockpile" of chemical weapons, pending universal adherence to the treaty, the other negotiating parties strongly resisted. They demanded—and the treaty ultimately reflected—that all parties' CW must be destroyed in a timely fashion for the treaty regime to be meaningful. Kemper, *supra* note 390, at 23; Jones & Wagner, *supra* note 69, at 593-94; Bernauer, *supra* note 90, at 31-32.

movement toward elimination of their CW arsenals.[489] American leadership is a *sine qua non* of global acceptance of the CWC, and although we can never rigorously quantify these diplomatic assessments, the treaty regime will be much stronger, and much more attractive to fence-sitting countries, if the United States disposes of its stockpile within ten, rather than fifteen, years.[490] Although the treaty does contemplate a possible extension of time,[491] its exercise is unlikely to be cost-free.[492]

Second, any American hesitancy in discharging the disarmament obligations is likely to have special repercussions inside Russia, where the government faces even more severe environmental and fiscal challenges. For decades, the Soviet military establishment was allowed to despoil the national landscape in horrendous ways, and the scope of the required cleanup is immense.[493] Ironically, the Russian (and all former Soviet) populace is only now becoming environmentally sensitized by the unraveling truth about the consequences of the Chernobyl disaster, as well as a host of other staggering pollution problems; now, that increased "green consciousness" may translate into greater obstacles for the CW disposal effort.[494] CW is merely one

489 Herby, *supra* note 97, at 14, 17. At various stages during the stultified CWC negotiations, some had proposed retreating from the ambitious goal of achieving a truly comprehensive CW treaty and concluding instead a partial, interim accord that would at least "freeze" the existing global CW stockpiles and bar further proliferation of the weaponry. This more limited type of agreement—which would have preserved the existing monopoly in favor of the few CW-capable states—was unacceptable to most countries, and the participants stayed at the negotiating table until they were able to conclude a broad-reaching accord that disarmed the existing CW possessors as well as prohibited the spread of the weaponry to additional states. Oudraat, *supra* note 97.

490 One of the last changes made in the evolving text of the CWC during the closing stages of the negotiations was the deletion of language that would have provided that if any one state received permission to extend its dismantling timetable, other states could respond by delaying their own CW eliminations. TREVOR FINDLAY, PEACE THROUGH CHEMISTRY: THE NEW CHEMICAL WEAPONS CONVENTION 46 (1993).

491 CWC, *supra* note 1, Verification Annex, Part IV(A).C.24-28.

492 For example, because Russia anticipates such severe difficulties in meeting the CWC dismantling timetable, it might respond by delaying the deposit of its instrument of ratification of the treaty, joining the CWC regime only later. However, failure to adhere to the CWC at the earliest possible date would have negative consequences, such as making the country ineligible for membership on the Organization's Executive Council and exposing the country to export restrictions applicable to all nonparties. Herby, *supra* note 97, at 18-19.

493 *See, e.g.*, MURRAY FESHBACH & ALFRED FRIENDLY, JR., ECOCIDE IN THE USSR (1992); Mark Sommer, *Struggling to Cut the Half-Life of Moscow's Nuclear Mess*, CHRISTIAN SCI. MONITOR, Aug. 18, 1993, at 18.

494 Ember, *supra* note 9, at 18; FINDLEY & FARBER, *supra* note 197, at 199-201. The Chernobyl disaster killed 31 people, forced the evacuation of 135,000 more, contaminated the land on which 4 million people live in Russia, Ukraine, and Belarus, and substantially increased the long-term incidence of cancer and other diseases for additional millions. Reportedly, the incident emitted as much dangerous radiation into the atmosphere as the combined effect of all the nuclear weapon tests ever conducted. *Id.*

piece of a large, soiled fabric of Russian environmental issues; the list of ecological disasters awaiting emergency remediation is daunting,[495] and the population will no longer blindly trust the government to "do the right thing" on environmental and security issues.[496]

One telling casualty of the Russian population's newfound environmentalist instincts has been the once-secret CW destruction facility constructed near the Volga River town of Chapayevsk, about five hundred miles southeast of Moscow. The plant, erected beginning in 1987 in a locale already infamous for horrendous chemical-related pollution and lethal accidents, cost some $165 million and was to be capable of neutralizing and burning up to five tons of chemical agents daily. Local community activists mounted a stunning petition campaign against the facility, rejecting assurances and promises from the Moscow authorities and threatening to go on strike if the plant were commissioned. Finally, in August 1989, the plant was officially converted into a training facility—before its intended destruction capacity had ever actually opened. The move leaves the Russian military without any current capability for destroying its CW stockpile and has sent the planners back to the drawing boards to design a facility, or string of facilities, that would be environmentally acceptable in some feasible location.[497]

At the same time, the Russian government must confront the fact that it has an enormous quantity of CW stocks and materials to eliminate, and precious little disposable income to apply to the task.[498] The

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495 It was principally the surge of local and national interest in environmentalism, rather than a newfound appreciation for arms control or national security motivations, that led to the closure of the facilities where the Soviet Union had traditionally conducted its nuclear weapons tests. Despite official government statements, the local populace simply would not tolerate additional spoliation of the test site ecology. Luther J. Carter, *Soviet Nuclear Testing: The Republics Say No*, 250 SCIENCE 903 (1990); Fred Hiatt, *Russian Test Site Displays Pride, Perils of a Superpower*, WASH. POST, Oct. 18, 1992, at A1; Peter Almquist, *Destruction Plant at Chapayevsk: 'Safe... [If] There Are No Accidents,'* ARMS CONTROL TODAY, Sept. 1990, at 14.

496 Russian experts have charged that tens of thousands of workers died, and 300 towns, housing 1 million people, were contaminated due to lax Soviet practices in the production, storage, testing, or demolition of chemical weapons. *Russians Detail Deaths Laid to Chemical Arms*, WASH. POST, Jan. 24, 1994, at A11.

497 Almquist, *supra* note 495; Satchell, *supra* note 4, at 56; Michael R. Gordon, *Moscow Is Making Little Progress in Disposal of Chemical Weapons*, N.Y. TIMES, Dec. 1, 1993, at A1; Dr. B. Richardson, Statement Before the Subcomm. on Nuclear Deterrence, Arms Control and Defense Intelligence of the Senate Armed Services Comm. 8 (May 26, 1993) (stating that Russian environmental concerns have also resulted in prohibitions against the shipment of CW across some regions) [hereinafter Richardson Statement]; Mikulak, *supra* note 107, at 13; Ember, *supra* note 9, at 18-19.

498 The Soviet Union's CW arsenal was the largest and most modern in the world, much feared by NATO and the United States. The Soviet Union regularly upgraded its CW warfighting capabilities and trained its troops regarding operations in a CW-contaminated environment much more extensively than other countries. The U.S.S.R. had integrated chemical weapons into its operational military routines, and it assembled a major infrastructure of CW-related

Soviet Union admitted holding some 40,000 tons of weaponized agents, and Russian authorities have recently estimated the eventual pricetag for the destruction operations at some $10 billion.[499] Some outside observers, however, have contended that the true quantity of the existing Russian lethal arsenal may in fact be much higher,[500] and recent disquieting revelations of dissembling about other aspects of the modern Russian CW program[501] have only exacerbated their con-

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facilities, equipment, and ordnance. STOESSEL COMM'N, *supra* note 75, at 25-29; Blaine Harden, *The Gassing of Washington*, WASHINGTONIAN, Feb. 1984, at 125. *But see* Doty, *supra* note 132, at 27 (explaining that much of the former Soviet CW arsenal is quite old, and a large percentage of it has been stored in bulk containers, rather than in weapons); R.G. Sutherland, *The Chemical Weapons Convention: The Problems of Implementation*, PAC. RES., Feb. 1994, at 7, 11 (discussing location and composition of Russian CW stockpile).

See also SMITHSON HANDBOOK, *supra* note 92, at 13 (describing proposals for Russia to convert an existing chemical weapons production facility at Novoceboksary to the task of CW destruction, and to build two new destruction facilities at Gorny and Kambarka, where the weapons are now stored); *Concern About the Expense for Disposal of the Soviet Stockpile*, ARMS CONTROL REP., Feb. 1991 at 704.E-2.25 (indicating U.S.S.R. faces daunting expense in destroying CW as required by treaty, and no location in the country has been willing to accept a destruction installation).

499 Amy E. Smithson, *Chemicals Destruction: The Work Begins*, BULL. ATOM. SCIENTISTS, Apr. 1993, at 38, 41; U.S. DEP'T OF DEFENSE, MILITARY FORCES IN TRANSITION 59 (1991) [hereinafter FORCES IN TRANSITION]. Some Russian experts have stated that the Soviet Union produced as much as 500,000 to 1 million tons of CW, much of which was buried on land or dumped into the ocean, rather than being safely destroyed, so a massive cleanup of old munitions outside the active stockpile awaits, too. *News Chronology*, CHEMICAL WEAPONS CONVENTION BULL., Mar. 1993, at 17 (quoting Russian environmental activist Lev Fedorov). Fortunately, the entire former Soviet chemical stockpile seems now to be housed within the confines of the Russian Republic, so the CWC will not have to deal with some of the worst "state succession" complications that have afflicted efforts at nuclear arms control, such as START. FORCES IN TRANSITION, *supra* (indicating massive consolidation of formerly forward-deployed CW has occurred since mid-1980s, and all of the Soviet Union's CW are now stored inside Russia); ARMS CONTROL REP., *supra* note 498, at 704.E-2.40 (1991) (U.S.S.R. pulling CW out of eastern Germany). In contrast, the nuclear weapons formerly held by the Soviet Union were physically located in four republics—Russia, Kazakhstan, Ukraine, and Belarus—a fact that has greatly complicated the effort to secure the reduction of nuclear arsenals under the START I and II agreements. *See* George Bunn & John B. Rhinelander, *The Arms Control Obligations of the Former Soviet Union*, 33 VA. J. INT'L L. 323 (1993).

500 Steven R. Bowman, *CRS Issue Brief: Chemical Weapons: U.S. Production, Destruction, and Arms Control Negotiations*, CONG. RES. SERV., Apr. 1990, at 5; Julian Perry Robinson, *Review: World CW Armament: Part II: The Soviet Union*, CHEMICAL WEAPONS CONVENTION BULL., May 1989, at 15; R. Jeffrey Smith, *Estimate of Soviet Arms Is Cut; U.S. Revises Figure on Chemical Weapons*, WASH. POST, Nov. 9, 1989, at A71 (indicating U.S. intelligence agencies had estimated that the Soviet CW arsenal contained as much as 300,000 tons of agent). *Cf.* Broad, *supra* note 61, at 1 (Russian official reporting that the country had 35% more nuclear warheads, and more than twice as much highly-enriched uranium as U.S. officials had estimated).

501 Two Russian scientists have alleged that important Soviet CW development efforts continued even after President Gorbachev, and later President Yeltsin, had announced that the entire CW program had been halted. One of the authors of that expose, Vil Mirzayanov, was arrested on charges of revealing state secrets and has been subjected to extra-legal proceedings that, for some, call into question the respectability of the Russian justice system and the fidelity of the government's commitment to openness and an end to CW activities. Gale Colby, *Fabricating*

cerns. Even the physical security of Russia's deadly arsenals has been called into question, as reports circulate about the emergence into the international black market of nuclear and other weapons-related materials spirited away from military control.[502]

There is, in short, strong reason to doubt Russia's innate ability to complete the CW dismantlings as required by the treaty.[503] Russian governmental spokespersons have earnestly solicited Western aid, predicting that if left to its own devices their country would be unable to allocate sufficient material and technological resources to the program.[504] Moreover, Russian authorities have expressed interest in converting former CW production facilities to alternative uses, rather than destroying them altogether, and in recapturing some of the commercially valuable components of CW, rather than sending them up in smoke. Those types of sophisticated recyclings, however, will inevitably require more time and more money.[505] Even if Russia were allowed the greater leniency of the treaty's fifteen-year period, compliance would be problematic.

The United States and others have already pledged a substantial quantity of financial assistance to the constituents of the former Soviet Union, with the lion's share being consciously allocated to efforts to underpin emerging Russian democracy and civilian control.[506] However, relatively little of the funding has actually been delivered so far,

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Guilt, BULL. ATOM. SCIENTISTS, Oct. 1993, at 12; Richard Stone, *Russia Seen Poised to Drop Prosecution of Chemist*, 263 SCIENCE 1083 (1994); Fred Hiatt, *Russian Court Opens Unprecedented Secrets Trial*, WASH. POST, Jan. 25, 1994, at A15; Satchell, *supra* note 4, at 56-57.

502 Frank von Hippel et al., *Eliminating Nuclear Warheads*, SCI. AM., Aug. 1993, at 44.

503 *See* FORCES IN TRANSITION, *supra* note 499; Doty, *supra* note 132, at 28 (quoting Stephen J. Ledogar, the chief U.S. CWC negotiator, "Russia cannot meet either the bilateral timetable or the 10-year [CWC] deadline currently envisioned. They can't even find a site. They have no . . . destruction plan even on the drawing board."); Thomas Stock, *Chemical and Biological Weapons Developments and Proliferation*, *in* SIPRI YEARBOOK 1993: WORLD ARMAMENTS AND DISARMAMENT 259, 277 (1993).

504 George Leopold, *Russia Seeks Western, U.S. Aid To Destroy Chemical Weapons*, DEF. NEWS, Nov. 16-22, 1992, at 38; George Leopold, *Russia Wants Early Chemical Demolition Start*, DEF. NEWS, Aug. 10-16, 1992, at 6; Smithson, *supra* note 4, at 38, 42 (indicating the head of the Russian CW destruction program has recommended to the Russian parliament that Russia delay ratification of the CWC until sufficient foreign assistance for the dismantling efforts is obtained).

505 FORCES IN TRANSITION, *supra* note 499; Leopold, *supra* note 504, at 6; Amy E. Smithson, *Russia Wants Plastics, Too*, BULL. ATOM. SCIENTISTS, May-June 1994, at 14.

506 *U.S. Plans and Programs Regarding Dismantling of Nuclear Weapons in the Former Soviet Union: Hearing Before Senate Foreign Relations Comm.*, 102d Cong., 2d Sess. (1992), *passim* [hereinafter *U.S. Plans and Programs*]; Dunbar Lockwood, *Dribbling Aid to Russia*, BULL. ATOM. SCIENTISTS, July-Aug. 1993, at 39 [hereinafter Lockwood, *Dribbling Aid*]; Lee Ann Patterson, *A 'Marshall Plan' for the Former Soviet Union: Ideological, Economic and Political Considerations*, ARMS CONTROL, Aug. 1993, at 181; Dunbar Lockwood, *U.S., Russia Sign New Agreements on Nuclear Dismantlement Assistance*, ARMS CONTROL TODAY, Oct. 1993, at 21.

as political and other impediments insert delays and conditions.[507] Moreover, the aid program is necessarily spread quite thin, as the country suffers from multiple, overlapping needs for physical infrastructure, financial reorganization, and political revitalization.[508] Even the segment of the money that has to date been dedicated to military reform and conversion has, for plausible reasons, focused quite heavily upon nuclear, rather than chemical, weapons.[509] Only approximately $55 million of the overall Nunn-Lugar aid package of $800 million has been earmarked for CW dismantling efforts, and the countries have not yet found fully effective ways to apply even that modest sum.[510] The largest single project, a $30 million grant to sup-

507 Congress has authorized some $1.2 billion in assistance to the demilitarization programs of the former U.S.S.R., under 1991 legislation colloquially known as Nunn-Lugar funding. U.S. ARMS CONTROL AND DISARMAMENT AGENCY, FACT SHEET: U.S. NUNN-LUGAR SAFETY, SECURITY, DISMANTLEMENT PROGRAM (1994). However, the processes of formalizing the necessary implementing accords, identifying specific projects for using those funds, and actually disbursing the money have been protracted. By the summer of 1993, only half of the available funds had been committed in principle to particular projects, only $31 million had been formally obligated, and even less had actually been spent. Lockwood, *Dribbling Aid*, *supra* note 506. In fact, some of the Congressional allocations were "lost," because they were time-limited and the funds were not spent soon enough. John Deni & Dunbar Lockwood, *DOD Plan Calls for More Transparency in Managing U.S.-Russian Plutonium*, ARMS CONTROL TODAY, Apr. 1994, at 23.

On the American side, impediments to faster progress have included political inhibitions against proceeding very quickly with the program, and the military's reluctance to release the funding from other applications. On the recipients' side, both Ukraine and Kazakhstan were initially reluctant to enter into the Safe and Secure Dismantlement (SSD) talks for internal political reasons, and Russia has not always welcomed the particular kinds of assistance programs that the United States was offering. The pace of the aid program, at last, seems to be accelerating. Lockwood, *Dribbling Aid*, *supra* note 506; U.S. CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, DISMANTLING THE BOMB AND MANAGING THE NUCLEAR MATERIALS 130 (1993) [hereinafter DISMANTLING THE BOMB]; *Fact Sheet: Safe and Secure Dismantling of Nuclear Weapons in the New Independent States*, U.S. DEP'T OF STATE DISPATCH, Jan. 1994, at 1, 6.

508 Under the SSD "umbrella agreement," Nunn-Lugar funds may be applied to projects that promote the safe and secure transportation, storage, disabling, and safeguarding of weapons; the conversion of defense industries; and the assessment of the environmental damage caused by nuclear waste disposal. Lockwood, *Dribbling Aid*, *supra* note 506. In addition, the United States has undertaken a wide array of other public and private assistance to Russia, involving humanitarian relief, technical advice on converting to a private sector economy, and support in building democratic institutions. *Fact Sheet, U.S. Assistance to Russia*, U.S. DEP'T STATE DISPATCH, Aug. 1993, at Supp. 13.

509 The programs aimed at nuclear dismantling have—for obvious reasons—seized both the headlines and a dominant share of the decisionmakers' attention. U.S. efforts have accorded priority to supporting Russia (and other former Soviet republics) in storing, transporting, and disposing of their most powerful arms in a safe and secure fashion. Martin Sieff, *Moscow Balks at Verification of Scrapped Nukes*, WASH. TIMES, Sept. 30, 1993, at A1; Dunbar Lockwood, *Clinton Seeks to Accelerate START I Deactivation Measures*, ARMS CONTROL TODAY, June 1993, at 27.

510 Under a U.S.-Russia agreement for cooperation in the safe, secure, and environmentally sound destruction of the former U.S.S.R.'s CW stockpile, up to $25 million would be allocated to programs for assisting the Russians in developing a national destruction plan, hosting Russian interns in U.S. destruction facilities, providing safety and environmental technology and equip-

port the construction of a Central Chemical Weapons Destruction Analytical Laboratory inside Russia,[511] has been agreed upon, but the money has not yet been disbursed.[512]

It is important to note that Russia is not wholly without resources of its own to bring to the task of CW destruction. In fact, some experts opine that the Soviet Union's historic quantitative and qualitative superiority in CW and related military technologies may now give Russia something of a lead over the United States in selected aspects of what could become a CW disarmament race.[513] The U.S.S.R. and Russia have certainly experimented with various CW destruction technologies, not always reaching the same conclusions that their American counterparts have developed.[514] It is quite possible that Russian experts could teach their American interlocutors as much about environmentally sound CW elimination techniques as vice-versa.[515]

It is also clear that a large cadre of displaced Russian military scientists, formerly employed in privileged positions within government weapons laboratories or in other sensitive positions, is now eagerly seeking other remunerative employment opportunities inside the new republic.[516] Applying their talents to the task of weapons de-

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ment, and training key personnel. This is projected to be merely the modest start on a much larger cooperative CW destruction program. Richardson Statement, *supra* note 497, at 8; *U.S. Plans and Programs*, *supra* note 506, at 13, 26.

511 *News Chronology*, CHEMICAL WEAPONS CONVENTION BULL., Sept. 1993, at 17 [hereinafter *News Chronology*]. The purposes of the plant will be to conduct environmental baseline studies, to develop techniques to be used at the actual destruction locations, to provide training, and to perform the quality control functions. *Id. See also* Michael R. Gordon, *Pentagon Offers New Way to Verify Disarmament*, N.Y. TIMES, Mar. 10, 1994, at A6; ARMY ALTERNATIVES, *supra* note 249, at 4-2.

512 By the end of 1992, only $1.6 million of the CW-related allotment had been spent, most of it to fund a private United States consulting firm in establishing a Moscow field office. *News Chronology*, *supra* note 511, at 17. Germany has also agreed to support certain aspects of the incipient Russian CW disposal operation. Sutherland, *supra* note 498, at 7, 11.

513 Many commentators have noted the desirability of using the former Soviet military establishment—the scientists and soldiers who created the CW arsenal in the first place—to take the lead in cleaning it up. POTENTIAL USES, *supra* note 58, *passim*; George Perkovich & William C. Potter, *Cleaning Up Russia's Future*, WASH. POST, Jan. 5, 1992, at C2.

514 Georgi S. Leonov & Vladislav V. Sheluchenko, *Principal Technological and Environmental Aspects of the Destruction of Chemical Weapons*, 15 DISARMAMENT 94 (1992).

515 George Perkovich & William C. Potter, *Coping with the Soviet Nuclear Brain Drain: An Environmental Approach*, MONTEREY INSTITUTE OF INT'L STUDIES NEWS BULL., Dec. 1991; ARMY ALTERNATIVES, *supra* note 249, at 4-5; Leopold, *supra* note 504, at 6. *But see* KATHLEEN C. BAILEY, DOOMSDAY WEAPONS IN THE HANDS OF MANY: THE ARMS CONTROL CHALLENGE OF THE '90s, at 77-78 (1991) (suggesting that the CW destruction technologies that are optimal for use in the United States might not simultaneously be best inside Russia, given differences in infrastructure and social circumstances); ARMY ALTERNATIVES, *supra* note 249, at 4-3 (noting differences in the composition of American and Russian CW stockpiles).

516 John J. Fialka, *Russian Scientists Change Their Work, Not Always Along Lines the U.S. Likes*, WALL ST. J., May 5, 1992, at A16.

struction would be a mutually-attractive bargain, reducing the arsenal and simultaneously reducing the scientists' possible incentives to participate in a feared "brain drain," through which they might sell their expertise to weapons-hungry, terrorist-sponsoring renegade countries around the world.[517] Even if the United States and others[518] had to underwrite part of the effort to retrain the Russian experts, and even if other types of substantial outside support were also required to promote the disarmament function, it would surely be money well spent.[519]

In addition, it should be noted that there is a multilateral synergy between the Russian and the American CW dismantling campaigns. That is, effective global implementation of the CWC requires that both military giants participate fully in the program of destruction or conversion of their CW-related assets. If either were to falter in that effort, the other might well pause too, fearful of getting too far out in front in unilateral disarmament, and the entire treaty regime would then be imperiled.[520]

It is not, of course, logically essential for the American and Russian CW disarmament efforts to proceed in lock step.[521] In fact, in the new post-Cold War world order, it may be strongly in the United States' interest to advance with our timely implementation of the CWC dismantling obligations, even if Russia were unable, for whatever reason, to follow suit precisely; getting rid of our unwanted, dangerous CW stockpile and securing the faithful treaty adherence of other countries—such as the third world, potential proliferators of chemical weaponry, who might be agnostic about the CWC unless firmly led (and pushed) into it—may now be even more important

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517 William J. Broad, *In Russia, Secret Labs Struggle to Survive*, N.Y. TIMES, Jan. 14, 1992, at C5; R. Jeffrey Smith, *Gates Fears Soviet 'Brain Drain,'* WASH. POST, Jan. 16, 1992, at A22.

518 Germany, in particular, has accepted responsibility for a special role in assisting Russia in the destruction of chemical weapons. Joachim Badelt et al., *Disposing of Chemical Weapons: A Common Heritage Calls for a Cooperative Approach*, 23 BULL. PEACE PROPOSALS 43, 48 (1992).

519 The United States and Russia are already deeply involved in discussions about mutually-supportive programs to destroy or convert to civilian purposes certain other aspects of the former Soviet military apparatus, such as weapons-grade plutonium and nuclear submarines. William J. Broad, *A Plutonium Pact Will Aid Disposal*, N.Y. TIMES, Apr. 6, 1993, at A11; Thomas W. Lippman, *Russia Thinks Plutonium From Arms Has Commercial Value, Congress Told*, WASH. POST, Mar. 10, 1993, at A24; John J. Fialka, *U.S. Is Studying Ways to Help Russia Dispose of Aging Nuclear Submarines*, WALL ST. J., Apr. 2, 1993, at A5C.

520 Amy E. Smithson, *Conventional Wait*, BULL. ATOM. SCIENTISTS, Sept. 1993, at 10. The bilateral U.S.-U.S.S.R. chemical destruction agreement, *supra* text accompanying note 92, also requires the two parties to dismantle their CW arsenals, but the text of that accord, as well as the political realities underlying it, protect either party from having to proceed with the CW destruction any faster than the more tardy country is able to do. *Id.*

521 Herby, *supra* note 97, at 18.

than obtaining the immediate eradication of all Russian CW.[522] Originally, the CWC was conceptualized as being essentially of bilateral interest; the main goal of the negotiations was to reduce the Soviet chemical arsenal, and if other countries could be induced to participate in the regime, too, that was a bonus. However, world events have radically altered that picture. Today, the main effect of the CWC is *multilateral* arms control, as the prime CW threat originates in the developing world, where rogue states and others who might sincerely, but mistakenly, conclude that CW could be an attractive security option should be disarmed.[523] If the United States were to delay implementing the CWC because of Russia's possible tardiness, we would be guilty of failing to recognize how the stakes, and our security priorities, have shifted.

Finally, it should be noted that events in other countries, too, may affect the American demilitarization efforts. Iraq, for example, is the one country in which chemical weapons have recently been destroyed publicly on a large scale.[524] The dismantling of some fifty thousand munitions there has been accomplished under United Nations auspices through an ad hoc combination of neutralization, incineration, and crude open-pit burning, sometimes using technologies that are basically consistent with the strictures of the CWC, but often employing methods that would be patently inadmissible inside the United States.[525] CW-related facilities, too, have been eliminated or converted to the destruction task, but again, not always in compliance with the environmental protection policy of the CWC.[526]

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522 *See The U.N. Assembly; In Clinton's Words: U.N. Cannot Become Engaged in Every World Conflict*, N.Y. TIMES, Sept. 28, 1993, at A16 ("I have made nonproliferation one of our nation's highest priorities. We intend to weave it more deeply into the fabric of all of our relationships with the world's nations and institutions.").

523 Thomas Bernauer, *Towards a Comprehensive Chemical Warfare Control Regime: Some Thoughts on the "Why" and "How,"* UNIDIR NEWSL. (United Nations Institute for Disarmament Research, Geneva, Switzerland), Dec. 1992, at 5; Jean Pascal Zanders, *Chemical Weapons: Beyond Emotional Concerns*, 21 BULL. PEACE PROPOSALS 87 (1990).

524 John Gee, *The Destruction, Removal or Rendering Harmless of Iraq's Chemical Warfare Capability*, 15 DISARMAMENT 77 (1992); *U.N. Inspectors Fly to Iraq To Destroy Chemical Arms*, N.Y. TIMES, Jan. 22, 1993, at A6; FROM VERSAILLES TO BAGHDAD: POST-WAR ARMAMENT CONTROL OF DEFEATED STATES 151-53 (Fred Tanner ed., 1992).

525 Gee, *supra* note 524; NRC ALTERNATIVES, *supra* note 129, at 72-73 (describing that 400-500 tons of mustard were incinerated, and 70 tons of GB were neutralized in 1992-93); Doty, *supra* note 132, at 28 (describing that Iraqi arsenal is estimated at 50,000-100,000 weapons; Iraq claims to have destroyed 25,000 munitions during summer 1992); *Ambassador Rolf Ekeus: Unearthing Iraq's Arsenal*, ARMS CONTROL TODAY, Apr. 1992, at 6-7 (indicating that the maximum size of Iraqi CW inventory is 50,000 weapons; some are rockets already leaking chemical agent and will be destroyed using explosives) [hereinafter *Ekeus*].

526 Gee, *supra* note 524; *Ekeus*, *supra* note 525, at 8 (explaining that the Iraqi plant at al-Multhana, originally used for producing CW, has been converted to the CW elimination task; United Nations inspectors also considered importing a Canadian mustard gas disposal facility).

Some commentators doubt that United Nations investigators have yet been able to locate the entirety of the Iraqi weapons infrastructure; there may still be quantities of chemical agent, materiel, or production equipment to be unearthed and eliminated.[527] Should that destruction process, too, be conducted without conformity to the highest standards of environmental protection? Should the international community be so eager to rid Iraq of its weapons of mass destruction that we tolerate incomplete adherence to ecological and safety measures that we would otherwise insist upon in our own back yards?[528] If the CWC comes into force for Iraq, will that change the requirements for balancing the competition between environmentalism and disarmament?[529]

No other countries have publicly admitted the current possession of an active CW stockpile, although American intelligence experts have long suspected that several are (or could have become) covert members of the "CW Club," and that many others may have been assiduously pursuing that status.[530] Certainly, other countries ("past possessors") have admitted *prior* CW deployment, and many have accumulated significant experience with various disposal techniques.[531] When the treaty enters into force, and the reporting and inspection responsibilities kick in, several more countries' well-kept national CW secrets may come tumbling out of the closet, and the dismantling obligations may become rather more dispersed.[532] Abandoned and obsolete CW arsenals, too, will require remediation,[533] so the incipient

527 Gee, *supra* note 524; Paul Lewis, *U.N. Sends Atom-Detecting Copters to Iraq*, N.Y. TIMES, Sept. 19, 1993, at 14; ROD BARTON, CHEMICAL WEAPONS INSPECTIONS IN IRAQ: VERIFICATION IMPLICATIONS FOR THE CHEMICAL WEAPONS CONVENTION (Australian National University Peace Research Center, Working Paper No. 131, 1993).

528 Badelt et al., *supra* note 518, at 46 (arguing that the international community should not require Iraq to destroy its CW so quickly that environmental considerations are overlooked).

529 A small-scale incineration facility used to destroy Iraqi CW could be adapted as a model, a training site, or an operational plant available to dispose of CW held by other Middle Eastern countries. Morrison, *supra* note 196, at 1104.

530 Richardson Statement, *supra* note 497, at 2 (citing concerns about the spread of chemical warfare capability to as many as 24 countries).

531 NRC ALTERNATIVES, *supra* note 129, at 62-74 (noting CW disposal experience of Canada, Germany, and Britain); Doty, *supra* note 132, at 28-29 (indicating Austria, Italy, Belgium have experience building or destroying chemical munitions).

532 Some of the CWC's key declaration requirements become operative very shortly after the treaty enters into force. Within 30 days after the effective date of the agreement, each party must provide initial statements about its current and previous ownership or possession of CW, its receipt or transfer of CW, and its knowledge of any other state's CW located on its territory. In addition, parties must provide production data for the previous three years for some chemicals and for the upcoming calendar year for all regulated chemicals. CWC, *supra* note 1, art. III; Lois R. Ember, *Chemical Arms Treaty Makes Unprecedented Demands of Industry*, CHEMICAL & ENGINEERING NEWS, June 1993, at 7, 10.

533 Even highly industrialized and chemically-sophisticated societies, such as Germany, may encounter severe difficulty in destroying old chemical munitions that were abandoned after

clash between disarmament and environmentalism could be a drama unfurled in a number of countries—none of which could afford to be seen as insensitive to either set of imperatives.[534]

The world is becoming more engaged in environmental issues, even, or especially, when there is a concomitant security dimension.[535] And increasingly, that global attention has had an effect—not necessarily decisive, but often influential. For example, opposition from Pacific Ocean littoral states[536] has played a role in scuttling any American ideas about destroying the entire United States CW stockpile at Johnston Island[537]—the image of the Pacific as America's reluctant dumping ground has mobilized efforts culminating in a congressional prohibition on expansion of the JACADS mandate.[538] Destroying, transporting, or even long-term storing, of chemical weapons or other hazards in *anybody's* back yard has thus become much more complicated.

VII. RECOMMENDATIONS

Many observers will be sympathetic to both factions in this novel public policy debate, recognizing the importance of cleaning up the CW arsenal without further destroying the environment. And many observers will also be unwilling to surrender very much on either point, reluctant to sacrifice either the CWC and the urgency of exploiting what might be a fleeting "window of opportunity" for the achievement of chemical disarmament, or the host of hard-fought environmental priorities and standards that have finally worked their way into American law.

The most felicitous outcome, of course, would be a technological, economic, and political solution that allows all these values to be served simultaneously. While we should continue to hold out hope

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World Wars I and II. Badelt et al., *supra* note 518, at 44 (explaining Germany has only one CW destruction facility, with very limited capacity, but a large quantity of still-lethal abandoned munitions may yet be discovered); Doty, *supra* note 132, at 29.

534 *See* Robinson, *supra* note 181, at 93 (noting how many countries have adopted some version of NEPA procedures).

535 *See id.* at 103 (suggesting that customary international law (i.e., rules that are binding upon states independent of treaty obligations) is developing a requirement that countries study the environmental impacts before undertaking actions that could adversely affect international natural resources).

536 *See* Micronesia Memorandum, *supra* note 145.

537 Johnston Island has virtually no full-time indigenous population, other than personnel assigned there in connection with American military activities, and is hundreds of miles away from any substantial population centers.

538 The Department of Defense Appropriations Act of 1992, Pub. L. No. 102-172, 105 Stat. 11506, bars the shipment of any additional chemical munitions to Johnston Island, with the exception of approximately 90 old mustard shells recently discovered in the Solomon Islands and any other archaic U.S. CW that suddenly turns up elsewhere in the Pacific. Morrison, *supra* note 196, at 1104.

for—and to work assiduously toward—that nirvana, no one can be confident that it will prove to be fully attainable, or that it will appear within the time frame mandated by the treaty[539] and within the financial cost structure that the range of treaty parties will be willing to bear.[540] There is also the question, lurking in the background, of whether there are wider implications of the unraveling CWC drama: is this a precedent for any other arms control regimes that might be developed in the future,[541] such as the nascent efforts to destroy at last the planet-jeopardizing stockpiles of nuclear[542] and conventional[543]

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539 Prior U.S. statutes, too, have incorporated timetables for the destruction of the chemical stockpile, but those deadlines always proved quite malleable, and subsequent statutes repeatedly moved the "finish line" back to whatever point the Army requested. *Supra* note 232. The treaty, in contrast, will not be subject to unilateral American modification.

540 Perfect safety is unattainable in major human activities, as there are risks (to the environment, to public health and safety, etc.) inherent in any option. The task is to attempt to understand, measure, manage, reduce, and select among the potpourri of risks. *See* BONINE & MCGARITY, *supra* note 189, at 598.

541 The United States has recently undertaken a new diplomatic initiative aimed at producing an international agreement to limit the production of weapons-grade fissile materials. Such an accord might require countries to place their existing stockpiles of plutonium and highly-enriched uranium under international safeguards, it might mandate the closure (and clean up) of former production facilities, and it might otherwise inspire a range of environment-related activities comparable to those of the CWC. *See* R. Jeffrey Smith, *U.S. Ready to Propose New Limits On Materials for Nuclear Weapons*, WASH. POST, Sept. 23, 1993, at A4; FEDERATION OF AMERICAN SCIENTISTS, ENDING THE PRODUCTION OF FISSILE MATERIALS FOR WEAPONS; VERIFYING THE DISMANTLEMENT OF NUCLEAR WARHEADS (1991).

542 As the START agreements and other important nuclear arms control accords begin to take effect, the United States, Russia, and other countries will be driven to reduce substantially their stockpiles of nuclear armaments. The methodology for accomplishing these eliminations is still under development—in some instances, candidate technologies (such as cryofracture) are strikingly similar to those under consideration for CW destruction, and the concurrent environmental constraints are cognates, too. *Breaking Up (a Bomb) Is Hard to Do*, 261 SCIENCE 1673 (Constance Holden ed., 1993); Frans Berkhout et al., *Plutonium: True Separation Anxiety*, BULL. ATOM. SCIENTISTS, Nov. 1992, at 28; Holly Idelson, *Nuclear Weapons Complex Braces for Overhaul*, 50 CONG. Q. 1066 (1992); Theodore B. Taylor & Lev P. Feoktistov, *Verified Elimination of Nuclear Warheads and Disposition of Contained Nuclear Materials*, *in* VERIFICATION: MONITORING DISARMAMENT 45 (Francesco Calogero et al. eds., 1991); Matthew L. Wald, *U.S. Is Unequipped to Disarm A-Bombs*, N.Y. TIMES, Sept. 24, 1993, at A13; David C. Morrison, *After the Race*, 25 NAT'L J. 2837 (1993); DISMANTLING THE BOMB, *supra* note 507.

543 As the U.S. military structure shrinks in response to the ending of the Cold War and the continuation of budgetary constraints, increasing numbers of surplus conventional weapons (everything from rockets to grenades to torpedoes) will need to be destroyed, and the closure of now-excess military installations will also prompt a $100 billion environmental cleanup task. Worldwide, the market for demilitarization of conventional arms could reach $5 billion. Barry Meier, *Breaking Down an Arms Buildup*, N.Y. TIMES, Oct. 15, 1993, at D1; David C. Morrison, *Batting Cleanup*, 24 NAT'L J. 2492 (1992); Brian Bremner, *If You Can't Build Weapons, Destroy 'Em*, BUS. WEEK, Mar. 9, 1992, at 86; HIDDEN DANGERS: ENVIRONMENTAL CONSEQUENCES OF PREPARING FOR WAR *passim* (Anne H. Ehrlich & John W. Birks eds., 1990).

weaponry?[544] Even aside from the fields of disarmament and environmentalism,[545] might other, more distant, areas of public policy also benefit from the attempt here to develop a simultaneous solution to two conflicting, pressing social and technical problems?[546]

This Article recommends that the efforts to pursue both CW dismantling and environmental protection should now proceed via "bending" United States commitments and policies—in two different senses.[547] First, some of our existing national priorities will have to be "bent" (to yield, to be stretched or twisted—but not quite to be broken) to accommodate competing concerns. Second, some of our national policy tools and implementing powers should be "bent," in the sense of being harnessed and applied to a task, to exercise and effectuate a set of necessary compromises. This section sketches five such bending transformations.

A. Bend Existing Environmental Law

Timely and effective exercise of the disarmament and verification obligations of the CWC will require some relief from existing state and federal environmental statutes and regulations. The implementing legislation for the treaty[548] (or perhaps some later enactment) should therefore specify that NEPA, the host of federal antipollution

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544 Herby, *supra* note 97, at 14 (explaining that for many of its parties, the CWC will be the first experience with an arms control agreement requiring truly intrusive verification; its success may encourage them to accept additional such measures).

545 Aside from the weapons applications of nuclear technology, civilian nuclear power plants have also incited a range of environmental and other policy concerns, such as how to dispose of the resulting waste products, how to ensure safe and clean operation, and how to retrofit hazardous Eastern European reactors with adequate protective devices to avoid a second Chernobyl. The tradeoffs between environmentalism and society's need for electricity is another complex social dilemma, comparable in some ways to those assessed in this Article. Paul Lewis, *Aid Plan Drafted for Atomic Safety in Eastern Europe*, N.Y. TIMES, May 21, 1992, at A1; Margaret Kriz, *Wasting Away*, 25 NAT'L J. 2430 (1993).

546 For example, there is also an emerging tension today between the important public values of increased international "free trade" and enhanced protection of the natural environment, as manifest in the controversies regarding the North American Free Trade Agreement, *supra* text accompanying notes 219-20, and in connection with the General Agreement on Tariffs and Trade. *See* Jagdish Bhagwati, *The Case for Free Trade*, SCI. AM., Nov. 1993, at 42; Herman E. Daly, *The Perils of Free Trade*, SCI. AM., Nov. 1993, at 50.

547 *Cf.* HAROLD H. KOH, THE NATIONAL SECURITY CONSTITUTION: SHARING POWER AFTER THE IRAN-CONTRA AFFAIR 43-44 (1990) (indicating executive branch strives to "bend," if not "break," treaties).

548 The CWC, like many international agreements, is at least partially non-self-executing, requiring the passage of domestic implementing legislation before it can become fully operative as internal law for the United States. RESTATEMENT, *supra* note 203, § 111. Numerous provisions of the CWC explicitly contemplate subsequent domestic enactments to bring the parties into full compliance. IMPLEMENTATION MANUAL, *supra* note 197, at 6. *See, e.g.*, CWC, *supra* note 1, art. VII.1; *see also* Felix C. Calderon, *National Implementation Measures*, UNIDIR NEWSL. (United Nations Institute for Disarmament Research, Geneva, Switzerland), Dec. 1992, at 14.

statutes, and the environmental laws of the several affected states shall be waived in certain respects, not to apply with their usual vigor to all aspects of the CWC construction, operation, and inspection functions.

These exceptions, however, should be crafted narrowly. For example, regarding the NEPA requirements, the Army and cooperating agencies should still be required to write all the relevant environmental impact statements for major federal actions and should still circulate them at the appropriate stages for widespread public information and comment. But the construction activity on the CW elimination facilities should be allowed to proceed independently, without being held up by endless delays in the EIS process.[549] Similarly, the Army should be held to full compliance with the requirements to provide community awareness and emergency preparedness planning, but should not defer construction and procurement pending the completion of those documents and procedures.

In the same vein, the Army should be held to full compliance with reasonable substantive emissions ceilings incorporated into relevant federal and state antipollution standards, but states should not be allowed to veto the projects, and the timetable for state action in reviewing and granting the necessary permits should be expedited by federal law. For example, if a particular state is taking too long to evaluate and issue a required RCRA or Clean Air permit, the Army should be able to obtain a federal release in order to allow the activity (construction or testing, for example) to proceed as required.[550] In addition, there should be a provision allowing expeditious waiver of applicable permit limitations where necessary to facilitate a fully effective on-site inspection under the treaty. The objective should be to allow the inspection to occur as required by the CWC, to ensure that it be completed as safely and cleanly as possible, and to report and remediate ex post whenever the relevant permit has been exceeded.

The Army should also be required to perform the elimination functions as cleanly and safely as possible, but timeliness should also

549 This recommendation might appear to turn NEPA on its head: the statute contemplates that ordinarily an EIS would be drafted *prior* to undertaking any major federal action, as an aid to the agency in making an intelligent choice. My proposal, on the other hand, would allow the government to proceed with the CW elimination and only concurrently or subsequently study and publicize the environmental effects. In fact, however, critics of NEPA assert that in a great many instances the preparation of an EIS is already largely a post hoc exercise, used by the agency to justify a course of action that it has already selected. *See* Wood, *supra* note 202, at 197.

550 *See* MITRE, *supra* note 289, at 3-8 (describing tardiness by Army and individual states in seeking and reviewing necessary permits); Owen Statement, *supra* note 4, at 6 (noting that state governments, being either conciliatory or reticent, can greatly speed up or slow down the process of obtaining a RCRA or Clean Air permit necessary to begin construction of an incinerator); ISSUES AFFECTING, *supra* note 254, at 28-29; OBSTACLES TO THE PLAN, *supra* note 306, at 23-24.

be included as a fixed parameter. This means, for example, that to the extent incinerators continue to be used for CW destruction, the NRC recommendations regarding pollution abatement techniques for smoke stack emissions[551] should be incorporated, even if they are costly and their ultimate contribution to a cleaner smoke plume is marginal. In a sense, if "something has to give" in balancing our competing social interests, the first constraint to loosen should be the budget—if necessary, we will spend somewhat more to accomplish the disarmament; then the details, especially the procedural and timeliness standards, of existing environmental law; and only last the international law obligations of the CWC.

A major function of environmental laws such as NEPA, of course, is to *help* the government make better, more informed decisions about potentially polluting activities, and these managerial measures should be fully effectuated and enhanced.[552] The CWC, for example, would benefit from a complete legislative environmental impact statement. Even if the document arrives far later than the usual timetable, Congress and the public should be apprised of the full range of environmental consequences and the potential alternative methodologies and locations that might be available.[553] Likewise, the Army should undertake more citizen outreach efforts, to attempt to inform a skeptical public and to provide affected communities the most current data on the range of possible activities and hazards.[554] But there should be no

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551 *Supra* text accompanying notes 435-40.

552 *See* Robinson, *supra* note 181, at 110 (calling the environmental assessment process "the single best management handle for reaching the point of decision-making, in whatever agency"); Doyle, *supra* note 181, at 19 (noting the Army has learned that "the NEPA process is a valuable tool to decision making"). *But see* Wood, *supra* note 202, at 197 (stating that EISs are mostly not cost-effective substantive decisionmaking tools); Robert Davis, *Do We Exalt EIS Form Over Substance?*, *in* ENVIROMENTAL IMPACT ASSESSMENT, *supra* note 181, at 203 (indicating that form is often more important than substance in EIS documentation).

553 Inherent in the EIS process is the requirement that the agency's survey of available policy alternatives should include study of *all* the reasonable options, not just the agency's favored one or few. 42 U.S.C.A. §§ 4332(2)(C)(iii), 2(E) (West 1977); 40 C.F.R. § 1502.14 (1993); LAITOS & TOMAIN, *supra* note 197, at 236-38. In the case of a treaty the primary choices might appear to be simply two: approve the treaty as signed, or reject it (the "no action" alternative). In fact, however, in many instances, renegotiation of the treaty, or approval of it with reservations might also have noticeably different environmental impacts. *See* ARMS CONTROL AND DISARMAMENT AGENCY, *supra* note 184. However, the CWC does not allow reservations to its major provisions, so only "renegotiation" would be a legal possibility, and it is not likely to be a politically viable alternative. *See* CWC, *supra* note 1, art. XXII.

554 The Army has undertaken substantial community awareness programs at each of the eight intended locations in connection with the preparation of the programmatic and site-specific EISs. *See* PEIS, *supra* note 130, at 1.8-11, supp. R; Owen Statement, *supra* note 4, at 16; *Meetings and Workshops Inform the Public and Clarify Misconceptions*, CHEMICAL DEMILITARIZATION UPDATE, Nov. 1993, at 5. Citizen Advisory Commissions (with members appointed by the governor) have been established at many of the sites, *New Year—New Legislation*, CHEMICAL DEMILITARIZATION UPDATE, Jan. 1993 at 1, and national meetings of Intergovernmental Con-

veto or impediment of the CWC's obligations—the dismantling should proceed; the inspectors should be allowed to enter, take samples, and conduct their inquiries; and all the other operational aspects of the treaty should be effectuated in a timely fashion, in pursuit of the enduring, overriding national policy of chemical disarmament.

B. Bend the CWC

At the same time, the arms control side of the equation cannot emerge unscathed from the conflict with environmental law. In particular, I recommend that the Army now abandon its plans to accomplish the complete destruction of the CW stockpile and non-stockpile materiel within the treaty's ten-year period through exclusive reliance upon the baseline incineration technology at the eight continental U.S. sites. Instead, I suggest a common sense compromise, taking advantage of existing resources and seeking out new opportunities, as follows: (1) proceed with testing and, if reasonable existing environmental standards can be met, operation of the JACADS-style incinerator at Tooele, Utah because that facility is simply too far along to abandon;[555] (2) advance cautiously with the permit applications for only one additional incinerator, probably the Anniston, Alabama unit, which is the next furthest along in the convoluted chain of development, as a "standby" or fallback option, without now making an irrevocable commitment to constructing or operating it;[556] (3) explore diverse alternative elimination technologies with vigor and rigor, and prove our sincerity in the search for better methodologies by prudent investment of substantial governmental research funds;[557] and (4) to ensure that the CWC's ten-year timetable can be met, the Army should now begin making plans for undertaking a timely neutralization operation, to deweaponize the arsenal, denature and stabilize the components, and seek a more completely tolerable future environ-

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sultation and Coordination Boards have been convened. 1992 Annual Report, *supra* note 141, at 10; NAS STOCKPILE COMMITTEE, *supra* note 140, at 123-24.

555 This one facility is already projected to destroy almost half the existing U.S. chemical weapons stockpile within three years. That component of the overall job alone is too valuable to throw away, and if the Tooele, Utah plant were to operate for an additional four years, it could solve a big part of the total stockpile problem. PEIS, *supra* note 130, at 2-2, 2-65.

556 With two incineration facilities (Tooele, Utah and Anniston, Alabama) operating concurrently, the entire CW stockpile could be eliminated well within the treaty's allowed ten years. In addition, if alternative technologies came on-line during the relevant period, one or both of the incinerators could be de-commissioned. Moreover, the drain-denature-store strategy would provide additional time to research and develop a more satisfactory solution to the destruction problem, while still complying with the basic mandate of the CWC.

557 *Infra* notes 598-99. A broad-ranging research agenda could plausibly include investigation of improved incineration technologies to make the JACADS-style "baseline" approach even safer and cleaner, as well as inquiry into completely different CW destruction methodologies.

mental solution to the problem of ultimate destruction of the toxic materials.

It is important to recall that the treaty requires the parties to "destroy" their chemical weapons, but it does not specify incineration or any other technology; the goal is to preclude weaponization of the chemical substances, and that prophylaxis could be accomplished via means far short of complete eradication of the chemicals and all their residues.[558] In the treaty's terms, "'Destruction of chemical weapons' means a process by which chemicals are converted in an essentially irreversible way to a form unsuitable for production of chemical weapons, and which in an irreversible manner renders munitions and other devices unusable as such."[559]

The substantive arms control interests would thus be amply satisfied if the United States were, in a reliable and verifiable fashion, to: (1) separate the lethal agent from the ordnance; (2) cut, crush, or puncture any operational delivery systems, such as shells, bombs, or mines; (3) chemically denature the toxic agents, so they were, although perhaps still terribly hazardous, no longer suitable for warfare purposes, such as by forcing an irreversible chemical reaction, adding impurities or otherwise; and (4) store the resulting toxic waste products, under international safeguards,[560] pending the evolution of acceptable technologies for their complete incineration or other elimination.[561]

This deferral of the ultimate eradication of the lethal chemicals will not be inexpensive. Any denaturing procedures would require

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558 The process of "demilitarizing" the chemical weapons, as a first step toward "destroying" them, implies more than simply draining the lethal agent out of the munition. In addition, the munitions must be rendered useless, the agents must be safeguarded against accidents or sabotage, and reliable assurances must be provided to guard against a party's later simply repouring the agent into new weapons. SIEGEL, *supra* note 256, at 14. *Cf.* Robert Seely, *Ukrainian Retreats on A-Pledge*, WASH. POST, Oct. 20, 1993, at A31 (noting that the Ukraine proposes, as an alternative to dismantling the nuclear missiles on its territory, "creatively" partially neutralizing them, by deactivating their coding mechanisms, so they could no longer threaten the United States).

559 CWC, *supra* note 1, Verification Annex, part IV(A).C.12.

560 The United States could provide reliable assurances that the denatured chemical residues were no longer suitable for chemical weapons applications and that they were not, in fact, being adapted for those purposes. The Army could invite international observers to visit the storage facilities, install permanent technical monitoring equipment, and emplace self-authenticating, tamper-proof seals or tags on the containers, comparable to those employed in other arms control applications. *See* Mark Mullen, *Verification of a Chemical Weapons Convention: Summary of Lessons Learned from the Verification Experience of the International Atomic Energy Agency*, CENTER FOR NATIONAL SECURITIES STUDIES BRIEFING, Dec. 1991.

561 *See* NRC ALTERNATIVES, *supra* note 129, at 196-205. A variety of techniques could be employed to detoxify the chemical agents. Even if the reaction stopped far short of complete neutralization, it could be sufficient to render the resulting substance unsuitable for weapons purposes. *Id.* at 110-22; GREENPEACE ALTERNATIVES, *supra* note 425, at 81; NAS STOCKPILE COMMITTEE, *supra* note 140, at 109, 126, 159.

new laboratories in which to develop and conduct the de-weaponization reactions, possibly expensive chemical inputs, and additional secure long-term, large-volume storage facilities.[562] Handling the lethal agents more often than absolutely necessary will run additional environmental risks—some experts conclude that the "front-end processing" (the manipulation of the munitions prior to the incineration of the chemicals) is the most dangerous, unstable aspect of any dismantling operation,[563] and under this recommended type of two-step scenario, we would have to undertake that preparatory handling activity twice.[564]

Also, any chemical processing to eliminate the weapons capacity of the toxic agents would surely create a much larger overall quantity of hazardous wastes—a morass that would still be highly dangerous to the environment, exposed for an additional period of time to all manner of natural and human risk factors.[565] In addition, it should be noted that neutralization processes are applicable for disposal of the agents alone; some other mechanism (incineration or an alternative) would still be required to consume, clean, or dispose of the shell casings, explosives, dunnage, etc.[566]

But the drain-denature-and-store scenario does buy time. It allows military and civilian experts an additional opportunity to invent or adapt a more secure, environmentally-friendly destruction technique and still comply with the CWC's ten-year goal. By "punting" the problem into the future—hopefully only a short time into the future—we can create a breathing space within which to allow addi-

562 The storage costs for lethal chemical weapons (or for the still-toxic products generated by denaturing the agents) would be substantial. If long-term retention is a possibility (to provide an additional opportunity for developing more satisfactory destruction methodologies), then the storage system would likely be even more expensive than the existing $60-100 million per year programs. *See Hearing on National Defense Authorization Act for Fiscal Year 1989 and Oversight of Previously Authorized Programs Before the House Armed Services Comm.*, *supra* note 141, at 158; *Department of Defense Appropriations for 1988: Hearings before Subcomm. of House Comm. on Appropriations*, 100th Cong., 1st Sess., 1987, part 5; *Department of Defense Appropriations for 1989: Hearing before Subcomm. on the Dep't of Defense of the House Comm. on Appropriations*, *supra* note 140, at 13, 25; *Status of 1990 Bilaterals*, *supra* note 123, at 21-22; 1992 ANNUAL REPORT, *supra* note 141, at 20. In addition, as the overall destruction program is stretched out, the total costs inevitably rise. *See Government Operations Hearings*, *supra* note 306, at 125 (estimating that each year of delay in the CW destruction program costs $350 million).

563 *See* PEIS, *supra* note 130, at 2-29 to 2-34; Mikulak, *supra* note 107, at 13.

564 On the other hand, the disassembly is also by far the most *expensive* phase of CW elimination (*e.g.*, 10 to 20 times as costly as agent destruction), and under either program, that major cost would be incurred only once. Doty, *supra* note 132, at 25.

565 *Supra* note 384. The Army has undertaken to perform additional stockpile surveillance, in order to ensure that leaks or other accidents in the about-to-be-destroyed stockpile do not jeopardize the community. ARMY ALTERNATIVES, *supra* note 249, at 3-27.

566 ARMY ALTERNATIVES, *supra* note 249, at 3-9.

tional creativity and additional resources to come to bear upon the problem and still achieve the overarching disarmament objectives.[567]

C. Bend "NIMBY"

The popular public anathema against undertaking any hazardous activities in any particular locale will also have to yield—the weapons are here, and we simply have to do something about them. In the case of the CW elimination function, this means making some hard political choices that might temporarily disadvantage one community in favor of other communities and the country as a whole—not an easy policy to implement in a democracy.

The rational thing to do at this point is to reverse the Army's 1988 decision to destroy the weapons on-site at all eight installations.[568] At some of the locations, the quantity of stored CW is so small that on-site disposal is not cost-effective; removal under even very elaborate and painstaking transportation arrangements would be more sensible. At some sites, the weapons are housed so near a population center that the social dangers are too great. No matter how many precautions we build into the incineration or other elimination operations, it is still prudent to try to reduce the probability of mass human exposure.[569] At some sites, grass roots organizations have been so successful at marshalling public opposition that it would be foolhardy to persist with the projected facility—even a massive public relations campaign might be insufficient to quell the dysfunctional popular antagonism. At some sites, the process of obtaining the appropriate permits and constructing the necessary facilities is already so

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567 In fact, it might be appealing, under this logic, to "punt" the entire problem of CW destruction into the future, by not doing any incineration right now, and holding all the drained and denatured chemicals indefinitely, until a better technology is invented. I propose, however, that the United States should proceed cautiously but promptly to begin getting rid of at least some of its CW arsenal. My suggested compromise is to advance slowly with incineration and simultaneously to increase our research effort into more viable alternatives—but not to defer the problem forever. I would also sustain the operations of the current CAMDS incineration facility at Tooele, Utah (upgraded by the retrofitting of additional suitable environmental protection enhancements) to help work down the existing stockpile. *See* PEIS, *supra* note 130, at 2-37; *Department of Defense Appropriations for 1988: Hearing Before Subcomm. of House Comm. on Appropriations*, *supra* note 562, at 46 (explaining that delaying the CW destruction in order to investigate alternative technologies will raise programmatic costs); *see also* ARMY ALTERNATIVES, *supra* note 249, at 3-22 (discussing maintaining CAMDS).

568 PEIS, *supra* note 130, at 2-131. This would require a change in the existing statutory mandate, which currently forbids the Army from even studying relocation alternatives. *See supra* note 335.

569 *See* PEIS, *supra* note 130, at 3-5 to 3-22 (characterizing the population, schools, development, and other resources near the Aberdeen, Maryland facility), 3-37 to 3-55 (undertaking the same neighborhood analysis for Lexington, Kentucky); Satchell, *supra* note 4; *Government Operations Hearings*, *supra* note 306, at 143 (identifying, for each of the 8 proposed sites, how many people live within a 35 kilometer (22 mile) radius, and illustrating that Aberdeen is by far the largest, with 1.2 million people).

far behind schedule that there are real questions about the Army's ability to achieve the local goals even under the best of circumstances—a late, slow start may prove fatal to a location's ability to make a timely contribution to the CWC.[570]

Using these criteria, the three most problematic sites are Aberdeen, Maryland; Lexington, Kentucky; and Newport, Indiana. Omitting them from the roster of incineration or other elimination depots would not substantially increase the physical burden at the other locations and would appreciably ease the financial and regulatory burden upon the overall dismantling program.[571] If the project were altered in a more substantial way, such as by concentrating all the eliminations at only two or three national locations (Tooele, Utah; Anniston, Alabama; and perhaps Umatilla, Oregon or the experimental cryofracture facility at Pueblo, Colorado[572]) the balance of political and economic factors might be even more favorable, and the logistical objections, though serious, could be overcome.[573]

I also recommend that at each location where an incinerator or other elimination facility will be built, the affected community[574] should have the local option to decide whether the plant should be promptly dismantled by the Army at the conclusion of the CW campaign, or whether it should be converted for purposes of handling other types of municipal or industrial wastes in the future.[575] Some

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570 Of course, shifting more of the elimination burden to the Tooele, Utah facility would likely pose additional costs and environmental risks at that site. PEIS, *supra* note 130, at 2-103 to 2-112.

571 Those three facilities together contain only approximately 11% of the total U.S. stockpile. *Supra* text accompanying note 136.

572 An additional relevant consideration, beyond the scope of this Article, arises from the growing concept of "environmental justice." This set of concerns would question the placement of hazardous activities such as CW elimination facilities, to ensure that they were not disproportionately located in low-income, minority, or other communities that were consistently disadvantaged by government policies. *See* John H. Cushman, Jr., *Clinton to Order Pollution Policy Cleared of Bias*, N.Y. TIMES, Feb. 10, 1994, at A1; American Bar Association, Standing Comm. on Environmental Law, Comm'n on Homelessness and Poverty et al., Draft Report to the House of Delegates (June 29, 1993); Vicki Been, *What's Fairness Got to Do with It? Environmental Justice and the Siting of Locally Undesirable Land Uses*, 78 CORNELL L. REV. 1001 (1993). In fact, most of the communities where American strategic weapons are based are noticeably below the national medians in key economic indicators of income and growth. START I LEIS, *supra* note 47, at 4.75, 78.

573 *See infra* text accompanying notes 581-97 (regarding transportation routes).

574 One difficulty not addressed in this Article is what, precisely, is the relevant "community" for purposes of making this decision about dismantling or converting the CW elimination facility. It is possible that the affected town, county, region, and state citizens and officials might come to different conclusions.

575 Some experts have opined that the small size and specialized design of the JACADS-style incineration facilities make them unsuited for conversion to other waste disposal applications. A MITRE Corporation report concluded that "for many potential future uses, the demilitarization facilities are not economically viable options." Morrison, *supra* note 196, at 1104.

localities may already have adequate waste disposal mechanisms, but others are still searching for alternatives and might consider retention of a small incinerator or other facility suitable for a niche in the economy. Different communities might therefore weigh the tradeoff between environment and jobs differently, and the new technologies to be created in the coming years might alter the balance of interests, too. In this circumstance, it should be a local choice.[576]

In addition, I recommend that the JACADS facility be strengthened and kept operating. For all its imperfections, JACADS is currently the only functioning CW destruction installation available to the United States. Although its small size would make it impractical to expect it to accept any major portion of the total CW elimination operation, it can still make a contribution.[577] At least on a public relations level, the fact that the United States has already started dismantling its CW stockpile and is sustaining that function month after month, while seeking even better technologies, creates a favorable picture. And JACADS could serve a valuable training function, instructing those who would later operate comparable incinerators inside the United States and elsewhere.[578] It is even possible that JACADS could serve as a suitable location for the destruction of other countries' CW stockpiles, where the small size of a particular CWC party's national arsenal suggested that construction of a local incineration or other facility was inefficient.[579] To those who protest continued American usage of the Pacific Ocean as a remote "dumping ground" for hazardous activities,[580] we could note that the continental

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576 *Cf.* Tim Carrington, *A Kentucky County And the Army Have Nervous Relationship*, WALL ST. J., Mar. 5, 1985, at 1; Ken Wells, *Utah Town Likes Its Nerve-Gas Bombs Because They Help the Local Economy*, WALL ST. J., Mar. 5, 1985, at 22.

577 The Army did evaluate, in summary fashion, the options of relocating the entire CW inventory (or, alternatively, solely the Aberdeen, Maryland portion of the stockpile) to Johnston Atoll for destruction, but rejected that alternative due to the cumbersome logistics. PEIS, *supra* note 130, at 2-81 to 2-84.

578 The Army has constructed a Chemical Demilitarization Training Facility (CDTF) at the Aberdeen, Maryland base, to train the operators, maintenance workers, and others for actual operations at JACADS, Tooele, Utah, and elsewhere. CDTF also plays a valuable role in "trouble shooting" problems that have arisen during the destruction process. Owen Statement, *supra* note 4, at 10-11; *The CDTF—Dual Purposes*, CHEMICAL DEMILITARIZATION UPDATE, July 1993, at 2; *Department of Defense Appropriations for 1989: Hearings before Subcomm. on the Dep't of Defense of the House Comm. on Appropriations*, *supra* note 140, at 57-58.

579 Most other likely CWC parties have not yet admitted the possession of any weapons or other items subject to elimination under the treaty, but when it enters into force, some of them may well be compelled to declare hidden materiel. In some instances, the revealed quantity may justify the construction of an on-site destruction facility, but in others, it would be wasteful to insist upon erecting a dedicated facility of such short-term utility. *See* David Pugliese, *Canada Puts New Spin on Incineration*, DEF. NEWS, July 27, 1992, at 9 (explaining that Canada used a portable incinerator to destroy its small stockpile of mustard and nerve agents).

580 Ember, *supra* note 9, at 14-15. When the Army proposed moving American chemical weapons from Okinawa to Umatilla, Oregon, Congress reacted by passing Section 13 of Pub. L.

United States territory, too, will house at least one or two larger-scale destruction facilities, sharing the burdens and risks of the overall program.

All of this requires, of course, that chemical weapons will be transported from one secure military reservation to another for disassembly and destruction.[581] Previous studies have identified this type of long-distance movement as one of the most hazardous aspects of any dismantling program,[582] and the Army will have to develop techniques for avoiding or mitigating a myriad of dangers, such as vehicle accidents, weather mishaps, and terrorist attacks.[583] Preliminary indications are that rail transport should be used, rather than truck (because too many trips would be required[584]) or air (because of the danger of a catastrophic accident[585]), and that the routing should be arranged to avoid major population centers to the extent feasible.[586] Obviously, extra precautions, such as providing military security escorts,[587] selecting the track routes that are in the best physical condition,[588] and rerouting other traffic, should be implemented. Special packaging for the agents and munitions should be developed, and it

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No. 91-672, 50 U.S.C.A. 1512, prohibiting those munitions from entering the continental United States. The weapons were then shipped to Johnston Atoll. RECORD OF DECISION, *supra* note 145, at 4 n.2; GREENPEACE 9/90 REVIEW, *supra* note 145, at 12-15; *Disposal of Chemical Munitions Hearings*, *supra* note 141, at 19. Johnston Atoll itself now requires extensive cleanup; in 1985, the U.S. Fish and Wildlife Service declared it to be one of the 10 areas most in need of environmental resuscitation in the United States and its territories. Davis, *supra* note 196, at 7.

581 It would be possible, at least on a limited scale, to move the destruction equipment to the CW stockpile, rather than vice versa, and the United States has developed a small capacity portable Drill and Transfer System (DATS) to destroy chemical munitions on site. DATS, however, is expensive and can handle only a very limited quantity; it is most suitable for disposing of small caches of newly-discovered abandoned CW munitions that are too fragile to transport to a secure storage facility. Rouse, *supra* note 9, at 42.

582 *See* PEIS, *supra* note 130, at 2-50 to 2-73, 2-87.

583 Rouse, *supra* note 9, at 76-77. Transporting the CW stockpile from a current base through other communities to a destruction center will be politically unpopular with the states and localities being transited. The Army will have to deal, as well as it can, with that community disquiet, too. *Id.* at 60, 79.

584 The Army projects that relocation of the entire CW stockpile to a single national destruction center at Tooele, Utah would require 70-75 rail shipments; if two regional destruction facilities were employed (at Tooele and at Anniston, Alabama), some 50 to 55 rail shipments would be necessary. PEIS, *supra* note 130, at 2-51, 2-63. If truck transportation were used, some 820 truck convoys (or 610 for the 2-site alternative) would be required. *Id.* at 2-87.

585 *Id.* at 2.65-73, supp. G-19 (studying proposed relocation of CW inventories from low-quantity sites at Aberdeen, Maryland and Lexington, Kentucky to Tooele, Utah). Some 1400 flights would be necessary solely to remove the CW stockpile from the Lexington, Kentucky base. Morrison, *supra* note 196, at 1104. The Army also briefly evaluated the possibility of ocean shipment of the Aberdeen stockpile to Johnston Atoll. PEIS, *supra* note 130, supp. S.

586 PEIS, *supra* note 130, at 3-119, supp. G.18.

587 *Id.* supp. G.21.

588 *Id.* at 2-51.

might be useful to chill the chemicals, rendering them less volatile during transportation.[589]

While no guaranties can be given that the movement of the munitions will be incident free,[590] there are some precedents that provide a basis for optimism. Most directly, the Army was spectacularly successful in the "Retrograde Project,"[591] withdrawing the United States CW stockpile from Germany in 1990 and conveying it several thousand miles via truck, rail, and ship to Johnston Island.[592] Similarly, the chemical weapons now housed at the eight continental United States locations were, for the most part, originally transported to those sites by rail.[593] More recently (albeit, on a very small scale), the Army has periodically been compelled to convey old, abandoned CW munitions and materiel from a suddenly-discovered burial pit to a more secure location for storage or destruction. The task of shipping a small quantity of unstable items is surely not the same as the task of moving a much larger quantity of more standardized weaponry, but perhaps some useful lessons have already been learned.[594] Additionally, it should be noted that the United States government regularly moves components for many types of weapons—including nuclear weap-

589 Rouse, *supra* note 9, at 71; PEIS, *supra* note 130, at 2-50 to 2-65, supp. G.9 (describing special freight cars, handling and packing procedures, and support crews that would be used to transport CW via rail). *See also* GENERAL ACCOUNTING OFFICE, *supra* note 145 (describing inadequacy of Army's vehicles for conveying CW stockpile from Germany to Johnston Atoll and stating that extensive repairs were necessary before arsenal could be transported consistently with international safety standards). Chilling the CW will thicken mustard agent, making it less problematic in the event of an accident or leak, but will have little effect on nerve agents.

590 *See* Don Phillips, *Recent Bridge Accidents Seen as "Wake-Up Call" on Safety*, WASH. POST, Oct. 10, 1993, at A3 (reporting on numerous occasions when a river barge or other vessel has rammed into a bridge (often, a railroad bridge), damaging it and causing a subsequent accident. There is little systematic monitoring of such incidents, and even if there were, in one recent Louisiana incident, a barge struck the bridge only minutes before Amtrak's passenger liner attempted to go over it; only a very swift, sophisticated sensor system could have avoided the fatal accident).

591 The program withdrawing the U.S. CW stockpile from Germany was also known as "Operation Lindworm." Marc Fisher, *U.S. Starts Pullout of Chemical Arms*, WASH. POST, July 27, 1990, at A1.

592 *Supra* text accompanying notes 144-45 (discussing relocation of CW from Germany to Johnston).

593 PEIS, *supra* note 130, at 2-87, supp. G. It should be noted that these shipments occurred only gradually, over a period of years, and at a time when the munitions were newer and presumably in better condition to withstand the rigors of repeated handling and transportation. Moreover, the applicable state and federal environmental protection laws were much less stringent when those shipments occurred. For the most part, these shipments were incident-free, although some accidents, involving agent leaks or spills and personnel injuries, did occur. *Id.* at G-3. *See also* Rouse, *supra* note 9, at 70-81; *Disposal of Chemical Munitions Hearings*, *supra* note 141, at 63-72.

594 *See* NON-STOCKPILE REPORT, *supra* note 147, at 8.1-8.3; PEIS, *supra* note 130, at 4-148 to 4-168 (discussing mitigation of accidents that might occur during shipment of CW).

ons—around the continental United States via rail and truck.[595] All manner of other hazardous military and civilian products, including bombs, rockets, hazardous wastes, and other inevitable products of a complex society, have also been routinely shipped; CW will not be the first dangerous cargoes to venture onto the American public roadways.[596]

As noted above, I recommend that in this sensitive, rare situation, the balance between environmentalism and security be struck by: (1) requiring the Army to adhere to the substance of all reasonable federal and state standards, but (2) releasing the Army from full compliance with the administrative interstices of the system of local permits and notifications. Thus, here, too, the Army should be relieved of the requirements to obtain permission from the states and municipalities that will be traversed in moving the chemical weapons, and I would deny the affected governors and mayors the opportunity to frustrate the dismantling effort by forcing a rerouting.[597] In return, the Army should be mandated to adhere to the highest state-of-the-art standards for safe transportation, even where that involves spending more money for additional layers of redundant security.

D. Bend the Budget

As suggested, there are several points in the CW elimination effort where something has to "give." In order to preserve as much as possible our commitment to the CWC and simultaneously respect as much as possible the corpus of environmental protection standards, we have to be prepared to purchase multiple levels of protection, even at a substantial price. My recommendations will initially reduce some of the Army's projected expenses—billions will be saved by foregoing the construction of six or seven of the planned incinerators—but those economies are likely to be swamped by offsetting increases in other areas.

One manifestation of the willingness to bend the budget should be a commitment to accelerated research and development of alternative CW destruction technologies. Simultaneous pursuit of diverse,

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595 INF TREATY ENVIRONMENTAL ASSESSMENT, *supra* note 186, apps. B, C; START I LEIS, *supra* note 47, at 2.33, 4.63-64; Kevin Cameron, *Taking Apart the Bomb*, POPULAR SCI., Apr. 1993, at 64, 66; Gerald Jacob & Andrew Kirby, *On the Road to Ruin: The Transport of Military Cargoes*, *in* HIDDEN DANGERS: ENVIRONMENTAL CONSEQUENCES OF PREPARING FOR WAR 71 (Anne H. Ehrlich & John W. Birks eds., 1990).

596 *Cf.* Keith Schneider, *Bill Would Exempt Navy From Environment Law*, N.Y. TIMES, July 22, 1993, at A19 (discussing that Navy stores spent nuclear fuel from 114 submarines and fifteen other ocean-going vessels at military reservation in Idaho); Phyllis W. Jordan, *Deal in Works to Get Rid of Nuclear Waste*, NORFOLK VIRGINIAN-PILOT, July 28, 1993, at D1 (describing that nuclear waste materials are stored on barges in James River).

597 *Supra* text accompanying notes 334-37 (discussing Hazardous Materials Transportation Act).

complex methodologies will not be cheap, especially when large-scale, long-duration testing will be needed to validate and refine any promising concepts. On the other hand, to some extent, these expenditures should be seen as seed money for development of an important new civilian industry: safe, clean disposal of wastes is an unresolved, growing imperative in the United States and elsewhere,[598] and it is possible that some equipment, facilities, and technologies developed for the CW destruction mission could be spun off to other, wide-spread commercial applications. A CW-related technology, especially where it holds the potential for that type of remote employment, should be vigorously pursued.[599]

The goals of the research effort should remain suitably modest. We are unlikely to find any "magic bullet" solution that solves all our arms control and ecological problems simultaneously and efficiently. No technology will satisfy everyone, and even if the Army were to announce tomorrow that it was suddenly shifting from incineration to "molten metals" or "bioremediation" or some other promising candidate, instant opposition would surely arise, with critics identifying the shortcomings, along some important parameters, of the new favorite.

For this reason, the Army should remain open to the possibility that different technologies will prove most suitable to different combinations of munitions, agents, and locations. While the "one size fits all" approach of the baseline incinerator technology might seem most efficient, there are, in fact, substantial variances among the elements to be destroyed, and those variances might lend themselves to different optimal technologies and equipment.[600] At Pueblo, Colorado, for example, the entire arsenal consists of munitions and containers of mustard gas.[601] It seems intuitive that a specialized elimination technology, tailor-made to the circumstances of this particular location, might be optimally able to exploit those limited characteristics. Simi-

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598 *See* Tom Kenworthy, *Incinerators May Face Tougher EPA Standards*, WASH. POST, May 19, 1993, at A3; Editorial, *Managing the Waste Stream*, N.Y. TIMES, May 22, 1993, at 18; COSTNER & THORNTON, *supra* note 307, at 7, 44-50 (stating that U.S. industry produces over one trillion pounds of hazardous wastes per year, with the total increasing at a rate of 5.5% per year); POTENTIAL USES, *supra* note 58, at 31-32 ("New capabilities are urgently needed for the treatment of both the hazardous and, in the case of radioisotopic waste, the mixed (radioactive and hazardous) wastes that are produced.").

599 Other researchers, outside the chemical weapons area, are also vigorously pursuing alternative technologies for the treatment of hazardous wastes, and there may eventually be some symbiosis between the different types of efforts. OTA ALTERNATIVES, *supra* note 140, at 9-10; *Army Seeks Funds to Study Alternative Disposal Methods*, CHEMICAL DEMILITARIZATION UPDATE, Apr. 1994, at 6.

600 *See* PEIS, *supra* note 130, at 2-78 to 2-80 (explaining that the Army does evaluate some site-unique options for disposal of materiel at the eight locations). *But see* ARMY ALTERNATIVES, *supra* note 249, at 6-6 (rejecting the notion that different disposal technologies could be employed at different CW storage sites).

601 PEIS, *supra* note 130, at 2-8.

larly, the existing inventory of binary weapons might be sufficiently different from the unitary stockpile that a dedicated destruction technique and facility would be appropriate. In the same vein, the task of eliminating the abandoned non-stockpile items will be extremely varied, having to cope with small volumes, but a great diversity of types of inputs; a specialized facility might need to be developed to incorporate the necessary adaptability.

In another recommendation with substantial budgetary implications, I suggest that the Army undertake a very vigorous campaign to attempt to locate all the old and abandoned chemical weapons and associated toxic materials that it possibly can, and that the United States undertake to destroy those that can be safely retrieved, even where we are not legally obligated to do so under the CWC.[602] Whether abandoned on alien territory, dumped under the high seas, or deposited in American soil, these archaic weapons pose an acute long-term danger, and the United States has the greatest capacity to rid the world of the hazard.[603] Moreover, zealously seeking out and destroying these devices, even when we are not legally compelled to be quite so aggressive, is precisely the type of symbolic eleemosynary activity that the world's sole remaining superpower should undertake, vigorously confirming that the era of chemical weapons is finally finished on this planet, and we are determined to root out the last vestiges of that loathsome legacy of an earlier era.

One final budgetary consideration deserves mention. The CWC contains provisions—but a tone of profound mistrust and apprehension—on the subject of converting CW-related chemicals and production facilities to civilian applications.[604] These worries are legitimate, and the treaty's verification measures designed to guard against covert reconversion back to military applications should be vigorously enforced. But we cannot afford to overlook the possibilities for bending existing resources to better applications. Where former CW-related facilities can be cleaned up and reliably safeguarded, the owner should be allowed to re-tool for pesticides, plastics, or other production. In contrast to the usual configuration of American CW facilities, for example, the chemical weapons production units inside Russia are not

602 The CWC obligates each party to destroy chemical weapons that it abandoned on the territory of another party. CWC, *supra* note 1, Verification Annex, Part IV (B).C.

603 The difficulty and expense of retrieving and destroying abandoned chemical weapons should not be underestimated. In some circumstances, the fragility of the munitions and the circumstances of their undersea or underground location might suggest that the safest course of action is simply to leave them undisturbed. But where they can be recovered—or at least where they can be stabilized, wrapped in new layers of protective coating, and further insulated from contact with the environment—the United States ought to assume a leading role in promoting that safety. *See* Phillip Knightley, *Dumps of Death*, SUNDAY TIMES (LONDON) MAG., Apr. 5, 1992, at 26, 30; Krohn, *supra* note 376, at 93.

604 CWC, *supra* note 1, Verification Annex, Part V.D.

usually stand-alone, isolated installations, but are well-integrated into the large civilian chemical complexes, so conversion of those structures is even more plausible and worth exploring. Similarly, the "swords" of CW could themselves be beaten into "plowshares," as the possibility exists, for example, of extracting commercially valuable arsenic (in the form of gallium arsenide, useful in the manufacture of microchips) from reprocessed blister agent Lewisite.[605] Perhaps in modern industrialized societies, it will usually be preferable to construct such facilities and materials from scratch, rather than to recycle existing items, but other countries' economies might balance the costs and benefits differently and should be encouraged to do so.[606]

E. Bend Our Diplomacy

Widespread adherence and effective global implementation are essential for the success of the CWC.[607] If the treaty were unable to build substantial momentum toward universal membership, and if it were unsuccessful at quelling fears about spotty enforcement, then no one could have confidence that the world had been reliably freed from the specter of poison gas. And in all these enterprises, the United States—the key negotiator in drafting the text of the treaty and the dominant military power on Earth—will have to play a leading role.[608]

Regarding Russia, the United States should act promptly to enhance the prospects for Moscow's immediate participation in the CWC regime. Urgently, this means providing assistance in achieving the dismantling of Russia's stockpile of CW weapons and materials—

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605 Leonov & Sheluchenko, *supra* note 514, at 99; David C. Morrison, *Chemical Arms Aren't Easy to Destroy*, 24 NAT'L J. 2068 (1992); Amy E. Smithson, *Chemicals Destruction: The Work Begins*, BULL. ATOM. SCIENTISTS, Apr. 1993, at 38, 42. Russian CW authorities have expressed a particular interest in this type of recycling, concluding that arsenic (even if it threatens to become a glut on the Western market) is too valuable for them to throw away. Leopold, *supra* note 504, at 6. Similarly, some Russian experts have suggested that nerve gas components may also be subject to recycling for use in phosphate fertilizers. Doty, *supra* note 132, at 28; Morrison, *supra*; David Dickson, *Fertile Ground for Arms Control*, 243 SCIENCE 1001 (1989). *But see* GREENPEACE ALTERNATIVES, *supra* note 425, at 90 (discounting the practicality of recycling nerve agents). *See also* R.E. Roberts, *Verification Problems—Monitoring of Conversion and Destruction of Chemical-Warfare Agent Plant*, *in* STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE, CHEMICAL WEAPONS: DESTRUCTION AND CONVERSION 129 (1980).

606 Recycling of chemical agents or related facilities may also result in changes in the governing environmental protection laws. Certain parts of RCRA, for example, are generally applicable only to scrap or waste products, not to items that are being recycled or converted for reuse. 40 C.F.R. §§ 261.2 (a), (d), (e) (1993); BONINE & MCGARITY, *supra* note 189, at 733-34.

607 Some critics have doubted the CWC's ability to attract universal adherence, and the likelihood of problematic "holdout" countries will be a major challenge to the integrity of the regime. Smithson, *supra* note 4, at 38; Jones & Wagner, *supra* note 69, at 585-86.

608 *See* Max L. Friedersdorf, *Chemical Weapons Disposal Program*, DEP'T ST. BULL., June 1989, at 19 (discussing how the U.S. representative to the Conference on Disarmament described American CW destruction efforts and urged others to follow that lead).

the world's largest such arsenal.[609] Both financial and technological support will be required, and it will be a major undertaking simply to identify the types of assistance that can be put to most effective, prompt use. The United States has to date wedged open its pocketbook only a bit, and the funds allocated to Russian disarmament and weapons security have so far been disproportionately earmarked for nuclear, rather than chemical, adaptations. Creativity, as well as dollars, will be required to surmount the challenges of Russian CW dismantling. In the current political climate, Moscow can be no less attentive to ecological and other concerns than is Washington, D.C.

At the same time, the United States should attempt to gain, as well as to share, technology. Soviet engineers and weapons designers had achieved a substantial measure of success, and certainly played a very active role in building their country's security structure. Is it not plausible that those same organizations, laboratories, and individuals can now be bent to the task of dismantling? In the post-cold war era of "new thinking," both countries should recognize a shared interest in developing and implementing technologies that can perform the CW eliminations as rapidly, safely, cleanly, and inexpensively as possible, and both can contribute to the joint enterprise.

Regarding other countries, the United States should bend every diplomatic effort to promote widespread acceptance of the CWC obligations. In most instances, this should prove an easy task: the world strongly supports the notion of CW elimination,[610] it is a familiar concept that has been on the international disarmament agenda for decades, and the recent surge in multilateral affiliations with other arms control treaties[611] augurs success for global acclamation of the CWC, too. But there will likely be holdouts, renegades, and at least tempo-

609 The United States has recently undertaken a program of hosting Russian technical and political visitors at American CW-related sites and training Russian interns in the operation of the destruction equipment. 1992 ANNUAL REPORT, *supra* note 141, at 5; *Russian Delegation Tours Demil Plants*, CHEMICAL DEMILITARIZATION UPDATE, Apr. 1993, at 3; *Intern Familiarization Program Gears Up*, CHEMICAL DEMILITARIZATION UPDATE, Jan. 1993, at 3; *Russian Interns Start Training at USACMDA*, CHEMICAL DEMILITARIZATION UPDATE, Nov. 1993, at 3.

610 *Supra* note 84 (describing the 1989 Paris conference); Jill Smolowe, *The Search for a Poison Antidote*, TIME, Jan. 16, 1989, at 22; Edward Cody, *149 Nations Vow to Shun Poison Gas*, WASH. POST, Jan. 12, 1989, at A1; Jones & Wagner, *supra* note 69, at 601-04.

611 For example, the 1968 Nuclear Non-Proliferation Treaty, NPT, *supra* note 14, in some respects the nuclear counterpart of the CWC, has benefitted from a recent surge in international interest and participation, now bringing 157 parties within its regime. If that dramatic—but still not quite universal—growth in membership can be replicated for the CWC, the chemical accord will be very successful, indeed. *See* Thomas Graham, Jr., Some Personal Observations on Proliferation in the 1990s, Address at the AFCEA Seminar on Mobilizing the U.S. Counterproliferation Effort (May 24-25, 1993).

rary resisters.[612] The United States diplomatic corps should go to work on them vigorously, attempting to secure the necessary sixty-five adherences by July 1994, enabling the CWC to enter into force at the earliest possible moment, in January 1995.[613] Only if the United States and Russia have their respective houses in order—only if they have in hand realistic plans for timely elimination of their chemical arms—can this diplomacy be entirely successful.

Prompt creation of the CWC's administrative infrastructure and robust enforcement of its monitoring obligations are also essential. The United States, working first through the treaty's Preparatory Committee and provisional technical secretariat,[614] and later through the permanent structures of the full Organization, must ensure that the verification functions are vigilantly exercised, guarding against any covert "breakout" capabilities. A great deal of previously-secret information about countries' CW programs may soon be erupting,[615] and the United States should take the lead in ensuring that even the most deeply entrenched, darkly hidden CW enterprises and capabilities are rooted out.[616]

Of course, in all these diplomatic activities, the United States need not shoulder the entire burden. The CWC—by establishing a large, permanent, expert corps of inspectors and other international civil servants and treaty-enforcers—is a leading illustration of the type of "assertive multilateralism"[617] that the Clinton Administration has been touting. All countries have a profound stake in the success of the CWC, and all of them—led, inevitably, by the United States—should press it forward.[618]

VIII. Conclusion

This excursion into the intersecting worlds of disarmament and environmentalism has established, once again, that politics makes for

612 *See* Smithson Handbook, *supra* note 92, at 44 (identifying countries that have not yet signed the CWC, including Angola, Egypt, Iraq, Jordan, Libya, North Korea, Somalia, Syria, and Taiwan).

613 *See supra* text accompanying note 1 (discussing procedures for entry into force of CWC).

614 *Supra* text accompanying notes 97-98 (discussing the Preparatory Committee).

615 *Supra* text accompanying notes 112-13 (indicating that the CWC will soon require countries to make revealing declarations). Under the confidentiality provisions of the CWC, certain industrial declarations and reports are entitled to confidentiality, to guard against the unwarranted release of confidential business information, but national declarations about the history of CW production and possession are not restricted in that way.

616 *See supra* text accompanying note 501 (revealing that Russia's secret CW program continued even after the leadership said it had been halted).

617 Elaine Sciolino, *U.S. Narrows Terms for Its Peacekeepers*, N.Y. Times, Sept. 23, 1993, at A8 (quoting U.S. ambassador to the United Nations, Madeleine K. Albright).

618 *See* Badelt et al., *supra* note 518 (regarding Germany's special role in ridding the world of CW).

strange—and rotating—bedfellows. Not long ago, arms controllers and environmentalists viewed each other as presumptive allies across a wide range of social issues. From their joint opposition to the deployment of the MX missile,[619] to their concerted support for the negotiation of a comprehensive nuclear test ban treaty,[620] the two factions have regularly been stalwart contributors to the same peace coalitions.

Regarding chemical weapons, however, the erstwhile alliance is torn asunder—as one participant expressed it, "my knee jerks both ways" on this issue. Although both groups are clear in their support for the CWC, and both are eager to rid the world of the scourge of chemical warfare, they do adopt starkly different attitudes on the question of CW elimination methodologies.[621] It seems to matter a great deal whether an individual approaches the CW dismantling question principally from the perspective of an arms controller, seeing the network of domestic environmental law as yet another, largely irrelevant, hurdle that the CWC must surmount in order to accomplish its security objectives, or from the vantage point of an environmentalist, viewing the CWC as yet another of the diverse threats to ecological stability, so many of which speciously claim to represent urgent national priorities.[622] Both perspectives, in fact, incorporate more than a grain of truth, as both social policies are to be respected and advanced. But what should be done when their fundamental, legitimate concerns move into conflict?

Moreover, dismantling the CW stockpile and the non-stockpile materiel will be frightfully expensive. Disposal of this and the other detritus of the cold war is a costly proposition, and doing a thorough, environmentally protective, and safe job of it will inevitably eat up a major segment of the anticipated "peace dividend" from the establish-

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619 The MX (missile experimental) was a new intercontinental-range ballistic missile for which the executive branch struggled through the late 1970s and early 1980s to develop a suitable (and politically acceptable) basing mode. Arms control groups criticized the MX as destabilizing and provocative; environmentalists argued that it would occupy immense areas of fragile Southwestern land and consume huge quantities of scarce water and other resources. *See generally* Friends of the Earth v. Weinberger, 562 F. Supp. 265 (D.D.C. 1983), *appeal dismissed*, 725 F.2d 125 (D.C. Cir. 1984); Romer v. Carlucci, 847 F.2d 445 (8th Cir. 1988).

620 *See* PHILIP G. SCHRAG, GLOBAL ACTION: NUCLEAR TEST BAN DIPLOMACY AT THE END OF THE COLD WAR 46, 144, 146 (1992).

621 John Isaacs, *Arms Controllers v. Greenpeace*, BULL. ATOM. SCIENTISTS, Nov. 1990, at 4. *Cf.* DISMANTLING THE BOMB, *supra* note 507, at 45 (discussing the comparable clash of interests regarding nuclear weapons disposal).

622 Davis, *supra* note 196 (quoting environmental activists in the context of CW elimination, "We don't think environmental destruction is a requisite for peace," and "Disarmament is a very good idea. We'd never deny that. But it has to be done in an environmentally acceptable manner.").

ment of a new world order.[623] The final irony of the world's centuries-old fascination with chemical weapons may be the fact that finally getting rid of these things will cost so much more than building, maintaining, and storing them ever did.[624]

This situation presents what might be a classic formula for making a poor social decision, as we have: (1) a clash of scientific experts, who disagree profoundly on the maturity and risks of incineration technology; (2) a dearth of tested data regarding the feasibility of alternative technologies; (3) powerful, mobilized, and indignant social groups pressing their separate agendas on both sides of the political spectrum; (4) not much time available to make a decision due to the lengthy lead times associated with testing, licensing, and constructing any demolition facilities; (5) international pressures to set a viable precedent for other countries to follow; and (6) elements of law (treaty and statute) weighing on both sides of the scale. Where uncertainty, urgency, and importance lurk together, there may be little elbow room for compromise or wisdom.

The difficulty in reconciling arms control and environmentalism is magnified by the fact that there is no reliably safe course of action. Instead, all our policy options—even stagnant preservation of the status quo—involve some degree of risk to public health and security. I cannot assert that my recommendations are any safer than the Army's current disposal program; it involves, rather, the substitution of one set of imperfectly-known risks for another. Each of these dangers is difficult to identify and quantify on its own; when we have to trade off incommensurable hazards such as weapons proliferation vs. toxic waste, the calculation becomes ineffably complex.[625]

Public choice theory, in fact, would suggest profound, inherent constraints upon a society's ability to make intelligent decisions even under more favorable circumstances.[626] The limitations upon any group's ability to wrap itself around complex, multi-dimensional options and to select among them in a determined, defensible fashion, are substantial. Fundamental legal tasks, such as passing a law or construing a statute, are surrounded by the indeterminacy of collabora-

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623 Warren Strobel, *Cost of Destroying Arms Leaves Old Pacts Ignored*, WASH. TIMES, July 29, 1991, at A1; Rick Wartzman, *Weapons Makers Unite to Dismantle Nuclear Arsenals*, WALL ST. J., Jan. 31, 1992, at A3.

624 *See* POTENTIAL USES, *supra* note 58, at 15 (costs of reversing the global environmental crisis might amount to $774 billion over the next 10 years); Eugene J. Carroll, Jr., *Cleanups Should Begin At Home*, WASH. POST, June 16, 1992, at 3B (discussing that the 3700 nuclear hazardous waste sites in the United States will cost $150-200 billion to clean up).

625 *See* FINDLEY & FARBER, *supra* note 197, at 167-89; START I LEIS, *supra* note 47, at 2.32-33; Ellen J. Case, *The Public's Role in Scientific Risk Assessment*, 5 GEO. INT'L ENVTL. L. REV. 479 (1993); M. Granger Morgan, *Risk Analysis and Management*, SCI. AM., July 1993, at 32.

626 DANIEL A. FARBER & PHILIP P. FRICKEY, LAW AND PUBLIC CHOICE: A CRITICAL INTRODUCTION (1991).

tion and sub-group politicking. These dilemmas multiply when the values at stake—environmentalism and disarmament—have the character of "public goods," the enjoyment of which is available even to noncooperating "free riders."[627] As pluralism spreads around the world, the newly emerging democracies may suddenly confront the disabilities of undisciplined decisionmaking; an authoritarian government might be able to enforce a one-sided choice between arms control and environmentalism via strong central control, but the United States, and increasing legions of other putative CWC parties, cannot.

The Chemical Weapons Convention, and the resulting social dilemmas surrounding the complete and permanent elimination of these horrid armaments, therefore pose a dramatic and irresistible problem for the United States and other countries. The best hope at this time is for some sort of just-barely-tolerable compromise, cobbling together the bare minimum conditions that arms controllers, environmentalists, budgeteers, and others would insist upon, in order to fashion a package that all elements might be able to live with. And with that technique, perhaps the *implementation* of the CWC may, in fact, be able to mimic at least a portion of the stunning, long-awaited successes of the treaty's *negotiation.*

627 BERNAUER, *supra* note 69, at 209-11.