

**First Annual Report
to
The President and The Congress
of the**

**ADVISORY PANEL TO ASSESS
DOMESTIC RESPONSE CAPABILITIES
FOR TERRORISM INVOLVING
WEAPONS OF MASS DESTRUCTION**

I. ASSESSING THE THREAT

15 December 1999

Publication Notice

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PREFACE

Report Structure and Rationale

Many government officials and concerned citizens believe that “it is not a question of *if*, but *when*” an incident will occur that involves the use by a terrorist of a chemical, biological, radiological, and nuclear (CBRN) weapon—a so-called “weapon of mass destruction” (WMD)—that is designed, intended, or has the capability to cause “mass destruction” or “mass casualties.” In recent years, some have depicted terrorist incidents as causing catastrophic loss of life and extensive structural and environmental damage as not only possible but probable. Such depictions do not accurately portray the full range of terrorist threats. While such a devastating event is within the realm of possibility, the first annual report to the President and the Congress of the Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction (the “Panel”) delves into a broad range of issues, chronicles actual terrorist attacks, considers potential terrorist incidents, and attempts to answer the fundamental questions of “Who?,” “What?,” and “Why?;” and accordingly begins to consider what must be done to prepare for the “When.”

Chapter Two of the report chronicles CBRN schemes, attempts, and actual attacks by terrorists and the known or assumed motives or intentions behind them, with a thorough analysis of such incidents, in an attempt to provide insight into the current discussion of potential threats and possible consequences. That portion of the report focuses as well on the potential for incidents involving CBRN devices that are more probable, and will have less than mass-casualty consequences; but which could, nevertheless, have devastating effects—economically, politically, or psychologically. Chapter Two also provides an overview and analysis of the principal issues involving the threat posed to the United States by terrorist use of CBRN weapons, the identification of the range of potential adversaries and perpetrators who might employ such weapons, and the dimensions of the threat given the individual types of weapons and their technical and material requirements. In turn, Chapter Two explores in some detail the difficulties inherent in producing any CBRN weapon that has truly mass-destructive or mass-casualty capabilities.

Chapter Three of the report focuses on an analysis of the circumstances and facts—as they have come to light—surrounding the 1995 attack in the Tokyo subway system by the fanatic, apocalyptic religious cult, the Aum Shinrikyo. That seminal event—the first time a nonstate group had used a chemical weapon against civilians—is a benchmark against which all potential terrorists’ attacks involving chemical or biological weapons will likely be measured in the near term. The analysis delves into all of the implications of that most ambitious undertaking—including

extensive research and development efforts spanning chemical, biological, and even nuclear weapons aspirations—but one that ultimately fell far short of its intended purposes. Specifically, it examines the implications of the group’s attempts in the CBRN arena and assesses the inferences and lessons that can be drawn from Aum’s activities, in the context of deliberations about and U.S. domestic preparedness for potential acts of CBRN terrorism.

The report describes, in Chapter Four, some preliminary conclusions and hypotheses reached by the Panel, based on a thorough analysis and discussion of the threat and other information presented to the Panel, and the relevance of that analysis and information to the broader issues of preparedness, planning, training, and coordination at the Federal, state and local levels. The Panel makes several initial broad policy recommendations, as a result of its first two official meetings and analyses and information provided to it, on such topics as the need for a national strategy to address domestic response to terrorism; a better understanding by both policymakers and responders of the threats; the complexity of the current Federal structure; inherent problems associated with the manner in which Congress and the Executive Branch have addressed the issue; the need for more comprehensive and authoritative threat assessments and related analyses; the requirements for better information sharing among governmental entities at all levels; the need for clear, concise, and consistent definitions and terms of reference; the necessity for standards in planning and training, for the compatibility and interoperability of equipment among responders, and related research, development, test, and evaluation issues; and the issue of who or what entity is “in charge” if an event does occur.

The report concludes with an overview of the activities of the Panel being undertaken in the current fiscal year, which include a comprehensive review of related Federal programs; a survey of local and state emergency management and response officials; interviews with a number of related Federal, state, and local officials; case studies of jurisdictions where such events have occurred or been threatened; and future meetings of the Panel.

Working Definitions Used in the Report

For reasons of clarity and precision, the report uses the term CBRN (chemical, biological, radiological, and nuclear) terrorism, in preference to the more commonly used, yet potentially misleading term, “weapons of mass destruction” or WMD.¹ It is intended that the term CBRN, within the construct of this report, include potential terrorist attacks on industrial chemical facilities that do not necessarily involve an

¹The NLD (Nunn-Lugar-Domenici) Act defines a “weapon of mass destruction” as “any weapon or device that is intended, or has the capability, to cause death or serious bodily injury to a significant number of people through the release, dissemination, or impact of—(A) toxic or poisonous chemicals or their precursors; (B) a disease organism; or (C) radiation or radioactivity.”

actual CBRN weapon, where the purpose is to engineer the hazardous release of a toxic gas or gases as a means to kill and injure surrounding populations.

Nevertheless, with the exception of nuclear weapons, none of the unconventional weapons by itself is, in fact, capable of wreaking mass destruction, at least not in structural terms. Indeed, the terminology “weapons of mass casualties” may be a more accurate depiction of the potentially lethal power that could be unleashed by chemical, biological, or nonexplosive radiological weapons. The distinction is more than rhetorical and is critical to understanding the vastly different levels of technological skills and capabilities, weapons expertise, production requirements, and dissemination or delivery methods needed to undertake an effective attack using either chemical or biological weapons in particular.²

The definition of terrorism employed in this report, and used as the framework for the Panel’s deliberations to date,³ is essentially one used by RAND for more than a quarter of a century. Terrorism is violence, or the threat of violence, calculated to create an atmosphere of fear and alarm, through acts designed to coerce others into actions they otherwise would not undertake or into refraining from actions that they desired to take. All terrorist acts are crimes. Many would also be violations of the rules of war, if a state of war existed. This violence or threat of violence is generally directed against civilian targets. The motives of all terrorists are political, and terrorist actions are generally carried out in a way that will achieve maximum publicity. The perpetrators are usually members of an organized group, although increasingly lone actors or individuals who may have separated from a group can have both the motivation and potentially the capability to perpetrate a terrorist attack. Unlike other criminals, terrorists often claim credit for their acts. Finally, terrorist acts are intended to produce effects beyond the immediate physical damage that they cause.⁴

For the purposes of this report, a terrorist group is defined as a collection of individuals belonging to an autonomous nonstate or subnational revolutionary or antigovernment movement who are dedicated to the use of violence to achieve their objectives. Such an entity is seen as having at least some structure and command

²Although biological agents “are often described as ‘weapons of mass destruction,’ it does not follow that the ability to inflict mass casualties is an intrinsic property. Key variables in determining the impact of a [biological] terrorist attack are the quantity of agent employed and the means of dissemination.” See Jonathan B. Tucker and Amy Sands, “An Unlikely Threat,” *Bulletin of the Atomic Scientists*, Vol. 55, No. 4 (July/August 1999), which can be accessed at: <http://www.bullatomsci.org/issues/1999/ja99/ja99tucker.html>

³Several Federal agencies (e.g., the FBI and the Department of Defense) have their own definition of terrorism.

⁴Karen Gardela and Bruce Hoffman, *The RAND Chronology of International Terrorism for 1986* (Santa Monica, Calif.: RAND, R-3890-RC, 1990), p. 1 (with slight modifications), which in turn is taken from Brian Michael Jenkins, *International Terrorism: A New Kind of Warfare* (Santa Monica, Calif.: RAND, P-5261, 1974).

and control apparatus that, no matter how loose or flexible, nonetheless provides an overall organizational framework and general strategic direction.⁵ This definition is meant to include contemporary religion-motivated and apocalyptic groups, such as the Japanese Aum Shinrikyo cult and other movements that seek theological justification or divine sanction for their acts of violence. Although religion, often coupled with profound millennialist convictions, is of course the predominant motivation of such groups, their aims and objectives inherently involve a quest for power—in this specific context, power used to defend the faith, to defeat secular enemies, or to establish a national, or even aglobal, hegemony based on that particular sect’s (or its leaders’) self-defined theological precepts.

As the quest for power is inherent to politics, violence committed by these groups as having a political intent is, in the opinion of the Panel, terrorist in nature. In Aum’s case, for example, the group’s objective in staging the 1995 nerve gas attack was (among other aims) to lay the foundation for a revolt against the Japanese government that would result in the creation of a new regime dedicated to the service of the sect’s founder and leader, Shoko Asahara.

This report also includes a discussion of potential acts of state-sponsored terrorism employing CBRN weapons. State-sponsored terrorism is defined here as the active involvement of a foreign government in training, arming, and providing other logistical and intelligence assistance as well as sanctuary to an otherwise autonomous terrorist group for the purpose of carrying out violent acts on behalf of that government against its enemies. State-sponsored terrorism is, therefore, regarded as a form of surrogate warfare.

⁵The “Leaderless Resistance” strategy embraced today by the far-right paramilitary white supremacist movement in the United States would be included in this definition and the words “loose and flexible” have been deliberately included in the above to take into account this phenomenon. “Leaderless Resistance,” also called “phantom cell networks,” lays down a strategy of violence perpetrated by “autonomous leadership units” (e.g., terrorist cells) operating independently of one another that, it is intended, will eventually join together to create a chain reaction leading to a nationwide, white supremacist revolution. Although no clear, identifiable chain of command is evident in this structure, overall ideological direction and strategic guidance is nonetheless disseminated to individuals both actively and passively by leading white supremacist figures and key racist umbrella organizations. The “Leaderless Resistance” strategy is meant specifically to maximize security and thwart penetration and compromise from law enforcement personnel. Adherents of this strategy thus strike when the opportunity presents itself and against targets that have often been previously designated in hate literature or posted on the Internet by persons or organizations within this loose framework. The concept of “Leaderless Resistance” is described in the white supremacist adventure novel, *Hunter*, written by William Pierce (under the pseudonym Andrew MacDonald) and published by National Vanguard Books in Hillsboro, Virginia. *Hunter*, it should be noted, is the sequel to *The Turner Diaries* (which Pierce/MacDonald also wrote)—the novel described by the FBI as the “bible” of the American white supremacist movement (Quoted in Bruce Hoffman, *Terrorism in the United States and the Potential Threat to Nuclear Facilities* (Santa Monica, Calif.: RAND , R-3351-DOE, 1986), p. 42.

Excluded from this report are acts of violence committed by bona fide state agents—that is, clandestine acts of sabotage perpetrated by military, intelligence, or security officials in the service of a foreign government’s armed forces or intelligence agencies. Though the distinction between a state-sponsored act of terrorism and an act of clandestine sabotage by a state agent may seem semantic, it is a critical difference that distinguishes terrorism from warfare and from the type of violence examined in this report. Having said that, the Panel nevertheless acknowledges that capabilities must also exist for responding to such an incident, and that the foregoing distinction will, therefore, likely be lost on those who must respond to an incident involving the use of any one of a number of very lethal agents in the CBRN arsenal, regardless of the perpetrator.

Cyber Terrorism

This report does not specifically address any issues related to cyber terrorism. A strict interpretation of the Panel’s enabling legislation, and related Federal statutes that provide definitions of “weapons of mass destruction,” would indicate that the issue is not within the purview of the Panel’s mandate. Nevertheless, the Panel has concluded that the issues of cyber terrorism and the forms of terrorists activities that the Panel has considered thus far are so inter-related that the Panel cannot ignore the issue. The Panel will, therefore, consider issues related to cyber terrorism in its activities, and include in its subsequent reports conclusions and recommendations on the subject.

EXECUTIVE SUMMARY

The possibility that terrorists will use “weapons of mass destruction (WMD)”⁶ in this country to kill and injure Americans, including those responsible for protecting and saving lives, presents a genuine threat to the United States. As we stand on the threshold of the twenty-first century, the stark reality is that the face and character of terrorism are changing and that previous beliefs about the restraint on terrorist use of chemical, biological, radiological, and nuclear (CBRN) devices may be disappearing. Beyond the potential loss of life and the infliction of wanton casualties, and the structural or environmental damage that might result from such an attack, our civil liberties, our economy, and indeed our democratic ideals could also be threatened. The challenge for the United States is first to deter and, failing that, to be able to detect and interdict terrorists before they strike. Should an attack occur, we must be confident that local, state, and Federal authorities are well prepared to respond and to address the consequences of the entire spectrum of violent acts.

In recent years, efforts have clearly been focused on more preparations for such attacks. The bombings of the World Trade Center in New York and Alfred P. Murrah Federal Building in Oklahoma City, coupled with the 1995 sarin nerve gas attack in Tokyo and the U.S. embassy bombings this past summer, have heightened American concern and have already prompted an array of responses across all levels of government. At the same time, the country’s seeming inability to develop and implement a clear, comprehensive, and truly integrated national domestic preparedness strategy means that we may still remain fundamentally incapable of responding effectively to a serious terrorist attack.

The vast array of CBRN weapons conceivably available to terrorists today can be used against humans, animals, crops, the environment, and physical structures in many different ways. The complexity of these CBRN terrorist threats, and the variety of contingencies and critical responses that they suggest, requires us to ensure that preparedness efforts are carefully planned, implemented, and sustained among all potential responders, with all levels of government operating as partners. These threats, moreover, will require new ways of thinking throughout the entire spectrum of local, state, and Federal agencies. Effecting true change in the culture of a single government agency, much less achieving fundamental changes throughout and among all three, presents formidable hurdles. Nonetheless, the nature of these threats and their potential consequences demands the full commitment of officials at all levels to achieve these goals. Indeed, the need to ensure that a strategic national vision regarding domestic preparedness is in place, so that the country is better able to

⁶For reasons of clarity and precision, the report uses the term CBRN (chemical, biological, radiological, and nuclear) terrorism, in preference to the more commonly used, yet potentially misleading term, “weapons of mass destruction” or WMD.

counter these threats and to respond effectively to the challenges that they present, is among the reasons that this congressionally mandated Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction was established.

The enabling legislation⁷ directs the Panel to assess Federal efforts to enhance domestic preparedness, the progress of Federal training programs for local emergency responses, and deficiencies in Federal programs for response to terrorist incidents involving WMD; to recommend strategies for ensuring effective coordination of Federal agency response efforts and for ensuring fully effective local response capabilities for WMD terrorism incidents; and to assess appropriate state and local funding for response to WMD terrorism.⁸

To meet those objectives, the Panel determined that it must first understand the full range of potential CBRN threats from terrorists, based on the belief that without a fundamental understanding of the threats, preparedness efforts by Federal, state, and local entities could be misguided, uncoordinated, and wasteful.

The Panel's analysis of such threats points out that CBRN terrorism has emerged as a U.S. national security concern for several reasons:

- There has been a trend toward increased lethality in terrorism in the past decade.
- There is an increasing focus on the apparent dangers posed by potential CBRN terrorism.
- Terrorists may now feel less constrained to use a CBRN device in an attempt to cause mass casualties, especially following the precedent-setting attack in 1995 by the Aum Shinrikyo.

The reasons terrorists may perpetrate a WMD attack include a desire to kill as many people as possible as a means "to annihilate their enemies," to instill fear and panic to undermine a governmental regime, to create a means of negotiating from a position of unsurpassed strength, or to cause great social and economic impact.

Given any of those potential motives, the report identifies the "most likely terrorists groups" to use CBRN as fundamentalist or apocalyptic religious organizations, cults, and extreme single-issue groups but suggests that such a group

⁷Section 1405 of the National Defense Authorization Act for Fiscal Year 1999, Public Law 105-261 (H.R. 3616, 105th Congress, 2nd Session) (October 17, 1998).

⁸For purposes of the Panel's activities and recommendations, it has included the state level within the scope of its mandate.

may resort to a smaller-scale attack to achieve its goal. The analysis, however, indicates two additional possibilities:

- A terrorist attack against an agricultural base.
- A terrorist use of a CBRN device with the assistance of state sponsorship.

In the latter case, nevertheless, the Panel concludes that several reasons work against state sponsorship, including the prospect of significant reprisals by the United States against the state sponsor, the potential inability of the state sponsor to control its surrogate, and the prospect that the surrogate cannot be trusted, even to the point of using the weapon against its sponsor.

The Panel concludes that the Nation must be prepared for the entire spectrum of potential terrorist threats – both the unprecedented higher-consequence attack, as well as the historically more frequent, lesser-consequence terrorist attack, which the Panel believes is more likely in the near term. Conventional explosives, traditionally a favorite tool of the terrorist, will likely remain the terrorist weapon of choice in the near term as well. Whether smaller-scale CBRN or conventional, any such lower-consequence event—at least in terms of casualties or destruction—could, nevertheless, accomplish one or more terrorist objectives: exhausting response capabilities, instilling fear, undermining government credibility, or provoking an overreaction by the government. With that in mind, the Panel’s report urges a more balanced approach, so that not only higher-consequence scenarios will be considered, but that increasing attention must now also be paid to the historically more frequent, more probable, lesser-consequence attack, especially in terms of policy implications for budget priorities or the allocation of other resources, to optimize local response capabilities. A singular focus on preparing for an event potentially affecting thousands or tens of thousands may result in a smaller, but nevertheless lethal attack involving dozens failing to receive an appropriate response in the first critical minutes and hours.

While noting that the technology currently exists that would allow terrorists to produce one of several lethal CBRN weapons, the report also describes the current difficulties in acquiring or developing and in maintaining, handling, testing, transporting, and delivering a device that truly has the capability to cause “mass casualties.” Those difficulties include the requirement, in almost all cases, for highly knowledgeable personnel, significant financial resources, obtainable but fairly sophisticated production facilities and equipment, quality control and testing, and special handling. In many cases, the personnel of a terrorist organization run high personal safety risks, in producing, handling, testing, and delivering such a device. Moreover, the report notes, the more sophisticated a device, or the more personnel, equipment, facilities, and the like involved, the greater the risk that the enterprise will

expose itself to detection and interdiction by intelligence and law enforcement agencies—particularly in light of the increasing attention focused on terrorism today.

The report explains, with some specificity, the challenges involved in each of the four device or agent topic areas—biological, chemical, nuclear, and radiological—which suggests that some public pronouncements and media depictions about the ease with which terrorists might wreak genuine mass destruction or inflict widespread casualties do not always reflect the significant hurdles currently confronting any nonstate entity seeking to employ such weapons. The report acknowledges, nevertheless, that the situation now facing a terrorist could change dramatically because of new discoveries, further advances in technology, or other material factors. No matter how difficult or improbable such higher-consequence incidents may be, prudence requires that appropriate steps be taken across the broad spectrum of terrorist threats to deter, prevent, or interdict a terrorist attack before it occurs or failing that, to respond in a way that will—first and foremost—minimize human casualties and also mitigate damage to property and to the environment.

Part of the report focuses on the 1995 Aum Shinrikyo nerve gas attack on the Tokyo subway, which marked the first time that a nonstate group had used a chemical weapon against civilians. The conventional wisdom—that terrorists were not interested in killing, but rather in publicity, or were concerned about a loss of popular support or international recognition—has increasingly been called into question, not only by the Aum event but also by others, such as the World Trade Center and Oklahoma City bombings.

Nevertheless, Chapter Three, which chronicles Aum's attempts to develop a variety of lethal agents or devices, indicates that, despite Aum's considerable resources and the superior technical expertise and state-of-the-art equipment and facilities at its disposal, the group could not effect a truly successful chemical or biological attack. The lesson of Aum is that any nonstate entity faces organizational and significant technological difficulties and other hurdles in attempting to weaponize and deliver chemical and biological weapons, arguably providing a refutation of the suggestion voiced with increasing frequency about the ease with which such weapons can be made and used.

The report contains several conclusions and recommendations, as a result of the threat analysis and other information provided to the Panel and the collective expertise and experience of its members:

- The conclusion that the United States needs to have a viable national strategy to guide the development of clear, comprehensive, and truly integrated national domestic preparedness plans to combat terrorism, one that recognizes that the Federal role will be defined by the nature and severity of the incident but will

generally be supportive of state and local authorities, who traditionally have the fundamental responsibility for response, and the recommendation for promulgation of a national-level strategy, with a “bottom-up” perspective—a strategy that clearly delineates and distinguishes Federal, state, and local roles and responsibilities and articulates clear direction for Federal priorities and programs to support local responders;⁹ and a comprehensive, parallel public education effort.

- The conclusion that initial and continuing, comprehensive and articulate assessments of potential, credible, terrorist threats within the United States, and the ensuing risk and vulnerability assessments are critical for policymakers and the recommendation that more attention be paid to assessments of the higher-probability/lower-consequence threats—not at the expense of, but in addition to, assessments of the lower-probability/higher-consequence threats.
- The conclusion that the complex nature of current Federal organizations and programs makes it very difficult for state and local authorities to obtain Federal information, assistance, funding, and support; that a Federal focal point and “clearinghouse” for related preparedness information and for directing state and local entities to appropriate Federal agencies, is needed; and that the *concept* behind the National Domestic Preparedness Office is fundamentally sound.
- The conclusion that congressional decisions for authority and funding to address the issue appear to be uncoordinated, and the recommendation that Congress consider forming an *ad hoc* Joint Special or Select Committee, to provide more efficiency and effectiveness in Federal efforts.
- The conclusion that much more needs to be and can be done to obtain and share information on potential terrorist threats at all levels of government, to provide more effective deterrence, prevention, interdiction, or response, using modern information technology.
- The conclusion that many definitions and terms in this arena are ambiguous or confusing (e.g., “weapons of mass destruction” and “mass casualties”), and the recommendation that there be a revision and codification of universal and easily understood terms.

⁹The Panel has chosen to use “local responders” – as opposed to “first responders” -- to characterize those persons and entities that are most likely to be involved in the early stages following a terrorist attack. That characterization includes not only law enforcement, fire services, emergency medical technicians, emergency management personnel, and others who may be required to respond to the “scene” of an incident, but also other medical and public health personnel who may be required to provide their services in the immediate aftermath of an attack.

- The conclusion that national standards for responders at all levels, particularly for planning, training, and equipment, are critical, and the recommendation that more emphasis be placed on research, development, testing, and evaluation in the adoption of such standards.
- The conclusion that, despite recent improvements, too much ambiguity remains about the issue of “who’s in charge” if an incident occurs, and the recommendation that efforts be accelerated to develop and to test agreed-on templates for command and control under a wide variety of terrorist threat scenarios.

The report concludes with an overview of the activities of the Panel being undertaken in the current fiscal year:

- A comprehensive review of related Federal programs, placing emphasis on training; communications; equipment; planning requirements; the needs of maritime regions; coordination among the various levels of government; the effectiveness of the structure of military organizations for responses across a broad spectrum of potential threats; and research, development, testing, and evaluation.
- A survey of local and state emergency management and response officials to elicit their views on the efficacy of current Federal programs, particularly in the areas of training, equipment, planning, communications, and Federal agency coordination among the various levels of government.
- Interviews with a number of related Federal, state, and local officials to obtain more detailed information on their views of current Federal programs and activities and their specific proposals or recommendations to improve or enhance Federal efforts.
- Case studies of jurisdictions where such events have occurred or have been threatened, to review and analyze lessons learned from the full range of elements and issues involved in each specific plan or actual response.
- An analysis of the status of existing or the development of appropriate standards in the areas of training for responders at all levels, equipment, notification procedures, communications, and planning
- Consideration of cyber terrorism issue in the future work of the Panel
- A plan for future meetings of the Panel.

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I. INTRODUCTION

In recent years, the United States has focused increasing attention and resources on countering the threat of terrorist use of chemical, biological, radiological and nuclear (CBRN) weapons. The main catalyst behind this concern was the 1995 sarin nerve gas attack on the Tokyo subway, in which 12 persons were killed and more than 5,000 injured. This incident, perpetrated by an apocalyptic Japanese religious sect, the Aum Shinrikyo, appeared to underscore both the vulnerabilities and potentially catastrophic consequences of unprotected societies and ill-prepared governments in the face of indiscriminate attacks by enigmatic adversaries employing so-called weapons of mass destruction (WMD). Two years earlier, the bombing of New York City's World Trade Center by Islamic fundamentalists had demonstrated that the United States itself was not immune to acts of terrorism intent on causing large numbers of casualties. Indeed, the six persons who perished in that attack and the approximately 1,000 others who were injured paled in comparison to the tens of thousands who might have been harmed had the terrorists' plans to topple one of the Trade Center's towers into the other actually had succeeded. If any further evidence were needed of this potential, it was provided less than a month after the Tokyo attack when Timothy McVeigh used a large truck bomb to demolish the Alfred P. Murrah Federal office building in Oklahoma City, killing 168 persons and injuring hundreds more.

In the wake of these incidents, a new era of terrorism was perceived by experts¹⁰ and government officials¹¹ alike who foresaw a potentially bloodier and more destructive age of violence emerging as we approached the twenty-first century. The changes in terrorism that they described raised concerns in the United States, especially within Congress and the Executive Branch, about the implications of evolving terrorist threats that were now seen to include use of CBRN weapons. Congressional legislation was passed and Presidential Decision Directives (PDDs) were implemented that sought to strengthen the ability of the United States to prevent and

¹⁰See, for example, Bruce Hoffman, "Terrorism and WMD: Preliminary Hypotheses," *Non-Proliferation Review*, vol. 4, no. 3, (Spring-Summer 1997), pp. 45-53; Brad Roberts (ed.), *Terrorism with Chemical and Biological Weapons: Calibrating Risks and Responses* (Alexandria, Va.: The Chemical and Biological Arms Control Institute, 1997); the "Roundtable Article" in *Politics and the Life Sciences*, vol. 15, no. 2, pp. 167-183, (especially the contributions by Jonathan B. Tucker, "Chemical/ Biological Terrorism: Coping with a New Threat" and "Measures to Fight Chemical/Biological Terrorism: How Little Is Enough?"); and, John F. Sopko, "The Changing Proliferation Threat," *Foreign Policy*, no. 105 (Winter 1996/1997), pp. 3-14.

¹¹See, for example, Testimony of the Acting Director of Central Intelligence, William O. Studemann, Omnibus Counterterrorism Act of 1995, House Judiciary Committee, 6 April 1995 at: http://www.odci.gov/cia/public_affairs/speeches/archives/1995/dci_testimony_4695.html; Louis J. Freeh, Speech to the Annual Meeting of the American Jewish Committee, Washington, D.C., 4 May 1995 at <http://www.fbi.gov/pressrm/dirsprch/94-96archives/amjc.htm>; and, U.S. Senate Committee on Governmental Affairs, Permanent Subcommittee on Investigations, *Global Proliferation of Weapons of Mass Destruction*, Parts I, II, III (Washington, D.C.: U.S. Government Printing Office, 1996), passim.

respond to terrorist acts involving CBRN weapons within our borders. Among the most significant of these initiatives was PDD 39, which President Clinton signed in June 1995, less than three months after the Oklahoma City bombing. This executive order sought to reduce the nation's vulnerability to terrorist attacks, especially those involving mass casualties and/or CBRN weapons: directing Federal agencies to improve domestic response capabilities to manage the consequences of attacks employing such unconventional weapons.¹² The following year, Congress passed "The Defense Against Weapons of Mass Destruction Act," also known as the Nunn-Lugar-Domenici (NLD) Act. This legislation was derived from a series of hearings conducted in 1995 and 1996 that had not only highlighted the growing dangers posed by potential terrorist use of CBRN weapons and the need to curtail the risk of nuclear materials theft and diversion from the former Soviet Union's hemorrhaging stockpiles, but also the inadequate state of domestic preparedness efforts to respond to such threats. The key domestic component of the NLD Act, accordingly, focused on programs designed to enhance state and local emergency response capabilities to incidents of CBRN terrorism.¹³

In the respectively three and four years since both of these measures were promulgated, Federal spending on terrorism in general and on CBRN terrorism in particular has increased considerably. The contrast is all the more striking given the paucity of funds allocated for these activities prior to the 1995 Tokyo nerve gas attack and the bombing in Oklahoma City. In fiscal year 1996, for example, the principal Federal agencies involved in activities to combat terrorism spent \$5.7 billion; for fiscal year 2000 the President's budget request called for \$10 billion to be devoted to counterterrorism programs and efforts—a sum almost double the 1996 amount and nearly \$3 billion more than the sum originally required for fiscal year 1999.¹⁴ The

¹²See PDD 39, 21 June 1995 at <http://www.fas.org/irp/offodcs/pdd39.html>. PDD 39 designated the FBI as the lead Federal agency for managing all terrorist crises, including those perpetrated with CBRN weapons that either occur in the U.S. or break U.S. law. FEMA was designated as the lead Federal agency for managing the consequences of mass-casualty terrorist attacks, including those employing CBRN weapons. The FBI, FEMA, and other Federal agencies were further directed to review the adequacy of their response plans to CBRN terrorism. See the analysis of PDD 39 in Richard A. Falkenrath, Robert D. Newman, and Bradley A. Thayer, *America's Achilles' Heel: Nuclear, Biological, and Chemical Terrorism and Covert Attack* (Cambridge, Mass., and London: MIT Press, 1998), pp. 268–275.

¹³Among other things, the NLD Act required the Department of Defense (DoD) to "carry out a program to provide civilian personnel of Federal, state, and local agencies with training and expert advice regarding emergency response to a use or threatened use of a weapon of mass destruction or related materials." DoD has undertaken to do that training, initially in 120 cities. The Act also allocated funds for the Department of Health and Human Services (DHSS) for the establishment of metropolitan emergency medical response teams (commonly referred to as "Metropolitan Medical Strike Force Teams"), which has been initiated for 27 cities on a national basis. (Public Law 104-201, National Defense Authorization Act for Fiscal Year 1997, Title XIV—Defense Against Weapons of Mass Destruction, 23 September 1996)

¹⁴Statement of Henry L. Hinton, Jr., Assistant Comptroller General, National Security and International Affairs Division, U.S. General Accounting Office, before the Subcommittee on National Security, Veterans Affairs, and International Relations, Committee on Government Reform, U.S. House of Representatives, "Combating Terrorism: Observation on Federal Spending to Combat Terrorism," 11 March 1999, pp. 1 and 6.

budgetary increases for key individual agencies are even more pronounced. Only \$7 million was allocated to the Department of Health and Human Services (DHHS) in 1996 for its bioterrorism initiatives; by comparison, \$230 million has been requested for DHHS programs in fiscal year 2000—an increase of more than 3,000 percent.¹⁵ The Office of Justice Programs in the Department of Justice has experienced an equally profound increase in its resources to support state and local domestic preparedness programs. These activities had a zero budget line in fiscal year 1997: they received a budgetary allocation of \$21 million in 1998; followed by a nearly fivefold increase in fiscal year 1999 to \$120 million; with a sum of \$162 million requested in that office’s fiscal year 2000 budget.¹⁶

Yet, despite these many new legislative and programmatic initiatives and appreciably increased funding levels, valid concerns remain that the United States is still not appropriately organized and prepared to counter and respond to the threat of either mass-casualty or CBRN terrorism. Authoritative oversight bodies, such as the U.S. General Accounting Office, for instance, have argued that this rapid growth in expenditures and attendant proliferation of ambitious programs and broad initiatives has occurred in the absence of the critical analysis and rigorous prioritization needed to establish clear and well-defined requirements for these efforts.¹⁷ In the absence of such measures, the GAO and other critics have argued, coordination among the multiplicity of Federal agencies involved in these efforts cannot be ensured, much less the effective provision of needed support and assistance by these same agencies to their counterparts at the state and local levels. This need is especially acute among so-called “first responders”¹⁸—that is, the fire, emergency medical services, public health, other medical providers, and emergency management and law enforcement personnel at the state and local levels who are most likely to be the first on the scene in the event of any terrorist incident and, in the case of an attack involving a CBRN weapon, who would have the primary responsibility to address the immediate consequences in coping with and managing such an event.

Accordingly, Congress directed the establishment of a panel of private citizens¹⁹ to assess current capabilities for domestic response to terrorist acts that involve WMD,

¹⁵The increased funds will provide for expanded disease surveillance programs, improvements in its communications capabilities, and the establishment of regional laboratories. See *Ibid.*, p. 7.

¹⁶These monies are to be devoted to training and equipment for local responders and for the establishment of national training centers. See *Ibid.*, p. 8.

¹⁷*Ibid.*, pp. 2–3.

¹⁸The Panel has chosen to use “local responders” – as opposed to “first responders” -- to characterize those persons and entities that are most likely to be involved in the early stages following a terrorist attacks. That characterization includes not only law enforcement, fire services, emergency medical technicians, emergency management personnel, and others who may be required to respond to the “scene” of an incident, but also other medical and public health personnel who may be required to provide their services in the immediate aftermath of an attack.

¹⁹Private citizens of the United States are all citizens of the United States not currently employed by the United States government, including nonappropriated fund instrumentalities, or members of the

and to recommend appropriate policies and strategies for managing and mitigating the effects of such incidents.²⁰ Specifically, the Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction (hereafter referred to as “the Panel”) is charged with five main responsibilities. They are:

- to assess Federal agency efforts to enhance domestic preparedness for terrorist incidents involving WMD;
- to assess the progress of Federal training programs for local emergency responses to terrorist incidents involving WMD;
- to assess deficiencies in programs for response to terrorist incidents involving WMD, including a review of unfunded communications, equipment, and planning requirements, and the needs of maritime regions;
- to recommend strategies for ensuring effective coordination with respect to Federal agency WMD response efforts and for ensuring fully effective local response capabilities for WMD terrorism incidents; and
- to assess the appropriate roles of state and local government in funding effective local response capabilities for WMD terrorism.²¹

The legislation that established the Panel called for the Secretary of Defense to enter into contract with a federally funded research and development center (FFRDC) to provide the appropriate analytical and logistical support to facilitate the Panel’s performance of these tasks. RAND’s National Defense Research Institute was selected as the FFRDC contractor for this purpose.

The legislation also mandated that the Panel submit to the President and to the Congress a report setting forth its findings, conclusions, and recommendations for improving Federal, state, and local domestic emergency preparedness to respond to incidents involving WMD no later than December 15 of each year, beginning in 1999 and ending in 2001. This report represents the fulfillment of part of that requirement, and as such presents the Panel’s first annual report.

A principal focus of this report is on the threat dimension of CBRN terrorism. From the outset of its work, the Panel concluded that Federal, state, and local domestic response capabilities for potential acts of CBRN terrorism could not be critically assessed, neither could well-informed public policy be developed, in the absence of a thorough understanding of the threat—specifically, the type and magnitude of attacks for which each of the above jurisdictional levels of government is

United States armed forces on active duty, and who are not barred from employment or service under a United States government contract.

²⁰The legislation establishing the panel is contained in section 1405 of the National Defense Authorization Act for Fiscal Year 1999 (Public Law 105-261 (H.R. 3616), 105th Congress, 2nd Session), October 17, 1998).

²¹For purposes of the Panel’s activities and recommendations, it has included the state level within the scope of its mandate.

charged with preparing.²² The Panel, moreover, sees the threat not as a rigidly static phenomenon but as a dynamic and evolving one that requires constant monitoring, assessment, and evaluation. For example, the fundamental assumptions, on which critical legislation, such as the NLD Act, and executive orders, such as PDD 39, were based, arose from incidents that had then only recently occurred. The Panel was thus concerned that conclusions reached during the 1995–1996 time frame regarding the threats might possibly have derived from information that was not then as complete or as well understood as it is today or that was unduly influenced by threat perceptions that were either reactive or distorted by insufficient opportunity for detailed analysis and deliberate reflection.²³

As a result, the Panel commissioned the staff of its supporting FFRDC, RAND, to provide an articulate, comprehensive, and current assessment and analysis of the potential domestic threats from terrorists who might seek to use a CBRN device or agent. That assessment and analysis, with some condensation, is embodied in this report.

The Panel has drawn some conclusions from that comprehensive assessment and analysis of the potential threats, from briefings and other information provided to the Panel and from the Panel's collective knowledge and experience. Furthermore, the Panel is recommending several procedural changes and is proposing that several issues be addressed in the near term, both in Congress and in the Executive Branch. Those conclusions and recommendations are contained in Chapter Four. The Panel will make more specific recommendations on funding priorities and programmatic changes in subsequent annual reports.

²²Opening Statement of the Hon. James S. Gilmore, III, Governor of the Commonwealth of Virginia, at the first meeting of the Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction, RAND, Washington, D.C., 9 June 1999. See <http://www.rand.org/organizations/nsrd/terrpanel/minutes.6.9.html>.

²³Similar arguments have been presented by both the GAO and independent experts in testimony before the U.S. Congress. See the three statements of Henry L. Hinton, Jr., Assistant Comptroller General, National Security and International Affairs Division, U.S. General Accounting Office, before the Subcommittee on National Security, Veterans Affairs, and International Relations, Committee on Government Reform, U.S. House of Representatives on (1) "Combating Terrorism: Observations on Federal Spending to Combat Terrorism," 11 March 1999; (2) "Combating Terrorism: Observations on Biological Terrorism and Public Health Initiatives," 16 March 1999; and (3) "Combating Terrorism: Observations on the Threat of Chemical and Biological Terrorism," 20 October 1999; as well as testimony before the same subcommittee by John Parachini, Senior Associate, Center for Nonproliferation Studies, Monterey Institute of International Studies, "Combating Terrorism: Assessing the Threat," 20 October 1999.

II. ASSESSING THE THREAT: CBRN TERRORISM AND THE IMPLICATIONS FOR U.S. SECURITY AND PREPAREDNESS

Until recently, most Americans thought that terrorism was something that happened elsewhere. However frequently U.S. citizens and interests were the target of terrorists abroad, many nonetheless believed that the United States itself was somehow immune to such violence within its own borders. Terrorism, accordingly, was regarded as a sporadic—albeit attention-grabbing—problem that occasionally affected Americans traveling or living overseas and concerned only those U.S. government agencies with specific diplomatic and national security responsibilities. If the 1993 World Trade Center bombing shattered that complacency, then the explosion in Oklahoma City two years later dramatically underscored the breadth of grievances felt toward the U.S. government. The list of potential adversaries had seemed suddenly to grow from the foreign radicals and religious extremists located in other regions of the world about whom we had always worried, to include wholly domestic threats, such as those posed by the militantly antigovernment, white supremacist organizations that had come to light in the aftermath of the Oklahoma City tragedy. In addition, even mentally deranged loners, like the so-called “Unabomber,” were seen as also presenting a serious terrorist danger to their fellow Americans.

The threats confronting the United States in the post–Cold War era have become more diffuse and amorphous and are disturbingly as frequently homegrown as they are foreign. Terrorism, it is also argued, is changing—with new adversaries, evidencing new motivations and different rationales, having surfaced both in the United States and elsewhere. The resurgence of extreme, Manichean²⁴ religious imperatives, for example, coupled with the breakdown of traditional group constraints and the proliferation of millennialist, apocalyptic²⁵ cultist sentiments are the key factors associated with this development, and are among the main concerns to those charged with protecting and defending the United States against terrorist attack. In this respect, a new terrorist mindset is seen to have emerged—one that might not draw the line at mass, indiscriminate murder involving chemical, biological, radiological, or nuclear weapons. The next part of this chapter, accordingly, examines

²⁴Manichean groups adhere to the dualistic religious system of Manes, a combination of Gnostic Christianity, Buddhism, Zoroastrianism, and various other elements, with a basic doctrine of a conflict between light and dark—matter being regarded as dark or evil.

²⁵Apocalyptic and millenarian beliefs both concern themselves with a preordained event that will bring about the end of human history but differ on what will happen after this event. Millenarian doctrines promise their adherents that this cataclysmic episode will deliver them from a world of increasing evil and corruption to one of perfection and peace. Apocalyptic dogmas, on the other hand, focus on the imminent eschatological event and do not concern themselves with their believers' existence after that time. See Martha Lee, “Violence and the Environment: The Case of ‘Earth First!’” *Terrorism and Political Violence*, vol. 7, no. 3 (Autumn 1995), p. 110; See also Michael Barkun, “Introduction: Understanding Millennialism,” *Terrorism and Political Violence*, vol. 7, no. 3 (Autumn 1995).

this development, and assesses the rationales and motivations that would most likely impel terrorists to employ CBRN weapons.²⁶

CBRN Terrorism's Emergence as a National Security Concern

Since the end of the Cold War, and especially in the wake of the New York and Oklahoma City bombings and Aum Shinrikyo attacks in Japan—which has specific CBRN implication that are described and analyzed in detail in the next chapter—there has been a dramatic shift in the perceived threat of CBRN terrorism. This has been especially evident in the United States, where, as previously noted, Federal funding for domestic preparedness and homeland defense programs aimed WMD terrorism has increased enormously. What accounts for this sudden shift in direction and appreciation of what was previously dismissed as a far less realistic threat scenario? A number of developments seem to be relevant.

First, terrorism itself has arguably shown a marked trend toward greater lethality. While some observers point optimistically to the decline in the number of international terrorist incidents during the 1990s as a noteworthy and salutary development in the struggle against terrorism, the percentage of terrorist incidents with fatalities has paradoxically increased. For example, at least one person was killed in 29 percent of terrorist incidents in 1995. This represents the highest ratio of fatalities to incidents recorded since 1968.²⁷ The U.S. Department of State has also called attention to this trend of increasing terrorist lethality in its own authoritative annual compendium and analysis, *Patterns of Global Terrorism*.²⁸ As the 1998 State Department analysis reports:

There were 273 international terrorist attacks during 1998, a drop from the 304 attacks we recorded the previous year and the lowest annual total since 1971. The total number of persons killed or wounded in terrorist attacks, however, was the highest on record: 741 persons died, and 5,952 persons suffered injuries.²⁹

²⁶It is of course impossible within the context of this report to consider on an individual basis every terrorist organization active throughout the world today and to determine the threat that it poses regarding the potential use of CBRN weapons. Distinct groups will almost certainly hold different views on the various advantages and disadvantages associated with CBRN weapon use—the idiosyncratic nature of which would clearly need to be considered in any detailed “WMD” terrorism threat assessment.

²⁷Bruce Hoffman, *Inside Terrorism* (London: Victor Goldberg, 1998), p. 201, citing the RAND *Chronology of International Terrorism*.

²⁸See Office of the Coordinator for Counterterrorism, *Patterns of Global Terrorism 1996* (Washington, D.C.: U.S. Department of State Publication 10433, 1997), p. 1; and, idem, *Patterns of Global Terrorism 1997* (Washington, D.C.: U.S. Department of State Publication 10535, 1998), p. 1.

²⁹Idem, *Patterns of Global Terrorism 1998* (Washington, D.C.: U.S. Department of State Publication 10610, 1999), p. 1.

This development, moreover, conforms to a pattern of worldwide terrorist activity observed throughout the current decade. The trend toward increased lethality becomes more apparent, for example, when statistics over time are analyzed and compared. Between 1990 and 1996, for instance, a total of 50,070 people were killed in the combined indigenous terrorist incidents (against fellow citizens or foreigners within the terrorists' country's borders) and international terrorist attacks around the world. This nearly doubles the 28,110 who lost their lives in comparable incidents in the 14 years between 1970 and 1983. With respect to nonfatal casualties, the figures are even more dramatic. The 69,833 injured in such incidents between 1990 and 1996 more than triples the figure of 18,925 recorded between 1970 and 1983, with the annual average rising more than sevenfold, from 1,352 (1970-1983) to 9,976 (1990-1996).³⁰ Indeed, in a study conducted by two American economists involving time-series techniques and different data sets to measure whether international terrorism has become more deadly during the 1990s, they similarly conclude that, "Despite a decline in transnational terrorism of nearly fifty incidents per quarter during some of the post-Cold War era, terrorism still presents a significant threat. This conclusion follows because each incident is almost 19 percentage points more likely to result in death or injury as compared with the previous two decades."³¹

This growing proclivity toward violence appears to be evidence of a portentous shift in terrorism, away from its traditional emphasis on discrete, selective attacks toward a mode of violence that is now aimed at inflicting indiscriminate and wanton slaughter. Certainly such attacks as the 1993 car bomb attack that convulsed Bombay, India; the 1994 truck bomb explosion outside a Jewish community center in Buenos Aires, Argentina; the 1995 bombing of the Alfred P. Murrah Federal building in Oklahoma City; the 1996 suicide truck bomb attack against the Central Bank in Colombo, Sri Lanka; and, the 1998 twin U.S. embassy bombings in Kenya and Tanzania, all illustrate this development.³² The implication, therefore, is that terrorism is now on an escalation spiral of lethality that may well culminate in the indiscriminate use of CBRN weapons.

Second, the dangers posed specifically by chemical and biological weapons have become increasingly apparent. In part, this is a function of the demise of the Cold

³⁰Pinkerton's Risk Assessment Services (PRAS), *Terrorism, 1990-1996* (Washington, D.C.: Pinkerton's Risk Assessment Services Inc., 1991-1997); Alex Jongman, "Trends in International and Domestic Terrorism in Western Europe, 1968-88," *Terrorism and Political Violence*, vol. 4, no. 4 (Winter 1992), p. 36.

³¹Walter Enders and Todd Sandler, "Is Transnational Terrorism Becoming More Threatening? A Time Series Investigation," Unpublished ms. (October 1998), p. 21.

³²These attacks resulted in the following fatalities: 317 killed in the Bombay attacks; 96 killed in Buenos Aires; 168 dead in Oklahoma City; 86 killed in the Sri Lanka suicide bombing; and the 258 persons killed in the Kenyan and Tanzanian embassy bombings.

War preoccupation with the nuclear dimension of international relations.³³ Perhaps more significant, however, is the possibility that, given the ongoing travails of the Russian economy, poorly paid, disgruntled former Soviet scientists might attempt to sell their expertise in chemical, biological and nuclear weapons on the “open market” to terrorists or rogue states.³⁴

Finally, a precedent for mass destruction may have been set in the guise of the 1995 Aum nerve gas attack. That incident, as described in detail in Chapter Three, represented the first widely known attempt by a nonstate group to use a CBRN weapon with the specific intent of causing mass civilian casualties.³⁵ Moreover, Aum’s use of such an exotic weapon as sarin may have raised the stakes for terrorists everywhere, who now might feel driven to emulate or create their own version of the Tokyo attack to attract attention to themselves and their causes. As Jenkins observed shortly after the Tokyo attack, “It breaks a taboo and has psychological import. Others will ask whether such tactics should be adopted by them. It is now more likely that at least some of them will say ‘yes’.”³⁶

Reasons and Rationales Behind Potential CBRN Terrorism

If, in fact, we are approaching a new era of “super” CBRN terrorism, why would groups seek to escalate to this level? One can identify five possible motivating rationales.

First, and at the most basic level, may be simply the desire to kill as many people as possible. CBRN weapons could give a terrorist group the potential ability (especially if a nuclear weapon were used) to wipe out thousands, possibly even hundreds of thousands, in a single strike. The following statement of a former FEMA director gives an indication of the potential killing power of these agents compared to conventional high explosives (HE): “To produce about the same number of deaths

³³Bruce Hoffman, “Terrorism and WMD: Preliminary Hypotheses,” *Non-Proliferation Review*, vol. 4, no. 3 (Spring-Summer 1997), p. 45.

³⁴See Graham T. Allison et al., *Avoiding Nuclear Anarchy: Containing the Threat of Loose Russian Nuclear Weapons and Fissile Material* (Cambridge, Mass., and London: MIT Press, 1996), passim; Carnegie Corporation of New York, “Heading Off A New Nuclear Nightmare: Illicit Trade in Nuclear Materials, Technology, and Know-How,” *Carnegie Quarterly*, vol. xii, nos. 2-3 (Spring-Summer 1996), pp. 1-7; CSIS Task Force Report, Global Organized Crime Project, *The Nuclear Black Market* (Washington, D.C.: Center for Strategic and International Studies, 1996), passim; Falkenrath et al., *America’s Achilles’ Heel*, passim; Stern, *The Ultimate Terrorists*, pp. 89-106; and, Peter Chalk, “The Evolving Dynamic of Terrorism,” *The Australian Journal of International Affairs*, vol. 53, no. 2 (1999), p. 163.

³⁵James K. Campbell, “Excerpts From Research Study ‘Weapons of Mass Destruction and Terrorism: Proliferation by Non-State Actors,’” *Terrorism and Political Violence*, vol. 9, no. 2 (Summer 1997), p. 29.

³⁶Quoted in David E. Kaplan and Andrew Marshall, *The Cult at the End of the World: The Incredible Story of Aum* (London: Hutchinson, 1996), p. 200.

within a square mile, it would take 32 million grams of fragmentation cluster bomb material; 3,200,000 grams of mustard gas; 800,000 grams of nerve gas; 5,000 grams of material in a crude nuclear fission weapon; 80 grams of botulinal toxin type A; or only 8 grams of anthrax spores.³⁷ Such weapons would provide terrorists with the perfect means to seek revenge against, even to annihilate, their enemies, however defined, categorized, or otherwise determined.³⁸

A second reason for groups to seek to escalate to the CBRN level could be to exploit the classic weapon of the terrorist—fear. Terrorism, in essence, is a form of psychological warfare. The ultimate objective is to destroy the structural supports that give society its strength by both showing that the government is unable to fulfill its primary security function and, thereby, eliminating the solidarity, cooperation, and interdependence on which social cohesion and functioning depend.³⁹ Viewed in this context, even a “limited” terrorist attack involving CBRN agents would have disproportionately large psychological consequences, generating unprecedented fear and alarm throughout society.⁴⁰ The 1995 Aum sarin nerve gas attack, for instance, which resulted in 12 deaths, not only galvanized mass panic in Tokyo, it also shattered the popular perception among the Japanese people who, hitherto, had considered their country to be among the safest in the world. Moreover, it served to galvanize American attention to CBRN terrorism, despite taking place overseas.⁴¹

A third possible rationale for resorting to CBRN weapons could be the desire to negotiate from a position of unsurpassed strength. A credible threat to use a chemical, biological, or nuclear weapon would be unlikely to go unanswered by a government and could, therefore, provide an organization with a tool of political blackmail of the highest order.⁴²

³⁷Louis Giuffrida, “Dealing with the Consequences of Terrorism—We Are Not Yet Where We Must Be,” *Terrorism. An International Journal*, vol. 10, no. 1 (1987), p. 73

³⁸See, for instance, Roger Medd and Frank Goldstein, “International Terrorism on the Eve of a New Millennium,” *Studies in Conflict and Terrorism* 20, no. 3 (July-September 1997), p. 292.

³⁹Peter Chalk, *West European Terrorism and Counter-Terrorism, The Evolving Dynamic*, (London: MacMillan, 1996), p. 13; Martha Crenshaw, “The Concept of Revolutionary Terrorism,” *Journal of Conflict Resolution*, vol. 16, no. 3 (1972), p. 388.

⁴⁰Bruce Hoffman, *Terrorism and Weapons of Mass Destruction: An Analysis of Trends and Motivations* (Santa Monica, Calif.: RAND, P-8039, 1999), p. 53; Jeffrey D. Simon, *Terrorists and the Potential Use of Biological Weapons: A Discussion of Possibilities* (Santa Monica, Calif.: RAND, R-3771-AFMIC, December 1989), p. 8.

⁴¹Despite the initial and continuing reaction in Japan and around the world to the Aum chemical and biological weapons program and the prosecution of several of its members the group is apparently back in operation, although its plans for further terrorists activity are unclear.

⁴²It should be noted, however, that any terrorist group would face two major obstacles in attempting to use CBRN weapons for political blackmail. First would be the difficulty of establishing the credibility of the organization’s coercive threat by demonstrating that it does, in fact, possess a CBRN weapon. Second would be the problem of defining the conditions for the return of the weapon and the fulfillment of the terrorists’ demands, both of which would be virtually impossible without leaving open the possibility of a double-cross by either the government in question or the perpetrators themselves. For

A fourth reason, with specific reference to biological agents, could derive from certain logistical and psychological advantages that such weapons might offer terrorists. A biological attack, unlike a conventional bombing, would not likely attract immediate attention, and could initially go unnoticed, only manifesting itself days or even weeks after the event. This would be well suited to groups that wish to remain anonymous, either to minimize the prospect of personal retribution or to foment greater insecurity in their target audience by appearing as enigmatic, unseen, and unknown assailants.⁴³ As Jeffrey Simon observes, “[W]hile we tend to think about biological weapons as agents of mass destruction—which they certainly can be—there is also a more ‘practical’ side to these weapons from the terrorists’ perspective.”⁴⁴

Fifth, a group may wish to use CBRN weapons, and more specifically biological agents, to cause economic and social damage by targeting a state’s or region’s agricultural sector. On several previous occasions in other parts of the world, terrorists have contaminated agricultural produce or threatened to do so. Between 1977 and 1979, more than 40 percent of the Israeli European citrus market was curtailed by a Palestinian plot to inject Jaffa oranges with mercury. In 1989, a Chilean left-wing group that was part of an anti-Pinochet movement claimed that it had laced grapes bound for U.S. markets with sodium cyanide, causing suspensions of Chilean fruit imports by the United States, Canada, Denmark, Germany, and Hong Kong.⁴⁵ In the early 1980s, Tamil separatists in Sri Lanka threatened to infect Sri Lankan rubber and tea plantations with nonindigenous diseases as part of a total biological war strategy designed to cripple the Sinhalese-dominated government.⁴⁶

Many Western countries remain particularly susceptible to this form of aggression, given the integrated and intensive nature by which farm animals are bred, transported, and sold, as well as the high degree of genetic homogeneity and

further details see Bruce Hoffman, *Terrorism in the United States and the Potential Threat to Nuclear Facilities* (Santa Monica, Calif.: RAND , R-3351-DOE, 1986), p. 5; Brian Michael Jenkins, *The Likelihood of Nuclear Terrorism*, (Santa Monica, Calif.: RAND , P-7119, July 1985), p. 10.

⁴³For an interesting discussion on why terrorists may be less willing to take credit for their acts, see Bruce Hoffman, “Why Terrorists Don’t Claim Credit,” *Terrorism and Political Violence*, vol. 9, no. 1 (Spring 1997), pp. 1–6 and 18–19.

⁴⁴Simon, *Terrorists and the Potential Use of Biological Weapons*, p. 10.

⁴⁵See Ron Purver, *Chemical and Biological Terrorism: A New Threat to Public Safety?* Conflict Studies No. 295 (London: Research Institute for the Study of Conflict and Terrorism, 1996/1997), pp. 13–14; Ron Purver, *The Threat of Chemical/Biological Terrorism*. Commentary No. 60 (Ottawa, Canadian Security Intelligence Service, 1995), p. 7; and David Rapoport, “Terrorists and Weapons of the Apocalypse,” paper presented before the “Future Developments in Terrorism Conference,” Cork, Ireland, March 1999, pp. 13–14.

⁴⁶W. Seth Carus, *Bioterrorism and Biocrimes: The Illicit Use of Biological Agents in the 20th Century* (Washington, D.C.: Center for Counterproliferation Research, National Defense University, 1999) p. 175. See also Rohan Gunaratna , *War and Peace in Sri Lanka* (Colombo: Institute of Fundamental Studies, 1987), pp. 51–52.

concentration found in their main crop-growing regions.⁴⁷ Disrupting this vital and vulnerable industry could not only damage the economy, it could also undermine confidence in government's capability to protect the very rudiments of American society. Moreover, it would underscore the terrorists' coercive potential without crossing the threshold of mass murder and could potentially avoid the attendant risk of attracting massive government reprisals.

Based on this analysis, the most likely terrorist groups that would seek to cause mass civilian casualties with CBRN weapons are fundamentalist religious organizations or cults that embrace adversarial, Manichean worldviews, or other extremist single-issue groups. The uncompromising and absolute dualism of such organizations lends itself to highly extreme mechanisms of violence legitimization that could easily justify CBRN use. For the most part, however, these groups lack the means to translate their desire for mass murder into effective action. As such, it is more probable in the near term that CBRN employment will be a small-scale attack designed to elicit far greater psychological reactions. However, there are two scenarios that are conceivable exceptions to this hypothesis. One is the use by terrorists of biological agents as a way of destroying, or at least undermining, an adversary's agricultural base. Such discrete, deliberate attacks, as noted above, have the potential to cause sociopolitical and economic damage without crossing the threshold of mass civilian casualties and, thereby, attracting the type of public and governmental revulsion that this would entail. The other would necessitate state-sponsorship, which has the advantage of enabling terrorists to leapfrog the technical hurdles associated with CBRN weaponization and, thereby, allow them to translate their desires into meaningful action. Given the extreme, although potentially very different, consequences that might result from either category, examining each in more detail is worthwhile.

Agricultural Terrorism

One area of the CBRN terrorism debate that deserves more attention concerns the biological threat to agriculture.⁴⁸ Weaponizing pathogenic agents to destroy livestock and crops is far easier than creating munitions designed to kill hundreds, much less thousands, of people. This latter process requires at least a limited knowledge of microbiology, something not required in agricultural delivery. Over the years, farm animals have become progressively more disease-prone as a result of increased stress levels brought about by intensive antibiotic and steroid treatment

⁴⁷In the United States, for instance, it would not be uncommon to find livestock feedlots containing between 5,000 and 10,000 animals at any given time. The outbreak of a contagious disease at one of these facilities would be extremely difficult to control and could easily necessitate the wholesale destruction of all the animals, a formidable and, arguably, unrealistic task.

⁴⁸Agriculture, as used in this report, is intended to include the production of crops, livestock, and poultry.

programs, as well as by husbandry changes designed to elevate the volume of meat production and the quality and value of meat products. In addition, many more agents are highly infectious to animals than is the case with humans. Many of these agents will spread quickly because of the vertical integration of modern farming practices.

Sabotaging organic agricultural material is potentially just as easy. All major food crops come in a number of varieties, each generally suited to specific soil and climatic conditions and with differing sensitivities to particular diseases. Plant pathogens, in turn, exist in different strains with varying degrees of contagion to individual crop types. A terrorist could take advantage of these properties to isolate and disseminate disease strains that are most able to damage one or more of a state's major arable food supplies. Intensive fertilizer and pesticide/herbicide treatment programs, designed to increase production yields, compound this potential threat, creating the possibility of highly resistant "super diseases" and nonnative organisms and weeds that could be deliberately harvested and introduced with devastating effect.⁴⁹

Quite apart from their operational ease, bioattacks against agriculture are also comparatively risk free. They do not cross the threshold of mass human killing (at least directly) and are, therefore, unlikely to attract an especially strong government reaction in the way that a civilian bioattack would. Just as important, because there is no large-scale loss of human life, perpetrators may, by targeting the attack discretely, be able to avoid a substantial loss of political support or perceived loss of "legitimacy." There is little danger of inadvertent infection, as nonzoonotic diseases (which do not affect humans) can be used, while attacks themselves can be executed in such a way that they mimic natural disease occurrences—helping both to delay suspicion as well as reduce residual dangers of detection.⁵⁰

In essence, a concerted biological attack against an agricultural target offers terrorists a virtually risk-free form of assault, which has a high probability of success and which also has the prospect of obtaining political objectives, such as undermining confidence in the ability of government or giving the terrorists an improved bargaining

⁴⁹Correspondence between RAND project research staff and U.S. Department of Agriculture (USDA) officials, Washington, D.C., July-September 1999. See also Agricultural Research Service (ARS), *Agriculture's Defense Against Biological Warfare and Other Outbreaks* (Washington, D.C.: USDA, 1961); Corrie Brown, "Emerging Animal Diseases," in W.M. Schield, W. Craig, and J. Hughes, eds., *Emerging Infections* 3 (Washington, D.C.: ASM Press, 1999); Siobhan Gorman, "Bioterror Down on the Farm," *National Journal* 27 (July 1999); and John Gordon and Steen Beech-Nielson, "Biological Terrorism: A Direct Threat To Our Livestock Industry," *Military Medicine*, vol. 151 (July 1986).

⁵⁰Rogers, Whitby, and Dando, "Biological Warfare Against Crops," p. 72; Gordon and Beech-Nielson, "Biological Terrorism: A Direct Threat to Our Livestock Industry," p. 362; and, Stephen Goldstein, "US Could Face New Terror Tactic: Agricultural Warfare," *The Philadelphia Inquirer*, 6 June 1999.

position. This may be especially true if the agricultural bioterrorism attack is part of a carefully planned escalation—each attack or threatened attack having the potential to be more severe, perhaps more lethal—to attain the terrorists’ ultimate objectives. This is important, as one of the main factors that appears to have limited terrorist experimentation with WMD is lack of predictability, defined in terms of both state and popular reaction and of the perceived inability to carry out the operation in question effectively with minimal risk to the terrorists themselves.

The consequences of a successful bioattack on a sector of a country’s meat or food-crop base could extend beyond the immediate agricultural community to affect other segments of society. A successful attack could result in local or regional economic destabilization and even the disruption of overseas commerce in the trade of a particular commodity, especially if foreign importers moved to erect trade barriers as a “protective” measure.⁵¹

Failing to prevent the release of contagious agents against crops and livestock would also undoubtedly prompt a loss confidence in the government and may lead citizens to question the effectiveness of existing contingency planning against CBRN terrorism in general. The mechanics of dealing with a mass act of agricultural bioterrorism could generate additional public fallout in the form of criticism from animal rights activists and farmers, particularly if containment operations required the large-scale culling of high-risk, but not necessarily disease-showing, livestock.⁵²

Beyond immediate economic and political ramifications, biological attacks against agriculture have the potential to undermine social stability, to create fear, and to galvanize public opinion against the government. Infected farms would have to be quarantined and perhaps permanently closed, affecting not only the agricultural workers themselves, but also the employees of businesses that rely on their produce.⁵³ If attacks involved zoonotic diseases, a major public scare could well result—particularly if human deaths occurred—allowing terrorists to create a general atmosphere of fear and anxiety without having to carry out mass indiscriminate civilian slaughter.

The U.S. agricultural sector is especially vulnerable to agroterrorism, given its vertical integration and the way in which animals are bred, transported, and sold in this country, as well as the high degree of genetic homogeneity and concentration found in America’s main crop-growing regions. Moreover, readily available and

⁵¹See, for instance, Corrie Brown, “The Impact and Risk of Foreign Animal Diseases,” *Vet Med Today*, vol. 208, no. 7 (1996); and Judith Miller, “Administration Plans to Use Plum Island to Combat Terrorism,” *The New York Times*, 21 September 1999.

⁵²Correspondence between RAND project research staff and USDA officials, Washington, D.C., July-September, 1999.

⁵³See, for instance, Brown, “The Impact and Risk of Foreign Animal Diseases.”

relatively inexpensive livestock and produce are important to the health of the U.S. economy. Domestic cattle ranchers and dairy farmers earn between \$50 billion and \$54 billion a year through milk and meat sales, a figure that rises to more than \$100 billion, once related domestic industries and services are taken into account.⁵⁴ While that figure is a tiny fraction of the total U.S. Gross Domestic Product,⁵⁵ disrupting this vital and vulnerable industry could cause economic damage beyond the specific livestock or other agricultural commodity, as well as undermine confidence in the responsible stewardship of much of what is seen as contributing to the “American way of life,” from fast-food outlets to clothing, pharmaceuticals, transportation, entertainment, and general public safety.

State-Sponsored Terrorism

As will be discussed in greater detail below, one of the most significant barriers associated with CBRN terrorism relates to the difficulties of actually transforming nuclear or radiological material or chemical or biological agents into effective weapons suitable for mass destruction. This particular problem would be greatly reduced, however, if terrorist groups were able to benefit from external state-sponsored CBRN weapons programs. Several countries with a record of actively supporting terrorism are known, or at least alleged, to have embarked on the covert development of one or more CBRN capacities. The fear is that one of these states might be prepared to sponsor a CBRN attack, either to expand its own regional influence or as a way of contesting the prevailing power structure of the dominant international system.

In the current global context, the most important of these polities include Iraq, Iran, Sudan, and North Korea. All of these “rogue” states continue to shun internationally accepted norms of behavior; remain—at least outwardly—irreconcilably opposed to the major Western powers; and persist in their support for antigovernment movements, a number of which exhibit highly violent, Manichean tendencies and worldviews. Should any one of these countries view it in their wider geopolitical interest to provide a “client” group with the wherewithal to carry out a major CBRN attack, including a finished weapon, the prospect for a true act of mass destruction would become a distinct possibility.

Particular attention has focused on the proliferation threat emanating from Iraq, especially since the extent of its chemical and biological warfare programs became apparent in the years following the 1990–1991 Persian Gulf War. Independent weapons inspectors currently claim that Baghdad possesses no less than 3.9 tons of VX gas, 4,000 tons of ingredients to make chemical weapons, and at least 25 missile warheads containing germ agents—including anthrax, botulinum toxin, and

⁵⁴Ellen Shell, “Could Mad Cow Disease Happen Here?” *The Atlantic Monthly*, (March 1998); and, “Stockgrowers Warned of Terrorism Threat,” *The Chieftain*, 19 August 1999.

⁵⁵U.S. GDP for 1999 is estimated to be approximately \$9 trillion (chain weighted). Source: Bureau of Economic Analysis, U.S. Department of Commerce.

aflatoxin—that have yet to be declared to the United Nations Special Commission (UNSCOM).⁵⁶ Fears have been expressed that Saddam Hussein might provide some of these agents to American extremist organizations, such as antigovernment militias, as well as to other transnational groups fighting “hostile NATO countries,” in retaliation for the punitive sanctions imposed on his country since 1991.⁵⁷ Iran has also been the focus of growing concern, largely due to the extreme anti-Western sentiments shared by the country’s clerical elite and the vitriolic opposition they express to the U.S. military and political presence in the Middle East.⁵⁸ In 1996, American and Israeli intelligence sources warned that Teheran was holding stocks of chemical and biological agents—as well as a portable aerosol generator that could be used to disseminate anthrax—for possible future terrorist strikes against major American cities.⁵⁹

Attention has also focused on North Korea ever since the country’s covert nuclear weapons program was discovered in 1994. Concern has grown in tandem with the country’s deteriorating internal condition and rising tensions in this part of Northeast Asia. In particular, there is a growing fear that the Pyongyang regime will support a chemical, biological, or even nuclear terrorist attack on American forces in South Korea—and perhaps even on U.S. soil—in a last-ditch attempt to undermine Washington’s backing for Seoul and, in so doing, augment its own bargaining position with South Korea. In the wake of the bombings against the American embassies in Kenya and Tanzania, Sudan has additionally been brought under increasing scrutiny, with U.S. and British officials both claiming that Khartoum has chemical and biological weapons programs that have allegedly provided support to the Osama bin Laden terrorist network.⁶⁰

Although one can never completely discount the possibility that any one of these or other “terrorist-prone” states (such as Libya and Syria) will deliberately assist

⁵⁶Gary Milholin and Kelly Nugent, The Wisconsin Project on Nuclear Arms Control, reproduced in “Germs, Atoms and Poison Gas: The Iraqi Shell Game,” *The New York Times*, 20 December 1998. In addition to this material, Milholin and Nugent, whose report was based on reports from UNSCOM and the International Atomic Energy Agency (IAEA), claim Baghdad has yet to disclose the whereabouts of approximately 600 tons of ingredients for VX gas; up to 3,000 tons of other poison gas agents; 500 bombs with parachutes to deliver gas or germ payloads; approximately 550 artillery shells filled with mustard gas; 107,500 casings for chemical weapons; 31,658 filled and empty chemical munitions; at least 157 aerial bombs filled with germ agents; and spraying equipment to deliver germ agents by air.

⁵⁷See, for instance, “Iraq Revenge Fears as Extremists are Held,” *The Daily Telegraph* (UK), 20 February 1998; “Anthrax Alert on Duty-Free Spirits,” *The Times* (UK), 24 March 1998; and “UK Ports on Alert Over Deadly Anthrax From Report,” *CNN World Wide News*, 24 March 1998.

⁵⁸Richard Falkenrath, “Confronting Nuclear, Biological and Chemical Terrorism,” *Survival*, vol. 40, no. 3 (Autumn 1998), p. 57.

⁵⁹“Iran Ready to Unleash Germ Warfare: US,” *The Australian*, 8 December, 1996.

⁶⁰See W. Seth Carus, *Bioterrorism and Biocrimes: The Illicit Use of Biological Agents in the 20th Century* (Washington, D.C.: Center for Counterproliferation Research, National Defense University, March 1999), pp. 35–36. Al Venter, “North Africa Faces New Islamic Threat,” *Jane’s Intelligence Review Pointer* (March 1998), p. 11.

a terrorist proxy in its acquisition of a CBRN capability, three main factors appear to militate against such a scenario. First, governments that have devoted considerable time, effort, and resources to a covert buildup of their CBRN capacity—sometimes at the expense of international legitimacy—are unlikely to want to place these weapons in the hands of groups over which they have no ultimate control. The sponsor in question would likely have no direct ability to influence how the weapons are ultimately used (this, in the final analysis, being the decision of the surrogate group). Moreover, there would doubtless be grave concerns regarding the security of the weapons once in the hands of the terrorist proxy, the security infrastructure and resources of which are unlikely to match those of the supporting state.

Second, if it were ever discovered that a terrorist CBRN attack had been perpetrated with agents procured from a third party state sponsor, extremely strong, international pressure would build to strike back at the supplier. In this respect, the U.S. cruise missile attack on the al-Shifa pharmaceutical plant in Khartoum, Sudan, following last year's embassy bombings, arguably sent a powerful deterrent message to would-be state sponsors or suppliers of such unconventional weapons to international terrorists. More important, if the targeted state happened to be a nuclear power, retaliation could well be in the form of a nuclear counterattack, something the U.S. has specifically suggested on a number of occasions. Third, given the unpredictable nature of the terrorist groups that would be most interested in gaining a CBRN capacity, the possibility of proxies using weapons against the supporting state itself could never be entirely discounted by the terrorists' patron.⁶¹

Accordingly, rogue regimes should be viewed in the same manner as "mainstream" nation-states in the sense that, for the most part, they act according to clearly defined cost/benefit ratios—the classic statecraft of *realpolitik*. While there may well be some advantage to supporting a CBRN terrorist attack against an enemy state, the national and international ramifications of being implicated in such an assault are sufficiently significant that even outlaw governments would likely be deterred from considering this course of action. That is, the costs of sponsoring CBRN terrorism would be perceived as outweighing the benefits. As long as this holds true, one can reasonably expect state sponsorship of terrorism to continue to adhere to the form that it has traditionally taken since the late 1960s, namely the limited provision of guns, explosives, ordnance, money, and safe havens.⁶²

⁶¹For more on these barriers see Ron Purver, *Chemical and Biological Terrorism. A New Threat to Public Safety? Conflict Studies No. 295* (1996), p. 8; Carl-Heinz Kamp, "An Overrated Nightmare," *The Bulletin of the Atomic Scientists*, vol. 52, no. 4 (1996), p. 33; and, Simon, *Terrorists and the Potential Use of Biological Weapons*, p. 7, footnote 3.

⁶²This point was also made by Parachini in his testimony before the Subcommittee on National Security, Veterans Affairs, and International Relations, Committee on Government Reform, U.S. House of Representatives "Combating Terroism: Assessing the Threat," 20 October 1999, pp. 15-16.

It is significant that, to date, there is no evidence that any formal link exists between terrorist groups and state-assisted CBRN programs. Indeed, a 1997 assessment made by the U.S. Defense Intelligence Agency (DIA) states:

Most of the state sponsors have chemical or biological or radiological material in their stockpiles and therefore have the ability to provide such weapons to terrorists if they wish. However, we have no conclusive information that any sponsor has the intention to provide these weapons to terrorists The likelihood is believed to be low.⁶³

Other Higher-Probability/Lower-Consequence Threats

As noted earlier, the Panel believes that the historically more frequent, lesser-consequence terrorist attack, is more likely in the near term—one involving a weapon on a relatively small-scale incident, using either a chemical, biological or radiological device (and not a nuclear weapon), or conventional explosives. Rather than having the intention of inflicting mass casualties, such an attack could be designed to cause a limited number of casualties, but at the same time cause mass panic. Such an attack could be more along the lines of the biological terrorism incident that occurred in the U.S. a decade before the 1995 Aum nerve gas attack on the Tokyo subway—although the perpetrators' intention in that instance was not to cause panic. Nevertheless, even limited casualties could precipitate a disproportionate psychological response among the public. The resulting panic by citizens who perceive that they have been exposed, but who (like many in Tokyo) in reality have not been exposed, could effectively paralyze response capabilities even among the most prepared.

In 1984, members of a religious cult led by the Bhagwan Shree Rajneesh contaminated the salad bars of ten restaurants in The Dalles, Oregon, with salmonella bacteria, in the hope of debilitating the local populace and thereby rigging a key municipal election in the cult's favor. Although their plot was unsuccessful in achieving the group's political aims,⁶⁴ some 751 people reportedly became ill with salmonella gastroenteritis as a result of the attack.⁶⁵ Interestingly, the event was not immediately reported and it was only later that the group's activities came to light. Perhaps because no one (fortunately) perished, it did not, moreover, receive the often feverish media attention that has accompanied many of the recent domestic anthrax hoaxes or, for example, the recent scare posed by the outbreak of West Nile Fever in

⁶³Quoted in Carus, *Bioterrorism and Biocrimes*, p. 37.

⁶⁴Mary Thornton, "Oregon Guru Disavows Rajneeshism, Vows to Survive Investigations," *Washington Post*, 20 October 1985; and, Peter H. King, "Guru Revels in Revelation of a 'Paradise' Defiled," *Los Angeles Times*, 22 September 1985.

⁶⁵Thomas J. Török et al., "A Large Community Outbreak of Salmonellosis Caused by Intentional Contamination of Restaurant Salad Bars," *JAMA (Journal of the American Medical Association)*, vol. 278, no. 5, 6 August 1997, pp. 389–395.

New York City. The Rajneesh incident, furthermore, inspired none of the “copycat” or similar repeat attacks that might have been expected; nor did it provoke any hoaxes.

An equally plausible scenario is a series of simultaneous (or near-simultaneous) terrorist attacks using or threatening to use chemical, biological or radiological materials, mounted across a city, a wider metropolitan area or geographical region, or even a number of locations throughout the United States. The intent would similarly not be to kill large numbers of people or wreak mass destruction but to exhaust the capabilities of local authorities rapidly, thus creating panic, instilling widespread fear, and likely undermining confidence in government—perhaps even deliberately provoking counterproductive governmental and law enforcement overreaction. Such attacks need not kill anyone, to prove to negate governmental preparedness plans by overwhelming existing response capabilities. The comparative ease with which such low-level chemical, biological, or radioactive incidents could be orchestrated, at least in contrast to the more considerable resources and lower assurances of success that a true WMD or mass-casualties attack would entail, might therefore appeal more to prospective CBRN terrorists. The effects, though certainly less catastrophic, might be sufficient to achieve the terrorists’ principal aims.

Indeed, the ease with which the Russia, for example, was thrown into panic this past August and September, by a handful of enigmatic adversaries using conventional terrorist weapons and tactics, is evidence that terrorists can still ably achieve their objectives of fear and intimidation without resorting to more exotic weaponry or futuristic tactics—an important lesson for the United States *not* to discount the continuing use by terrorists of explosives and other conventional weapons. Attention to the “worst-case scenario” of lower-probability/higher-consequence CBRN terrorism should not be at the expense of higher-probability/lower-consequence incidents, such as the conventional terrorist bombings that rocked Moscow, or deliberate, more terrorist, discrete attacks involving smaller amounts of chemical, biological, or radioactive materials.⁶⁶ This point is demonstrated by another incident in Moscow four years ago that was claimed by Chechen rebels. In November 1995, on the first anniversary of the outbreak of fighting between Russia and the breakaway Republic of Chechnya, Chechen separatists threatened to detonate radiological devices in and around that city.⁶⁷ The rebels attempted to back up their threat by directing a Russian television news crew to a site in a popular Moscow park where the Chechens had buried a large radioactive parcel containing approximately 70 pounds of cesium-137.⁶⁸ Admittedly, this incident neither involved an actual nuclear weapon or device,

⁶⁶See Bruce Hoffman, “Conventional Terrorism Still Works,” *Los Angeles Times Sunday Opinion Section*, 26 September 1999, p. M2.

⁶⁷Sopko, “The Changing Proliferation Threat,” p 3.

⁶⁸See Transcript of NTV Television News, “Chechen Commander Basayev Warns Radioactive Packages Planted in Russia Ready to Explode,” 23 November 1995; Michael Spector, “Chechen Insurgents Take Their Struggle to a Moscow Park,” *New York Times*, 24 November 1995; Brian Killen, “Russia: Moscow Radioactive Parcel Harmless, Officials Say,” *Reuters Business Briefing* (London), 24 November

nor did it, pose any immediate danger to the news crew or any passersby. Nevertheless, it was sufficient to generate considerable alarm within Russia and to attract worldwide attention to the Chechens, their cause, and their demands—precisely the terrorists’ primary objectives.

Such scenarios, however, are at odds with the focus of current policy and preparedness efforts—which have been based on less than comprehensive information and analysis—which seem to emphasize the lower-probability/higher-consequence attacks at the expense of higher-probability/lower-consequence incidents. The guiding assumption has been that smaller-scale, non-mass-casualty events are a lesser-included contingency that can be addressed adequately by preparations for higher-end mass-casualty attacks.⁶⁹ This is by no means axiomatic. The higher-probability/lower-consequence incident will more likely require a state and local response—perhaps exclusively—rather than the lower-probability/higher-consequence event that would almost assuredly emphasize Federal action. Moreover, the number of threats involving the use of smaller-scale CBRN devices continues to increase (although most turn out to be hoaxes).⁷⁰

By continuing a policy that emphasizes high-end threats, there is a very real danger of failing to optimize state and local response capabilities to deal with the more probable terrorist threats confronting the United States today.

Impediments to Developing Effective WMD Capabilities

The detailed description, in Chapter Three, of the Aum Shinrikyo incidents suggests that the hurdles faced by terrorists seeking to develop true weapons of mass casualties and mass destruction are more formidable than is often imagined. This report does not argue that terrorists cannot produce and disseminate biological or

1995; and, “Russia: Moscow Radioactive Parcel Sparks Chechen-Raid Fear,” *Reuters* (London), 24 November 1995; “Russian Film Crew Alleges Chechen Connection in Moscow Radiation Scare,” Interfax News Agency (Moscow), 24 November 1995; “Chechen separatists hid case of radioactive cesium,” *Agence France Presse*, 23 November 1995; and, “Rebel’s Threat to Moscow,” *Daily Telegraph* (London), 25 November 1995.

⁶⁹ This issue emerged as a salient area of concern to the Panel as a result of information provided to it by the local responder and medical communities as well as by State and local government officials. Accordingly, during subsequent phases of the project further attention and investigation will be focused on this specific issue.

⁷⁰The number of criminal investigations opened by the FBI in response to threats regarding the use of CBRN materials has grown considerably in recent years: from 37 incidents in 1996 to 74 in 1997 to 181 in 1998. Three-quarters of these have threatened biological release, with anthrax the agent most frequently cited. The vast majority of these threats, however, have been “determined to be non-credible . . . have been small in scale and committed primarily by individuals or smaller splinter/extremist elements of right wing groups which are unrelated to larger terrorist organizations.” Statement for the Record of Robert M. Burnham, Chief, FBI Domestic Terrorism Section, before the U.S. House of Representatives Subcommittee on Oversight and Investigations, 19 May 1999, at <http://www.fbi.gov/pressrm/congress/bioleg3.htm>

chemical agents capable of injuring or indeed killing relatively small numbers of persons (such as the Aum event) or perhaps inflicting serious casualties even in the hundreds. The point is that creating truly mass-casualty weapons—capable of killing in tens of thousands, much less in the thousands—requires advanced university training in appropriate scientific and technical disciplines, significant financial resources, obtainable but nonetheless sophisticated equipment and facilities, the ability to carry out rigorous testing to ensure a weapon's effectiveness, and the development and employment of effective means of dissemination. Developing a nuclear weapon requires even greater skills, financial resources, and infrastructure. In these respects, accordingly, the resources and capabilities required to annihilate large numbers of persons—i.e., to achieve a genuinely mass-casualty chemical and biological weapon or nuclear/radiological device—appear, at least for now, to be beyond the reach not only of the vast majority of existent terrorist organizations but also of many established nation-states.⁷¹ Moreover, significant personal risks are run by those who would be involved in the acquisition, development, production, testing, and handling of any such lethal weapon or agent.⁷² The Panel recognizes that, while the analysis indicates significant difficulties currently faced by terrorists who may wish to perpetrate a major CBRN incident, such a catastrophic event is within the realm of possibility. Therefore, the Panel believes that comprehensive capabilities must be developed to respond to incidents across a broad spectrum.

There is an important corollary to the previously mentioned requirements inherent in such an undertaking (personnel, money, facilities, equipment, testing, and related logistics). All of that activity inevitably will materially increase the risk of exposure of the terrorist group to detection by intelligence and law enforcement agencies.⁷³

⁷¹The same point is made in Falkenrath et al., *America's Achilles' Heel*, pp. 30–34.

⁷²These points are echoed in a recent U.S. government report entitled, "Combating Terrorism: Need for Comprehensive Threat and Risk Assessments of Chemical and Biological Attacks," U.S. General Accounting Office (NSIAD-99-163) (September 1999), pp. 10–15.

⁷³ Even in the case of Aum there was ample intelligence pertaining to the group and its various nefarious activities that was in fact known to the Japanese authorities months before the Tokyo subway attacks. However, for a variety of reasons, this information was either willfully ignored or deliberately disregarded. For example, in June 1994, the group had tried to kill three judges presiding over a civil suit brought against Aum in the town of Matsumoto. Members of the group sprayed the apartment block where the judges were sleeping with sarin. Seven persons were killed and more than 250 others were admitted to hospital with nerve-gas induced symptoms (although taken seriously ill, the judges survived). Amazingly, though, a report subsequently issued by a special unit of the Tokyo metropolitan police department's criminal investigation laboratory pointing to the nerve gas' presence in the environs of the judge's residence went ignored—despite a record of repeated local complaints of strange odors emanating from the sect's nearby compound alongside previously raised questions about unexplained disappearances of both former Aum members and other individuals who had attempted to investigate the sect's activities (see Jonathan Annells and James Adams, 'Did terrorists kill with deadly nerve gas test?', *Sunday Times* (London), 19 March 1995. Interestingly, this news account was published only a day before the nerve gas attack on the Tokyo subway took place). The lesson from the Aum case, therefore, is

The Panel acknowledges that the situation now facing a terrorist, who may seek to use a CBRN weapon to achieve mass effects, could change dramatically because of new discoveries, further advances in technology, or other material factors. This is particularly true with respect to potential improvements in aerosolization techniques and processes; advances in the isolation, purification, stability, and quality of certain biological strains; or enhancements to delivery devices, such as nozzles or other sprayers. Future progress in any two or more areas would be especially troubling. Nevertheless, a survey of the challenges that *currently* confront any terrorist group attempting to develop its own “WMD” capability is illustrative.

Biological Terrorism

There are at least four primary acquisition routes that terrorists could conceivably pursue in acquiring a biological warfare capability. They are

- purchasing a biological agent from one of the world’s 1,500 germ banks, as Larry Wayne Harris did;
- theft from a research laboratory, hospital, or public health service laboratory, where agents are cultivated for diagnostic purposes;
- isolation and culturing of a desired agent from natural sources; or
- obtaining biological agents from a rogue state, a disgruntled government scientist, or a state sponsor.

The principal obstacle is less the development of a biological agent than the development of a genuinely lethal strain of the agent in sufficient quantities to cause mass casualties—precisely as Aum’s experience indicates. Acquiring the “most infectious and virulent culture for the seed stock is the greatest hurdle,” a former senior official in the U.S. military’s biological warfare program maintains.⁷⁴ As Aum clearly demonstrated, this is not an easily surmountable obstacle. The most obvious route would be by attempting to acquire the strain from nature, e.g., obtaining potentially lethal anthrax spores from soil and then culturing sufficient quantities to produce mass casualties. While theoretically conceivable, this is nonetheless difficult in practice and doubtless well beyond the capabilities of most terrorist groups.

Acquiring a biological agent of sufficient virulence is only one of the prerequisites for conducting biological terrorism on a mass scale. As Ken Alibek, one of the former Soviet Union’s leading biological weapons scientists has argued, the “most virulent culture in a test tube is useless as an offensive weapon until it has been put through a

less a matter of having intelligence, than being able to recognize its significance and being prepared to act decisively based on such information.

⁷⁴Quoted in Sheryl WuDunn, Judith Miller, and William J. Broad, “How Japan Terror Alerted World,” *New York Times*, May 26, 1998.

process that gives it stability and predictability. The manufacturing technique is, in a sense, the real weapon, and it is harder to develop than individual agents.”⁷⁵ Airborne viral agents, in particular, are extraordinarily difficult to work with, since the mass production, packaging, and storage of viruses are by themselves difficult and complicated tasks, demanding advanced biotechnical skills,⁷⁶ in addition to the attendant risks to personnel involved in the process.

In the specific case of botulinum toxins, there are difficulties in purifying these agents, which then will likely become unstable once they are purified. According to one biological warfare authority, “maintaining the high toxicity in the culture and the properties of the toxin as you purify it are what you have to have a lot of years [of experience] to know how to do.”⁷⁷ The same problem of maintaining toxicity during the purification process hampered U.S. government researchers during the Cold War. They discovered that attempting to achieve 95 percent purity of a biological agent—the level needed to render it effective as a weapon—in turn reduced the bulk amount of the toxin by 70–80 percent.⁷⁸

Producing other types of bioterrorism agents similarly requires training, advanced techniques, and specialized equipment. In the case of *B. anthracis*, for example, transforming the bacterium into spore form suitable for use in a wide-scale terrorist attack necessitates a combination of skill and extreme care during a production technique that involves the application of heat or chemical shock. During all stages of the process, *B. anthracis*, like all other biological agents, must also be continuously tested to ensure its purity and lethality and thus its utility for weapons purposes. Although small-scale laboratory testing might be concealed, any larger-scale tests will likely invite the attention of law enforcement or intelligence agencies. Indeed, any group aiming at developing a weapon capable of inflicting mass casualties would almost certainly require sophisticated, though not exotic, laboratory equipment. According to the Central Intelligence Agency, this would include “fermenters, large-scale lyophilizers or freeze dryers, class II or III safety hoods, High-Efficiency Particulate Air (HEPA) filters, and centrifuges.”⁷⁹ Estimates for the cost of equipping a facility for the production of biological agents for mass-casualty terrorist operations vary widely but would likely seem to fall anywhere in the \$200,000 to \$2 million range—certainly not trivial sums.

⁷⁵Ken Alibek with Stephen Handelman, *Biohazard* (New York: Random House, 1999), p. 97.

⁷⁶Raymond Allen Zalinskas, “Terrorism and Biological Weapons: Inevitable Alliance?” *Perspectives in Biology and Medicine*, Vol. 34, No. 1 (Autumn 1990), p. 51.

⁷⁷Quoted in Tom Waters, “The Fine Art of Making Poison,” *Discover*, August 1992, p. 33.

⁷⁸Faced with such difficulties, the United States abandoned its efforts to develop botulinum toxin as a biological warfare agent. Interview by RAND staff with David Franz.

⁷⁹*Global Proliferation of Weapons of Mass Destruction*, Hearings before the Permanent Subcommittee on Investigations, U.S. Senate Committee on Governmental Affairs, 104th Congress, 1st Session, Part I, October 31 and November 1, 1995, p. 529.

Although there remains a widespread public perception that it is easy to acquire and use highly lethal biological agents, there is no clear consensus among analysts about how much scientific and technological expertise and prior training are needed. Some authorities maintain that having an “experimental microbiologist and a pathologist, or someone who combines these capabilities, would be crucial. . . . [s]upplemented with a little help and advice from an aerosol physicist and a meteorologist.”⁸⁰ Other experts are even more conservative in their assessments. In their view, the creation of a mass-casualty biological weapon would entail scientific teams composed of persons highly trained in “microbiology, pathology, aerosol physics, aerobiology, and even meteorology.”⁸¹ The acquisition of dedicated staff with the appropriate scientific and engineering knowledge and credentials may, therefore, be the greatest hurdle to developing an effective biological terrorism capability. Finding trained and skilled personnel, who could also overcome obstacles of perhaps working in less-than-ideal environments and who are willing to participate in mass murder, is a profound organizational roadblock, inherent to terrorist development of biological weapons, that is perhaps too readily discounted.⁸² In addition, the paranoid, stressful, and fantasy-prone atmosphere almost certain to be present in a terrorist organization most likely to seek to acquire biological weapons would make it difficult for personnel to perform efficiently the careful and demanding work required for a successful program. In the case of Aum, the atmosphere within the cult, characterized by extreme paranoia, intense stress, and widespread delusion, likely contributed to its failure to develop an effective biological weapons capability. That atmosphere could exist in any number of potential terrorist organizations with similar intentions or motivations.

Finally, terrorists intent on inflicting hundreds of thousands of casualties with biological agents would have to create an aerosol cloud to disseminate the toxin. Aerosol clouds can be created from biological agents in either a mud-like liquid (“slurry”) form or in a dried, talcum powder-like form. The latter is far more difficult. In the case of *B. anthracis*, turning the spores into a powder requires the use of large and expensive centrifuges and drying apparatus. Powder, moreover, clings to surfaces, making it both difficult to handle and more probable that those handling it will accidentally infect themselves.⁸³ In addition, the drying process needed to create a pathogenic powder tends to kill inordinate amounts of the organisms. The use of slurry, on the other hand, while less technically challenging, still presents significant problems. For example, the slurry must be continuously refrigerated until it is used,

⁸⁰B.J. Berkowitz et al., *Superviolence: The Civil Threat of Mass Destruction Weapons* (Santa Barbara, Calif.: Adcon Corporation, 29 September 1972), p. 8–65.

⁸¹Ron Purver, *Chemical and Biological Terrorism: The Threat According to the Open Literature* (Ottawa: Canadian Security Intelligence Service, June 1995), p. 11.

⁸²Conrad V. Chester, “Obstacles to Large-Scale Biological Terrorism,” paper presented at the Annual Meeting of Doctors for Defense Preparedness, Las Vegas, Nev., September 22, 1991, p. 3.

⁸³Frederick R. Sidell, M.D., William C. Patrick, III, and Thomas R. Dashiell, *Jane’s Chem-Bio Handbook* (Alexandria, VA: Jane’s Information Group, 1998), p. 232.

and unless it is extremely pure, material is likely to settle at the bottom of a container and clog the sprayer or aerosol dissemination device. As is detailed below, this is precisely what happened when Aum Shinrikyo members sprayed what they believed to be a lethal strain of *B. anthracis* from the roof of a Tokyo building in 1993.⁸⁴ A slurry concoction is also tricky to disseminate as an aerosol of particles of an optimal size—in other words, that will readily be inhaled into the victims' lungs.⁸⁵ Disseminating particles of the proper size (1–5 microns) is critical to the success of any large-scale attack. Building a disseminator capable of dispersing 1- to 5-micron particles in dry form would, however, be a major technical hurdle for any prospective biological terrorist.⁸⁶ That being said, the dissemination itself could conceivably be physically accomplished in any number of different ways: from low-flying airplanes, crop dusters, trucks equipped with sprayers, or with an aerosol canister situated in one place and activated by a remote timing device.

Even if a terrorist group succeeded in producing a virulent biological agent, even if it conducted rigorous tests to ensure that virulence was maintained, and even if it prepared the agent properly for aerosolization and acquired the proper equipment with which to disseminate it, at least one major hurdle would remain. As bioagents are aerosolized and become airborne, they decay rapidly. It is estimated, for example, that 90 percent of the microorganisms in a slurry are likely to die during the process of aerosolization.⁸⁷ Environmental conditions are likely to reduce the effectiveness of biological agents still further. Sunlight, smog, humidity, and temperature changes reduce the ability of pathogens to survive and multiply, although biological agents dispersed in a subway station or other enclosed area may not be subjected to conditions as adverse as those in open areas. Potential users of biological weapons must, therefore, take into account other disruptive meteorological conditions as well. Rain will wash most aerosol particles out of the air, and high local wind speed will disrupt an aerosol cloud.

In sum, while the technical challenges in producing an effective biological weapon are not insurmountable, they are neither as straightforward nor as simple as has often been claimed and presented publicly. The latter view, based on the limited information previously available, has heretofore primarily served as the basis for the public and for many decisionmakers to draw conclusions about the direction of related public policy. The level of difficulty was in fact what Aum discovered for itself and why it elected to pursue, in tandem with its continuing biological weapons R&D program, a

⁸⁴WuDunn, Miller, and Broad, "Japan Germ Terror," p. A10.

⁸⁵Zalinskas, "Iraq's Biological Warfare Program," p. 144.

⁸⁶Chester, "Obstacles," p. 3.

⁸⁷Jonathan B. Tucker, "Bioterrorism: Threats and Responses," in Joshua Lederberg, ed., *Biological Weapons: Limiting the Threat*, BCSIA Studies in International Security (Cambridge, Mass., and London: MIT Press, 1999), p. 302.

concerted and even more expensive effort to produce chemical weapons.⁸⁸ Moreover, as previously mentioned, the requirements to amass personnel, money, facilities, equipment; to conduct testing; and to execute related logistics tasks, will materially increase the risk of exposure to detection by intelligence and law enforcement agencies.

Chemical Terrorism

Chemical agents fall into four broad categories:

- Choking agents, such as phosgene and chlorine.
- Blood agents, including hydrogen cyanide and cyanogen chloride.
- Blister agents, e.g., mustard gas.
- G-series nerve agents, such as tabun (GA), sarin (GB), and soman (GD); and V-series nerve agents, e.g., VX.

Although any of these agents could be used for the purpose of causing mass-casualty attacks, it appears likely that terrorists would reject most of them. In the case of choking agents, for example, very large amounts would be needed to inflict mass fatalities. Blister agents, while capable of causing injury on a large scale, are very unlikely to cause death en masse. VX and other V-series nerve agents would also be unlikely candidates, because the technical challenges associated with weaponizing them are formidable. Sarin, on the other hand, is highly toxic, volatile, and relatively easy to manufacture. Indeed, it was these same qualities that attracted Aum Shinrikyo's scientists to sarin and why Shoko Asahara, the group's leader, so enthusiastically supported the ambitious chemical weapons R&D program that they pursued in parallel to the cult's biological efforts.⁸⁹ Accordingly, for these reasons, it is perhaps worthwhile to focus on the technological requirements needed to produce sarin, especially because it is the only chemical agent to have been employed successfully for mass-casualty purposes by a terrorist group, even though its ultimate use fell far short of the effects intended.

Although often referred to as a nerve "gas," sarin is, in fact, a liquid at any ambient temperature. When in vapor form, it is heavier than air and, as a result, will cling to floors, sink into basements, and gravitate toward low terrain. Like all nerve agents, sarin works by interfering with the mechanisms through which one's nerves communicate with one's bodily organs, causing the latter to become highly overstimulated.⁹⁰ Although the effects on persons who inhale small amounts of vapor—such as occurred in the 1995 Tokyo subway attack—normally are limited to

⁸⁸Kaplan and Marshall, *The Cult at the End of the World*, pp. 85–86.

⁸⁹Ibid.

⁹⁰Sidell, Patrick, and Dashiell, *Chem-Bio Handbook*, p. 72.

tightness in the chest, shortness of breath and coughing; victims who inhale larger amounts soon lose consciousness, go into convulsions, and stop breathing altogether.

It has sometimes been claimed that producing sarin and other nerve agents is a relatively easy process, to the extent, according to one authority, that “ball-point pen ink is only one chemical step removed.”⁹¹ While sarin may be less complicated to synthesize than other nerve agents, the expertise required to produce it should not, however, be underestimated. The safety challenges involved would, at a minimum, require skill, training, and special equipment to overcome. For this reason, the level of competency required for producing sophisticated chemical nerve agents, including sarin, will likely be on the order of a graduate degree in organic chemistry and/or actual experience as an organic chemist—not simply a knowledge of college-level chemistry, as is sometimes alleged.

Moreover, as with biological weapons, developing a means to disseminate sarin effectively is likely to prove a far greater challenge to terrorists than is producing the agent itself. Although sarin’s high volatility greatly simplifies weaponization, terrorists who may seek to cause mass casualties will need a fairly sophisticated means of spreading the agent in sufficiently large quantities over their intended target area. For wide coverage in an open area, such as a city, an airplane equipped with a suitable industrial or crop sprayer could be a satisfactory mechanism for dissemination. Alternatively, terrorists could equip a truck and drive through the target area, taking care, of course, to ensure that its passengers are properly sealed off from the chemical agent. Temperature, wind speed, inversion conditions, and other meteorological factors, however, would likely determine the effectiveness of any attack. For example, as sarin and other chemical agents are exposed to the environment, they tend to be dispersed by the wind, which necessitates the use of large amounts of material to ensure that a given target receives a sufficiently high dose.

In fact, the need to produce and disperse sufficiently large amounts of sarin or other chemical agents to achieve the mass-casualty levels that may be sought by terrorists arguably drawn to chemical weapons in the first place ironically may be the biggest disincentive for their use. A U.S. Defense Department model illustrates the problem.⁹² Releasing ten kilograms (22 pounds) of sarin into the open air under favorable weather conditions covers about one-hundredth of a square kilometer with lethal effects. Since population densities in U.S. urban areas are typically around 5,000 people per square kilometer, such an attack would kill about 50 people. Releasing 100 kilograms (220 pounds) of sarin into the open air affects about ten

⁹¹Wayman C. Mullins, “An Overview and Analysis of Nuclear, Biological, and Chemical Terrorism: The Weapons, Strategies and Solutions to a Growing Problem,” *American Journal of Criminal Justice*, Vol. 16, No. 2 (1992), pp. 108-109.

⁹²The model, known as VLSTRACK 3.0, was developed by the Dahlgren Division, Naval Surface Warfare Center, Dahlgren, Virginia.

times as much area and therefore would kill approximately 500 people. Releasing 1,000 kilograms (2,200 pounds) into the open air would cover several square kilometers, killing about 10,000 people. Thus, only in an open-air attack using amounts approaching 1,000 kilograms of sarin would the effects become distinctly greater than that attainable by such traditional terrorist means as conventional explosives. One way for terrorists to overcome these problems would be to carry out an attack in an enclosed space, such as a domed stadium, office building, or subway system.⁹³

Again, Aum's experiences in the chemical weapons domain are instructive. Clearly, the cult was able to acquire the knowledge, chemicals, and equipment needed to synthesize sarin. It was an expensive research and development effort, with cost estimates as high as \$30 million. Aum's 80-man program, housed in state-of-the-art facilities, was led by a Ph.D.-level scientist, and it took at least a year between the time of conception and the initial production of sarin. Nevertheless, the Tokyo subway attack, and the cult's earlier sarin attack in Matsumoto, succeeded in killing (though no less tragically) only a dozen people.

Given these impediments, a terrorist interested in harming large numbers of persons might prefer to attempt to engineer a chemical disaster using conventional means to attack an industrial plant or storage facility, rather than develop and use an actual chemical weapon. In this way, significant technical and resource hurdles could be overcome, as well as reducing the profile of the terrorist organization to potential detection by intelligence or law enforcement agencies.

Common industrial and agricultural chemicals can be as highly toxic as bona fide chemical weapons and, as the 1984 Bhopal, India, catastrophe demonstrated, just as (if not even more) effective when unleashed on a nearby populace. In that incident, a disgruntled employee at a pesticide plant precipitated an explosion in one of the storage tanks by simply adding water to it. In the massive release of methyl isocyanate that followed, the noxious fumes affected thousands of people living near the plant. Four months later, some 1,430 persons were reported to have died as a direct result of the leak—a figure that increased to the 3,800 reported by Indian officials seven years later. A total of 11,000 persons were listed as having been disabled or harmed from exposure to the gas⁹⁴—in both instances, exponentially greater numbers than Aum was able to achieve in its attacks using sarin.

⁹³An attack on an enclosed structure would of course require less sarin to be effective. There are, however, operational problems associated with conducting chemical attacks in such environments that would first have to be overcome. The perpetrators, for example, will first need to heat the sarin to make it volatile; otherwise, the formation of sarin vapor would be slow enough to allow the victims to flee the area as they experienced early symptoms of exposure.

⁹⁴Jessica Stern, "Apocalypse Never, but the Threat Is Real" in "WMD Terrorism: An Exchange," *Survival*, vol. 40, no. 4 (Winter 1998-1999), p. 177.

Nuclear Terrorism

Perhaps the only certain way for terrorists to achieve bona fide mass destruction would be to use a nuclear weapon. In this area, however, the challenges are arguably the most formidable.

Although the collapse of the Soviet Union heightened Western fears about security at Russian military facilities, it appears that Russian strategic and tactical weapons are perhaps more secure than had been initially feared.⁹⁵ Where there may be particular concern, however, is during their transportation for maintenance or dismantling, when the Russian weapons apparently are not subject to the same strict security measures.⁹⁶ But even if terrorists were able to steal or acquire through black market purchase a stolen nuclear weapon, they would still face a number of significant obstacles in using or detonating it. Strategic nuclear warheads are immense and would be extremely difficult to move either easily or clandestinely. Tactical nuclear weapons, such as artillery projectiles, admittedly, are far lighter and easier to conceal, making them potentially much more attractive items for terrorist theft or illicit acquisition. Moreover, many tactical nuclear weapons, and most strategic nuclear devices, are equipped with permissive action links (PALs) or other protective mechanisms designed to prevent accidental or unauthorized detonation.⁹⁷ In addition, some nuclear devices have tamper-proof seals that will disable the weapon if unauthorized personnel attempt to disassemble it. It would be extremely difficult, therefore, for terrorists to circumvent or overcome these built-in protective measures; some of the smaller tactical weapons (including the KGB's alleged nuclear bombs concealed in small suitcases) admittedly may have had little or no protective devices or locks installed and, thus, the safety measures designed to thwart unauthorized detonation would be more easily overcome.⁹⁸ In the absence of assurance about the status and control of all Russian nuclear weapons, we must remain vigilant.

Terrorists who were either unable or unwilling to steal a nuclear device or were unsuccessful in obtaining one on the putative black market that has surfaced in the countries of the former Soviet Union and Warsaw Pact,⁹⁹ might attempt to build one

⁹⁵Karl-Heinz Kamp, "Nuclear Terrorism is Not the Core Problem," *Survival*, Vol. 40, No. 4 (Winter 1998-1999), p. 170.

⁹⁶Oleg Bukharin, "Nuclear Safeguards and Security in the Former Soviet Union," *Survival*, Vol. 36, no. 4, p. 62.

⁹⁷Peter deLeon et al., *The Threat of Nuclear Terrorism: A Reexamination*, N-2706 (Santa Monica, Calif.: RAND, January 1988).

⁹⁸See also, Jessica Stern, *The Ultimate Terrorists* (Cambridge, Mass.: Harvard University Press, 1999), pp. 89-99

⁹⁹For detailed analyses of this issue, see Bruce Hoffman with David Claridge, "Illicit Trafficking in Nuclear Materials," *Conflict Studies* nos. 314/315 (London), January/February 1999; Karl-Heinz Kamp, "Nuclear Terrorism—Hysterical Concern or Real Risk?," *Aussenpolitick—German Foreign Affairs Review*, vol. 46, no. 3. (1995) World-Wide Web Page of the International Security Net, Center for Security Studies, ETH Zurich (www.ethz.ch/au-pol/kamp.htm); Phil Williams and Paul N. Woessner, "The Real Threat of

themselves. Their first hurdle, however, would be in acquiring sensitive nuclear material (SNM), that is, either highly enriched uranium (HEU) or plutonium (Pu) suitable for fashioning a nuclear device.¹⁰⁰ Mining and processing uranium or building a reactor to create plutonium would of course be impractical (although, it should be noted, Aum's most grandiose aims embraced this possibility); terrorists would, therefore, have to steal SNM or conceivably purchase it on the black market. A number of authorities in recent years repeatedly have expressed concern about illicit access to nuclear materials and technology, particularly in the former Soviet Union. Minatom, the Russian entity with responsibility for nuclear weapons, has itself complained about a lack of qualified personnel and adequate control systems, and the security at HEU storage facilities has also been reported to be grossly inadequate.¹⁰¹

Given this apparent lack of security, and the fact that 250 tons of HEU and 50 tons of weapons-grade plutonium has been stockpiled in Russia,¹⁰² the risk of illicit acquisition from SNM storage facilities should be considered a serious threat. Potentially less worrying, however, is the supposed "black market" for these substances. Between 1992 and 1996, more than 1,000 claims were made involving the illicit sale and smuggling of nuclear material;¹⁰³ however, only six instances were substantiated, and none of those involved the quantities needed to construct an effective "homemade" device that could cause mass casualties—thereby suggesting that the black market, if it exists at all, is limited in size and grossly exaggerated in impact.¹⁰⁴

Nuclear Smuggling," *Scientific American*, vol. 274, no. 1 (January 1996); William C. Potter, "Before the Deluge? Assessing the Threat of Nuclear Leakage from the Post-Soviet States," *Arms Control Today*, October 1995; Rensselear W. Lee III, "Post-Soviet Nuclear Trafficking: Myths, Half-Truths, and the Reality," *Current History*, October 1995; Phil Williams and Paul N. Woessner, "Nuclear Material Trafficking: An Interim Assessment," *Transnational Organized Crime*, vol., 1, no. 2 (Summer 1995); and, Oleg Bukharin and William Potter, "Potatoes Were Guarded Better," *The Bulletin of the Atomic Scientists*, May-June 1995.

¹⁰⁰U-235 and Pu-239 are optimal weapons grade material for use in a nuclear weapon. However, a device using reactor grade, mixed isotope plutonium was detonated successfully during the 1960s. While less efficient, reactor grade material would presumably be easier to acquire. Office of the Secretary of Defense, *Proliferation: Threat and Response* (Washington, D.C.: USGPO, April 1996), p. A-1.

¹⁰¹Malcolm Gray and William Lowther, "The 'Loose Nukes,'" *Maclean's*, Vol. 109, No. 17, pp. 25-26.

¹⁰²Bukharin, "Nuclear Safeguards," p. 59.

¹⁰³Tom Wilkie, "Terrorists and the Bomb," *World Press Review*, Vol. 43, No. 9, p. 36. It is worth noting, however, that due in part to International Atomic Energy Agency (IAEA) safeguards, "individual commercial power reactors are neither the most vulnerable nor the most fruitful sites for diverting nuclear materials." OTA, *Technologies Underlying WMD*, p. 131.

¹⁰⁴To be sure, small amounts of SNM have been diverted illegally, apparently from Russian facilities. It is worth noting, however, that all of the SNM stolen to date is not sufficient to make a single nuclear device and that reported thefts of weapons grade material have dropped in recent years. Ongoing improvements in Russian nuclear security procedures should further reduce the incidents of theft. OSD, *Proliferation: Threat and Response* (Washington, D.C.: USGPO, 1997), accessed at <http://www.defenselink.mil/pubs/prolif97/trans.html#terrorism>.

Building a nuclear device capable of producing mass destruction presents Herculean challenges for terrorists and indeed even for states with well-funded and sophisticated programs. According to one analysis, minimum requirements include “personnel, skills, information, money, facilities, equipment, supplies, security, special nuclear materials. . . and, usually, other specialized and hard-to-obtain material.”¹⁰⁵ According to another assessment, a successful program hinges on

obtaining enough fissile material to form a super-critical mass for each of its nuclear weapons (thus permitting a chain reaction); arriving at a weapon design that will bring that mass together in a tiny fraction of a second, before the heat from early fission blows the material apart; and designing a working device small and light enough to be carried by a given delivery vehicle.¹⁰⁶

It is important to emphasize that the above represents the *minimum* requirements. If each one is not met, concludes the assessment, “one ends up not with a less powerful weapon, but with a device that cannot produce any significant nuclear yield at all or cannot be delivered to a given target.”¹⁰⁷

That being said, it is clear that certain types of nuclear devices are easier to create than others.¹⁰⁸ Two types of weapons systems, for example, can create nuclear fission: the implosion device and the “gun” type. In the former, explosives compress a sphere of HEU or plutonium into a small ball, thus achieving supercriticality and a nuclear chain reaction. Even the simplest implosion weapon, however, requires the fabrication of complex components, such as high-explosive lenses, high-performance detonation systems, and fusing and firing circuitry.¹⁰⁹ The gun-type device, on the other hand, employs HEU exclusively. Using a high explosive, the system fires a subcritical HEU projectile into a subcritical cylinder of HEU to form a solid mass of critical material. Although it uses relatively scarce HEU, the gun-type device is considered technically easier to fabricate; and many analysts accordingly argue that terrorists attempting to make a bomb “in house” will build a gun-type device.

There is disagreement, however, about what level of expertise and other resources are required to construct such a weapon. According to one authority, “most states and some exceptionally capable non-state actors” could build a highly destructive 10-kiloton weapon in several months at a cost of a few hundred thousand

¹⁰⁵Berkowitz et al., *Superviolence: The Civil Threat of Mass Destruction*, p. 7-2. The general steps involved in producing a nuclear weapon are described in Appendix I. The resources required to fabricate plutonium and uranium devices are outlined in Appendix II.

¹⁰⁶OTA, *Technologies Underlying WMD*, p. 129.

¹⁰⁷Ibid., p. 129.

¹⁰⁸There is a consensus among experts that building a fusion or thermonuclear weapon is well beyond the capability of any terrorist organization. For this reason, these devices will not be considered in this paper.

¹⁰⁹Falkenrath et al., *America’s Achilles’ Heel*, pp. 135-136.

dollars—assuming they had access to sufficient quantities of fissile material.¹¹⁰ Other experts, however, are far more skeptical in their estimates of the capabilities required. Although much of the information about nuclear weapons design and production has become public knowledge during the past 50 years, it is still extraordinary for nonstate entities to attempt to embark on a nuclear weapons R&D program.¹¹¹ Indeed, even technical requisite knowledge and hands-on experience are not enough to build an effective nuclear weapon. As an Office of Technology Assessment report explains, “[k]nowledge must be supplemented by industrial infrastructure and the resources to carry a nuclear weapon program to completion. The technologies for building cars and propeller-driven airplanes date back to early in this century, but many countries still cannot build them indigenously.”¹¹²

Moreover, the fact that a number of states—despite aid from other nuclear powers, their own intense motivations, the provision of considerable resources, alongside concerted espionage activities designed to support their R&D programs—still struggle to build a nuclear weapon capability, suggests that the technical challenges remain immense.¹¹³ In the case of South Africa, for example, it took scientists and engineers—who were endowed with a large and sophisticated infrastructure—four years to build their first gun-type system.¹¹⁴

Nevertheless, any nuclear weapons program will inevitably involve a number of people, and significant resources, equipment, and facilities. As noted earlier, all of that activity inevitably will materially increase the risk of exposure of the terrorist group to detection by intelligence and law enforcement agencies.

Radiological Terrorism

In the view of some authorities, theft of a nuclear device or building a weapon “in house” are the least-probable courses of action for a prospective nuclear terrorist. Far more likely—for all the reasons cited above—is the dispersal of radiological material in an effort to contaminate a target population or distinct geographical area.¹¹⁵ The material could be spread by radiological dispersal devices (or RDDs)—i.e.,

¹¹⁰Ibid., p. 126.

¹¹¹Berkowitz et al., *Superviolence*, p. 8-5. Given the complexity and range of the tasks involved, it appears highly unlikely that any single individual would possess all of the knowledge and skills required to fabricate even a crude nuclear weapon. J. Carson et al., “Can Terrorists Build Nuclear Weapons?” in Paul Leventhal and Yonah Alexander, eds., *Preventing Nuclear Terrorism: The Report and Papers of the International Task Force on Prevention of Nuclear Terrorism* (Lexington, Mass.: Lexington Books, 1987), p. 58.

¹¹²OTA, *Technologies Underlying WMD*, p. 150.

¹¹³Kamp, “An Overrated Nightmare,” p. 53.

¹¹⁴David Hughes, “When Terrorists Go Nuclear: The Ingredients and Information Have Never Been More Available,” *Popular Mechanics*, Vol. 173, No. 1, pp. 57-59.

¹¹⁵U.S. Congress, OTA, *Technology Against Terrorism: The Federal Effort*, OTA-ISC-481 (Washington, D.C.: USGPO, July 1991), p. 20.

“dirty bombs” designed to spread radioactive material through passive (aerosol) or active (explosive) means. Alternatively, the material could be used to contaminate food or water. This latter option is, however, considerably less likely given the huge quantities of radioactive material that would be required. The fact that most radioactive material is not soluble in water means that its use by a terrorist would be unlikely and impractical, if the purpose is to contaminate reservoirs or other municipal water supplies, because the radioactive material will settle out or be trapped in filters. Those factors, coupled with the fact that any radioactive material will present safety risks to the terrorists themselves, collectively indicate the serious difficulties for any adversary attempting to store, handle, and disseminate it effectively.

Radiological weapons kill or injure by exposing people to radioactive materials, such as cesium-137, iridium-192, or cobalt-60. Victims are irradiated when they get close to or touch the material, inhale it, or ingest it. With high enough levels of exposure, the radiation can sicken and kill. Radiation (particularly gamma rays) damages cells in living tissue through ionization, destroying or altering some of the cell constituents essential to normal cell functions.¹¹⁶ The effects of a given device will depend on whether the exposure is “acute” (i.e., brief, one time) or “chronic” (i.e., extended).

There are a number of possible sources of material that could be used to fashion such a device, including nuclear waste stored at a power plant (even though such waste is not highly radioactive), or radiological medical isotopes found in many hospitals or research laboratories. Although spent fuel rods are sometimes mentioned as potential sources of radiological material, they are very hot, heavy, and difficult to handle, thus making them a poor choice for terrorists. Other sources, such as medical devices, might be much easier to steal and handle. These materials, however, have a lower specific activity than the materials in reactor fuel rods (although large unshielded sources are quite dangerous). Presumably, terrorists could steal a device (either in transit or at the service facility or user location) and remove the radioactive materials. Radioactive materials are often sintered in ceramic or metallic pellets. Terrorists could then crush the pellets into a powder and put the powder into an RDD. The RDD could then be placed in or near a target facility and detonated, spreading the radiological material through the force of the explosion and in the smoke of any resulting fires. Of course, the larger the radioactive material dispersal area, the smaller the resulting dose rate.

Although incapable of causing tens of thousands of casualties, a radiological device, in addition to possibly killing or injuring any people who came into contact

¹¹⁶See: “The Effects of Nuclear Weapons,” compiled and edited by Samuel Glasstone and Philip J. Dolan, prepared and published by the U.S. Department of Defense and the U.S. Department of Energy, 1977.

with it “could be used to render symbolic targets or significant areas and infrastructure uninhabitable and unusable without protective clothing.”¹¹⁷ A combination fertilizer truck bomb, if used together with radioactive material, for example, could not only have destroyed one of the New York World Trade Center’s towers but might have rendered a considerable chunk of prime real estate in one of the world’s financial nerve centers indefinitely unusable because of radioactive contamination. The disruption to commerce that could be caused, the attendant publicity, and the enhanced coercive power of terrorists armed with such “dirty” bombs (which, for the reasons cited above, are arguably more likely threats than terrorist use of an actual fissile nuclear device), is disquieting.

The CBRN Terrorist Threat in Perspective

“Since 1996, the number of weapons of mass destruction threats called in to fire fighters, police and the FBI has increased fivefold. The threat comes not just from conventional weapons, like the bomb used in Oklahoma City, but also from chemical weapons, like the nerve gas agent that killed 12, but injured thousands in Tokyo, in the subway, just four years ago; and even from biological weapons that could spread deadly disease before anyone even realized that attack has occurred.

“I have been stressing the importance of this issue, now, for some time. As I have said repeatedly, and I want to say again to you, I am not trying to put any American into a panic over this, but I am determined to see that we have a serious, deliberate, disciplined, long-term response to a legitimate potential threat to the lives and safety of the American people.”

President Clinton¹¹⁸

As the President’s remarks suggest, there is a thin line between prudence and panic. The challenge in responding to the threat of potential terrorist use of CBRN weapons is to craft defense capabilities to respond to an incident if it occurs that are not only both cost-effective and appropriate, but dynamic enough to respond as effectively as possible in a wide a range of circumstances or scenarios. Because of the extreme

¹¹⁷Robins, “How Realistic is the Threat?”, p. 53. In November 1995, in one of the few recorded incidents of nuclear terrorism, Chechen rebels placed Cesium-137 in a busy Moscow park. Although the material was packed in a protective canister, and thus posed no real threat, the incident embarrassed the Russian government, which may have been the Chechens’ goal. OSD, *Proliferation* (1997). Most other criminal acts involving nuclear facilities or materials have been in the form of sabotage. In 1982, for example, the terrorist wing of the African National Congress destroyed nonoperational reactors at two South African power stations. Walter Laqueur, *The New Terrorism: Fanaticism and the Arms of Mass Destruction* (New York: Oxford University Press, 1999), p. 72.

¹¹⁸Remarks By The President to 17th Annual Legislative Conference Of The International Association of Fire Fighters, Hyatt Regency Hotel, Washington, D.C., 15 March 1999, p. 3 at <http://www.usia.gov/topical/pol/terror/99031502.html>.

consequences that could result from a successful attack involving nuclear or radiological material or a chemical or biological agent, even the remotest likelihood of one cannot be dismissed as insignificant. The challenge, therefore, is to avoid reaction too strongly to only one aspect of the problem, while still preparing adequately for a threat that remains uncertain but could nonetheless have profound repercussions.¹¹⁹

A critical step in this process is to reconsider the “worst-case scenario” threat assessment approach that has dominated domestic planning and preparedness for potential acts of CBRN terrorism.¹²⁰ The narrow focus lower-probability/higher-consequence threats, which in turn posit virtually limitless vulnerabilities, does not reflect the realities of contemporary terrorist behavior and operations. “This kind of analysis,” Brian Jenkins recently warned in testimony before Congress, “can degenerate into a fact-free scaffold of anxieties and arguments—dramatic, emotionally powerful, but analytically feeble.”¹²¹ Similarly, at the same congressional hearing, another expert, John Parachini, counseled that the “apparent over reliance on worst-case scenarios shaped primarily by vulnerability assessment rather than an assessment that factors in the technical complexities, motivations of terrorists and their patterns of behavior seems to be precisely the sort of approach we should avoid.”¹²² The main weakness in such an approach is in the axiomatic assumption that any less serious incident can be addressed equally well by planning for the most catastrophic threat—ignoring the fact that higher-probability/lower-consequence attacks might present unique challenges of their own.

Finally, this approach may be the least efficacious means of setting budgetary priorities and allocating resources and indeed assuring the security of our country. In its future assessments and analyses of resource allocation and priorities, the Panel will look closely at the issue of whether current U.S. government policies may be—as

¹¹⁹For analytical conclusions that agree in part, but also diverge in certain respects with the analyses contained in sections two and three of this report, see “Supporting Research and Analysis,” “The Phase I Report on the Emerging Global Security Environment for the First Quarter of the 21st Century,” *The United States Commission on National Security/21st Century* (also known as the “Hart-Rudman Commission”), September 15, 1999, which can be accessed at: <http://www.uscns.gov/Reports/reports.htm>

¹²⁰This same argument has been made repeatedly by Henry L. Hinton, Jr., Assistant Comptroller General, National Security and International Affairs Division, U.S. General Accounting Office, Before the Subcommittee on National Security, Veterans Affairs, and International Relations, Committee on Government Reform, U.S. House of Representatives in (1) “Combating Terrorism: Observation on Federal Spending to Combat Terrorism,” 11 March 1999; and (2) “Combating Terrorism: Observation on the Threat of Chemical and Biological Terrorism,” 20 October 1999; as well as by Parachini in “Combating Terrorism: Assessing the Threat” and Brian Michael Jenkins in their testimony before the same House subcommittee on 20 October 1999.; and the Hinton testimony “Combating Terrorism: Observation on Biological Terrorism and Public Health Initiatives,” before the Senate Committee on Veterans' Affairs and Labor, Health and Human Services, Education, and Related Agencies Subcommittee, Senate Committee on Appropriations, GAO/T-NSIAD-99-12, General Accounting Office Washington, D.C., 16 March 1999.

¹²¹Jenkins, “Testimony,” 20 October 1999, p. 4.

¹²²Parachini, “Combating Terrorism: Assessing the Threat,” 20 October 1999, p. 17.

some have suggested—fundamentally an attempt to overcompensate for previous years of neglect and the dismissal of the domestic terrorist threat, through spending that is divorced from any rigorous appreciation or detailed understanding of current terrorist trends. This was precisely the point made by Henry L. Hinton, Jr., the Assistant Comptroller General, National Security and International Affairs Division, U.S. General Accounting Office, when he testified before Congress in March 1999. “The [most] daunting task before the nation,” he argued,

is to assess—to the best of its ability—the emerging threat with the best available knowledge and expertise across the many disciplines involved. The United States cannot fund all the possibilities that have dire consequences. By focusing investments on worst-case possibilities, the government may be missing the more likely threats the country will face. With the right threat and risk assessment process, participants, inputs, and methodology, the nation can have greater confidence that it is investing in the right items in the right amounts. Even within the lower end of the threat spectrum—where the biological and chemical terrorist threat currently lies—the threats can still be ranked and prioritized in terms of their likelihood and severity of consequences. A sound threat and risk assessment could provide a cohesive roadmap to justify and target spending. . . .¹²³

Indeed, at a time when the “high-end” terrorist threats involving mass destruction CBRN weapons, the series of apartment building bombings that occurred in Russia and Dagestan during August and September 1999 is a salutary reminder of how terrorists can still achieve their dual aim of fear and intimidation through entirely conventional means and traditional methods—using bombs to blow things up.¹²⁴ This fact has important implications for U.S. counterterrorism preparedness. As fanatical and irrational as terrorists often appear, they remain remarkably conservative operationally, adhering to the same uncomplicated weapons and tactics on which they have relied for more than a century. Given the limited resources and constrained capabilities typical of most terrorists, they perhaps reflexively shun weapons and tactics that either cannot be relied on completely or that pose such enormous complexities in terms of their employment (e.g., achieving effective dispersal or dissemination) as to border on the unappealing, if not useless.¹²⁵ For this reason, it more probable that terrorists will remain essentially content with the limited killing potential of their handguns and machine guns and the slightly higher rates that their

¹²³Hinton, “Combating Terrorism: Observations on Biological Terrorism and Public Health Initiatives,” GAO/T-NSIAD-99-112, 16 March 1999, pp. 4–5.

¹²⁴Hoffman, “Conventional Terrorism Still Works,” *Los Angeles Times Sunday Opinion Section*, 26 September 1999.

¹²⁵And see “Combating Terrorism: Need for Comprehensive Threat and Risk Assessments of Chemical and Biological Attacks,” U.S. General Accounting Office (NSIAD-99-163)(September 1999), pp. 10–15.

bombs can achieve.¹²⁶ In other words, they seem to prefer the assurance of the modest success provided by their more conventional weapons and traditional tactics to the risk of failure inherent in more complex and complicated operations involving CBRN weapons. Indeed, of the more than 9,000 incidents since 1968, fewer than 100 evidence *any* indication of terrorists plotting or attempting to use chemical, biological or radiological weapons, or to steal or otherwise fabricate nuclear devices on their own.¹²⁷

There is another relevant paradox affecting terrorist behavior. Terrorists have long been seen as far more imitative than they are innovative.¹²⁸ To date, however, no similar or copycat act of terrorism, which at the time was thought might likely follow in the wake of Aum's use of sarin nerve gas, has materialized. In this respect, the Tokyo subway incident has been the exception rather than the rule in terms of terrorist behavior. "This fact gains significance," Jenkins also observed in his recent testimony, "when we note that past terrorist and criminal innovations—airline hijackings, political kidnappings, malicious product tampering—were promptly imitated. And terrorist attacks involving chemical and biological agents, if they do occur, are likely to remain rare events—they will not become the truck bomb of the next decade."¹²⁹

It should be noted that, as serious and potentially catastrophic as a domestic terrorist CBRN attack might prove, it is highly unlikely that it could ever completely undermine the national security, much less threaten the survival, of the United States as a nation. This point should be self-evident, but given the rhetoric and hyperbole with which the threat of CBRN terrorism is frequently couched, it requires reiteration. Even Israel, a comparatively small country in terms of population and landmass, who throughout its existence has often been isolated and surrounded by enemy states and subjected to unrelenting terrorist attack and provocation, has never regarded terrorism as a paramount threat to its national security and longevity, worthy of profligate budgets or the diversion of disproportionate resources and attention.¹³⁰ To take any other position risks surrendering to the fear and intimidation that is precisely the terrorist's stock in trade. Indeed, following the 1995 nerve gas attack, the Japanese government did not fall, widespread disorder did not ensue, nor did society collapse. There is no reason to assume that the outcome would be any different in the

¹²⁶For a more detailed discussion of this issue, see Bruce Hoffman, "Responding to Terrorism Across the Technological Spectrum," *Terrorism and Political Violence*, vol. 6, no. 3, (Autumn 1994). This was subsequently reprinted in John Arquilla and David Ronfeldt (eds.), *In Athena's Camp: Preparing For Conflict In The Information Age* (Santa Monica, Calif.: RAND, 1997), pp. 339–368.

¹²⁷Review of incidents recorded in the RAND Chronology of International Terrorism, 1968–present.

¹²⁸Brian Michael Jenkins, *International Terrorism: The Other World War* (Santa Monica, Calif.: RAND, November 1985, R-3302-AF), p. 12.

¹²⁹Jenkins, "Testimony," 20 October 1999, pp. 2–3.

¹³⁰Gérard Chaliand, "Preface" to Bruce Hoffman, *Le Mécanisme du Terrorisme* (Paris: Calmann Levy, 1999), p. 9.

United States. “The strength and resilience of liberal-democratic societies in the face of such threats,” one analyst points out, “tend to be underestimated.”¹³¹ America’s ability to address these challenges and cope with their consequences should likewise not be underestimated.

Summary

In sum, even if the motives of terrorists may be changing in such a way that they are becoming more lethal, and even if this in turn may lead them to contemplate ever more bloody and heinous acts that might lead to the use of CBRN weapons, these trends do not necessarily imply that terrorists have either the requisite scientific knowledge or technical capabilities to implement their violent ambitions. Accordingly, as easy as some argue that it may be for terrorists to culture anthrax spores or brew up a concoction of deadly nerve gas, the effective dissemination or dispersal of these viruses and poisons still presents serious technological hurdles that greatly inhibit their effective use. Indeed, the technological difficulties and other impediments encountered by a group as well endowed as Aum—the apocalyptic religious cult whose activities are most directly responsible for precipitating our current concern over terrorism and CBRN weapons—is precisely the case in point.

This is not to suggest, however, that there either is no threat of terrorist use of CBRN or that it is one that should be dismissed or discounted. Indeed, as noted above, the difficulties now facing a terrorist, who may seek to use a CBRN weapon to achieve mass effects, could change dramatically, because of new discoveries, further advances in technology, or other material factors. Moreover, any assessment of a potential terrorist group or organization should seek to determine—through the terrorists’ doctrine, dogma, public pronouncements, and the like—into which of two general categories the organization may fall:

1. Those organizations who seek some type of support for their cause; or
2. Those who simply do not care.

It is the latter type for which we should have the greatest concern in terms of potential use of a “mass-effect” CBRN device.

What this section has argued is that some public pronouncements and media depictions, about the ease with which terrorists might wreak genuine mass destruction or inflict widespread casualties, do not always reflect the significant hurdles currently confronting any nonstate entity seeking to employ such weapons. In this respect, it should be stressed that a limited terrorist attack involving not a WMD

¹³¹Joseph F. Pilat, “Apocalypse Now—or Never?” in “WMD Terrorism: An Exchange,” *Survival*, vol. 40, no. 4 (Winter 1998–1999), p. 174.

per se, but an unconventional chemical, biological, or radiological weapon on a deliberately small scale—either alone or as part of a series of smaller incidents occurring either simultaneously or sequentially in a given location—could have disproportionately enormous consequences, generating unprecedented fear and alarm, and thus serving the terrorists’ purpose just as well as a larger weapon or more ambitious attack with massive casualties could have. Hence, the issue here may not be as much a ruthless terrorist’s use of some WMD designed to achieve mass casualties, as the calculated terrorist’s use of some unconventional weapon to achieve far-reaching psychological effects in a particular target audience. To focus on weapons of truly “mass destruction” may, therefore, be missing the point and sidestepping the potential, credible threats posed by terrorists in this regard. As the evidence presented in this section suggests, it will likely not be the destruction of an entire city (as often proclaimed by fictional thriller writers and some government officials), but the far more deliberate and delicately planned use of a chemical, biological, or radiological agent for more discrete purposes.

By the same token, policymakers should assume, for planning purposes, that terrorism will continue to increase in both the number of actual incidents and threats, as well as in lethality. For the reasons stated above, the *current* hurdles for developing and delivering a true “weapon of mass destruction” are formidable, but, as noted, that situation could, in the future, take a nasty turn for the worse. Plans and programs to deter, detect, interdict, prevent, or respond to incidents must be designed to be flexible and adaptable to changing threats. Intelligence and other information collection and sharing techniques and procedures will need to be improved. As noted elsewhere, continued monitoring and assessments of this dynamic and amorphous threat will be critical to countering this challenge effectively.

III. A RETROSPECTIVE: THE LESSONS OF AUM SHINRIKYO

The 1995 sarin nerve gas attack on the Tokyo subway marked a turning point in the history of terrorism.¹³² Indeed, it has become the defining incident for all discussion about terrorist use of CBRN weapons. For the first time, a nonstate group had used a chemical weapon against civilians. Subsequent investigations by the Japanese authorities, the press, and the U.S. Congress revealed that Aum had even more sinister terrorist ambitions. Beginning in 1990, cult scientists sought to develop biological weapons, and on a number of occasions, Aum members sprayed biological material in an attempt to kill large numbers of people, including members of the Japanese royal family. Testimony during the trials of the Aum leadership also alleged that the cult had unsuccessfully attacked U.S. military bases in Japan, including the naval installation at Yokosuka.¹³³

More than four years later, the attack's implications are still as fiercely debated as they are incompletely understood. Was the incident a harbinger of future terrorist actions or a dramatic aberration? Had a profound taboo been broken by Aum's use of chemical weaponry or were the circumstances, capabilities, and resources at the disposal of this particularly idiosyncratic religious group so unique as to defy duplication or emulation by more common and stereotypical terrorist organizations?

This chapter considers these questions and related issues raised by the Aum attack. Specifically, it examines the implications of the group's ambitious research and development efforts—spanning chemical, biological and even nuclear weapons aspirations—and assesses the inferences and lessons that can be drawn from the apocalyptic cult's activities, in the context of deliberations about and U.S. domestic preparedness for potential acts of CBRN terrorism.

The Aum Shinrikyo and the “New Terrorism”

Until the Tokyo attack, most terrorism experts and other observers of this phenomenon could take solace in the belief that terrorists were fundamentally rational.¹³⁴ The conventional wisdom that therefore followed was that terrorists would

¹³²For the most complete account of the Aum sect's aims, motivations, and capabilities see David E. Kaplan and Andrew Marshall, *The Cult at the End of the World: The Incredible Story of Aum* (London: Hutchinson, 1996). See also D.W. Brackett, *Holy Terror: Armageddon in Tokyo* (New York and Tokyo: Weatherhill, 1996) and the recently published book by Robert Jay Lifton, *Destroying the World to Save It: Aum Shinrikyo, Apocalyptic Violence, and the New Global Terrorism* (New York: Metropolitan Books, 1999).

¹³³Sheryl WuDunn, Judith Miller, and William J. Broad, “How Japan Terror Alerted World,” *New York Times*, May 26, 1998. Although most of Aum's original leadership is in jail, the cult remains active in Japan and Russia. Kevin Sullivan, “Japan Cult Survives While Guru Is Jailed,” *Washington Post*, September 28, 1997.

¹³⁴See, for example, the studies conducted by RAND during the 1970s for Sandia National Laboratories and, in particular, Gail Bass, Brian Jenkins, et al., *Motivations and Possible Actions of Potential Criminal Adversaries of U.S. Nuclear Programs* (Santa Monica, Calif.: RAND, R-2554-SL, 1980).

refrain from using CBRN weapons simply because they could make few realistic demands by threatening the use of such indiscriminate weapons. In this context, it was further argued that the terrorists' aims and objectives could just as easily be attained or realized through less extreme measures than the detonation of a nuclear device, the dispersal of radioactive materials,¹³⁵ or by attacks employing either biological or chemical warfare weapons. In perhaps the most important book written on terrorism in the 1970s, Walter Laqueur clearly echoed this school of thought, concluding unambiguously that, "It can be taken for granted that most of the terrorist groups existing at present will not use this option, either as a matter of political principle or because it would defeat their purpose."¹³⁶

The terrorists' perceived obsession with controlling events was also regarded as an important constraint.¹³⁷ "Terrorists, like war planners," one unidentified expert opined at a mid-1980s symposium on the subject of nuclear terrorism, "believe they can control what they start . . . and CB [chemical and biological agents] seems too uncontrollable." Hence, this line of argument went, terrorists would most likely eschew weapons that could not be discriminately targeted against their enemies only. Indiscriminate weapons could also harm their ethnic brethren, co-religionists, or that often declared but amorphous constituency, the so-called "people." Of equal significance was the argument that, whereas terrorists had mastered operations using conventional weapons, they would doubtless be very wary of venturing into such unknown territory as CBRN weapons. Like most ordinary people, terrorists were also believed to harbor profound fears about dangerous substances of which they knew little and, if handled improperly, would affect them as adversely as the substances would their intended targets. Even when experts in the 1970s thought about possible terrorist use of weapons of mass destruction, the prevailing consensus was that terrorists would obviously prefer nuclear or radiological weapons to chemical or biological ones.¹³⁸ As Brian Jenkins, perhaps that era's most influential terrorism expert, explained in a paper presented at the same conference noted above:

Terrorists imitate governments, and nuclear weapons are in the arsenals of the world's major powers. That makes them "legitimate." Chemical and biological weapons also may be found in the arsenals of many nations, but their use has been widely condemned by public opinion and proscribed by treaty, although in recent years the constraints against use seem to be eroding.¹³⁹

¹³⁵See, for example, the discussion in Peter deLeon, Bruce Hoffman, et al., *The Threat of Nuclear Terrorism: A Reexamination* (Santa Monica, Calif.: RAND, N-2706, 1988), pp. 4-6.

¹³⁶Walter Laqueur, *Terrorism* (London: Weidenfeld and Nicolson, 1977), p. 231.

¹³⁷Jeffrey D. Simon, *Terrorists and the Potential Use of Biological Weapons: A Discussion of Possibilities* (Santa Monica, Calif.: RAND, R-3771-AFMIC, 1989), p. 12.

¹³⁸Robert L. Beckman, "Rapporteur's Summary," in Paul Leventhal and Yonah Alexander (eds.), *Nuclear Terrorism: Defining the Threat* (Washington, D.C.: Pergamon-Brassey's, 1986), p. 13.

¹³⁹Brian Michael Jenkins, "Is Nuclear Terrorism Plausible?" in *Ibid.*, p. 31.

But most important, there was a general acceptance of the observation made famous by Jenkins that: “Terrorists want a lot of people watching and a lot of people listening and not a lot of people dead.”¹⁴⁰ This maxim was applied directly to potential terrorist use of CBRN weapons and in turn was often used to explain the paucity of actual known plots, much less verifiable incidents. In this context, Jenkins argued in a 1975 paper assessing potential terrorist use of radiological or nuclear weapons that

Scenarios involving the deliberate dispersal of toxic radioactive material . . . do not appear to fit the pattern of any terrorist actions carried out thus far Terrorist actions have tended to be aimed at producing immediate dramatic effects, a handful of violent deaths—not lingering illness, and certainly not a population of ill, vengeance-seeking victims If terrorists were to employ radioactive contaminants, they could not halt the continuing effects of their act, not even long after they may have achieved their ultimate political objectives. It has not been the style of terrorists to kill hundreds or thousands. To make hundreds or thousands of persons terminally ill would be even more out of character.¹⁴¹

This was also the conclusion reached by a contemporary of Jenkins, the noted authority on subnational conflict, J. Bowyer Bell. He too had dismissed the possibility that terrorists might target a commercial nuclear power plant in hopes of engineering a meltdown or large-scale atmospheric release of radioactive materials on similar grounds of political expediency and logical instrumentality. “[T]here is no evidence,” Bell wrote in 1978,

that terrorists have any interest in killing large numbers of people with a meltdown. The new transnational television terrorists want media exposure, not exposure of the masses to radioactive fallout. And finally, the technological capacities of organizations with sufficient military skills to launch an attack . . . are not great. The mix of motive, military and technological skills, resources, and perceived vulnerability simply does not exist.¹⁴²

Despite the events of the mid-1980s—when a series of high-profile and particularly lethal suicide car and truck-bombings were directed against American diplomatic and military targets in the Middle East (in one instance resulting in the deaths of 241

¹⁴⁰Brian Michael Jenkins, “International Terrorism: A New Mode of Conflict” in David Carlton and Carlo Schaerf (eds.), *International Terrorism and World Security* (London: Croom Helm, 1975), p. 15.

¹⁴¹Brian Michael Jenkins, *Will Terrorists Go Nuclear?* (Santa Monica, Calif.: P-5541, November 1975), pp. 6–7.

¹⁴²J. Bowyer Bell, *A Time of Terror: How Democratic Societies Respond to Revolutionary Violence* (New York: Basic Books, 1978), p. 121.

Marines)—many analysts saw no reason to revise these arguments. In 1985, Jenkins, for example, reiterated that, “simply killing a lot of people has seldom been one terrorist objective . . . Terrorists operate on the principle of the minimum force necessary. They find it unnecessary to kill many, as long as killing a few suffices for their purposes.”¹⁴³ In the revised version of his earlier work, Laqueur similarly emphasized that

Groups such as the German, Italian, French, Turkish or Latin American terrorists are unlikely to use nuclear, chemical or bacteriological weapons, assuming that they have any political sense at all—an assumption that cannot always be taken for granted. They claim to act on behalf of the people, they aspire to popular support, and clearly the use of arms of mass destruction would not add to their popularity.¹⁴⁴

In sum, the conventional wisdom held that terrorists were not interested in killing but in publicity. Violence was employed less as a means of wreaking death and destruction than as a way to appeal to and attract supporters, focus attention on the terrorists and their causes, or attain tangible political aims and concessions—for example, the release of imprisoned brethren, some measure of political autonomy, independence for an historical homeland, or a change of government. Terrorists, it was therefore argued, themselves believed that only if their violence were calculated or regulated would they be able to obtain the popular support or international recognition they sought or achieve the political ends that they desired.

Since the Tokyo incident, however, these long-standing assumptions have increasingly been called into question by terrorist attacks that have not only involved CBRN weapons but that also have caused large numbers of casualties—such as the World Trade Center and Oklahoma City bombings and, more recently, the massive explosions at the U.S. embassies in Kenya and Tanzania. As these and other particularly lethal incidents in Egypt, Saudi Arabia, Algeria, Russia, and elsewhere have demonstrated, the more traditional and familiar types of ideological, ethno-nationalist and separatist organizations who dominated terrorism for the past 30 years—and on whom many of our most fundamental assumptions about terrorists and their behavior are based—have now been joined by a variety of different terrorist entities with less readily comprehensible nationalist or ideological motivations. This new generation of terrorists not only embraces far more amorphous religious and millenarian aims but in some cases are themselves less cohesive organizational entities with a more diffuse structure and membership.¹⁴⁵

¹⁴³Jenkins, *The Likelihood of Nuclear Terrorism*, p. 6.

¹⁴⁴Walter Laqueur, *The Age of Terrorism* (Boston and Toronto: Little, Brown, 1987), p. 319.

¹⁴⁵See, for example, the analysis of the international terrorist campaign allegedly orchestrated by Osama bin Laden in Neil King, Jr., “Moving Target: Fighting Terrorism Is Far More Perilous Than It Used to Be,” *Wall Street Journal Europe*, 25 August 1998. This type of loose, networked (as opposed to

The emergence of obscure, idiosyncratic millenarian movements—such as Aum; the militantly antigovernment, Christian white supremacist militias in the United States that are fuelled by a volatile mixture of religious, racial, and seditious dicta;¹⁴⁶ and the shadowy, transnational extremist Islamic movement that has been linked to the World Trade Center bombing, the attacks in 1995 and 1996 on U.S. military targets in Saudi Arabia, the 1997 slaughter of Western tourists in Luxor, and the embassy bombings in East Africa—represents a different and potentially more lethal threat than the more familiar, traditional terrorist adversaries. As former U.S. Senate staff member John Sopko explained in one of the first analytical efforts to map the contours of the “new face of terrorism” and assess the implications of Aum’s activities on future potential terrorist use of CBRN weapons:

. . . past assumptions that those in possession of weapons of mass destruction are rational, informed opponents who calculate the risks and benefits before using such force do not apply when these groups are driven by “divine intervention,” messianic leadership or suicidal instincts. As one FBI terrorist specialist notes, “it is extremely difficult to deal with someone not playing with a full deck of cards.”¹⁴⁷

The appearance of these new types of adversaries, accordingly, may require an equally profound change in our thinking about terrorist interest in CBRN weapons. Their markedly different motivations and intentions, coupled with their aspirations toward more lethal capabilities—compared with the conservatism of their more traditional, secular counterparts—may already have set in motion a drift toward the use of less discriminate weapons. It was, of course, international terrorist Osama bin Laden’s alleged interest in developing a chemical warfare capability for use against U.S. forces in Saudi Arabia that was cited to justify the August 1998 American cruise missile attacks on the al-Shifa pharmaceutical plant in Khartoum.¹⁴⁸ Information has

hierarchical) organization also reflects the “Leaderless Resistance” strategy advocated by the Christian paramilitary, white supremacist movement in the United States today. “Leaderless Resistance,” also called “phantom cell networks,” lays down a strategy of violence perpetrated by “autonomous leadership units” (e.g., cells) operating independently of one another that, it is intended, will eventually join together to create a chain reaction leading to a nationwide, white supremacist revolution. “Leaderless Resistance” is described in the white supremacist adventure novel, *Hunter*, written by William Pierce (under the pseudonym Andrew MacDonald) and published by National Vanguard Books in Hillsboro, Virginia. *Hunter*, it should be noted, is the sequel to *The Turner Diaries* (which Pierce/MacDonald also wrote)—the novel described by the FBI as the “bible” of the American white supremacist movement and is thought to have inspired Timothy McVeigh’s attack on the Federal office building in Oklahoma City.

¹⁴⁶For a more complete analysis of the cement that bonds together this seemingly diverse and disparate collection of citizen militias, tax resisters, antifederalists, bigots, and racists, see Bruce Hoffman, *Recent Trends and Future Prospects of Terrorism in the United States* (Santa Monica, Calif.: RAND, R-3618, 1988), pp. 26–27.

¹⁴⁷Sopko, “The Changing Proliferation Threat,” p. 15.

¹⁴⁸See Barbara Crossette et al., “U.S. Says Iraq Aided Production of Chemical Weapons in Sudan,” *New York Times*, 25 August 1998; Michael Evans, “Iraqis linked to Sudan Plant,” *The Times* (London), 25

subsequently emerged alleging that, in 1993, a follower of bin Laden's had attempted to purchase enriched uranium in hopes of fabricating a nuclear weapon;¹⁴⁹ while other unconfirmed (and perhaps less reliable) reports have surfaced that bin Laden may have already acquired a tactical nuclear weapon or at least attempted to do so.¹⁵⁰ Moreover, according to U.S. intelligence sources, the fugitive terrorist leader retains a continuing interest in acquiring chemical and biological weapons.¹⁵¹ Although the veracity of all these reports cannot be confirmed through open source literature, they nonetheless suggest a chilling confluence of motive and opportunity perhaps leading to capability. Admittedly, any number of *technical* factors greatly inhibit the deployment and effective use of an illegally acquired nuclear weapon. Similarly, there remain formidable¹⁵² (but perhaps not insurmountable) barriers that would attend the construction and detonation of even a primitive device.¹⁵³ At the same time, however, it is fundamentally troubling that terrorists today may increasingly be thinking along these lines. Moreover, it is sobering to consider, as one terrorism scholar suggests, that terrorists' interest in chemical and biological weapons might be impelled by their frustrations in trying to acquire a real nuclear capability.¹⁵⁴ These developments have already prompted at least some of terrorism's leading analysts to revise their previous thinking on the WMD issue. In his seminal 1996 article, which defined the new era of terrorism in the post-Cold War world, Laqueur observed: "Proliferation of weapons of mass destruction does not mean that most terrorists are likely to use them in the foreseeable future, but some almost certainly will, in spite of all the reasons militating against it."¹⁵⁵ This point was even more forcefully presented in the book that followed. "In an earlier work I warned against overrating the danger of terrorism," Laqueur writes,

August 1998; James Risen, "New Evidence Ties Sudanese To Bin Laden, U.S. Asserts," *New York Times*, 4 October 1998; Gregory L. Vistica and Daniel Klaidman, "Tracking Terror," *Newsweek*, 19 October 1998.

¹⁴⁹Benjamin Weiser, "U.S. Says Bin Laden Aide Tried to Get Nuclear Material," *New York Times*, 26 September 1998; and, Michael Grunwald, "U.S. Says Bin Laden Sought Nuclear Arms," *Washington Post*, 26 September 1998.

¹⁵⁰Michael Binyon, "Bin Laden 'now has nuclear arsenal'," *The Times* (London), 7 October 1998.

¹⁵¹Statement for the record of Louis J. Freeh before the U.S. Senate Committee on Appropriations, Subcommittee for the Departments of Commerce, Justice, and State, the Judiciary and Related Agencies, 4 February 1999 at <http://www.fbi.gov/pressrm/congress/freehct2.htm>.

¹⁵²See, for example, the compelling arguments presented in Karl-Heinz Kamp, "Nuclear Terrorism—Hysterical Concern or Real Risk?," *Aussenpolitik—German Foreign Affairs Review*, vol. 46, no. 3. (1995) World-Wide Web Page of the International Security Net, Center for Security Studies, ETH Zurich (<http://www.ethz.ch/au-pol/kamp.htm>), pp. 4–7. See also, Karl-Heinz Kamp, "'Loose Nukes': A Distant But Still Critical Threat," *Christian Science Monitor* (Boston), 19 August 1996.

¹⁵³On the surmountable hurdles regarding the relative ease with which a radiological device could be constructed see Allison et al., *Avoiding Nuclear Anarchy*, pp. 57–61; and, Arbman, "A Swedish View on Nuclear Terrorism," pp. 56–57, 59 and 60.

¹⁵⁴There is evidence that suggests both Aum and bin Laden either turned to, or redoubled, their efforts to develop chemical and/or biological capabilities when their respective nuclear ambitions could not be realized. See Gavin Cameron, "Multi-track Micro-proliferation: Lessons from the Aum Shinrikyo and al Qaida," *Studies in Conflict and Terrorism*, vol. 22, no. 4 (September-December 1999), forthcoming.

¹⁵⁵Walter Laqueur, "Postmodern Terrorism," *Foreign Affairs*, vol. 75, no. 5 (September-October 1996), p. 34.

which was neither a new phenomenon nor as politically effective as we are often led to believe. . . . While I decried the idea that terrorism was steadily growing into a global threat, I also wrote that it could become one as the result of technological developments. . . . The ready availability of weapons of mass destruction has now come to pass, and much of what has been thought about terrorism, including some of our most basic assumptions, must be reconsidered. The character of terrorism is changing, any restraints that existed are disappearing, and, above all, the threat to human life has become infinitely greater than it was in the past.¹⁵⁶

The Lessons of Aum: A Reassessment

The repercussions of the Tokyo nerve gas attack have exerted a profound impact, beyond that incident itself, on our thinking CBRN terrorism. This is not surprising, given the 12 persons who were killed and the thousands of casualties thought to have been caused by the attack. Moreover, it was only after the subway incident that evidence came to light revealing the enormity of Aum's catastrophic ambitions. When police raided the sect's laboratories following the nerve gas attack, for example, they found enough sarin to kill an estimated 4.2 million persons.¹⁵⁷ In addition, Aum had either already produced or had plans to develop other powerful nerve agents, such as VX, tabun, and soman; chemical weapons, such as mustard gas and sodium cyanide; and deadly biological warfare pathogens that included anthrax, the highly contagious disease known as Q-fever¹⁵⁸—and possibly the deadly Ebola virus as well.¹⁵⁹ Aum's most ambitious project, however, was doubtless its efforts to develop a nuclear capability. To this end, the group had purchased a 500,000-acre sheep station in a remote part of Western Australia. There, they hoped to mine uranium to be shipped back to Aum's laboratories in Japan, where scientists using laser enrichment technology would convert it into weapons-grade nuclear material.¹⁶⁰

¹⁵⁶Walter Laqueur, *The New Terrorism: Fanaticism and the Arms of Mass Destruction* (New York and Oxford: Oxford University Press, 1999), p. 7.

¹⁵⁷Richard Lloyd Parry, "Sect's poisons 'could kill 4.2m'," *The Independent on Sunday* (London), 26 March 1995; and, Andrew Pollack, "Japanese Police Say They Found Germ-War Material at Cult Site," *New York Times*, 29 March 1995.

¹⁵⁸Reuters, "Aum Cult Gas Cache," *International Herald Tribune* (Paris), 13 December 1996. See also, National (Japanese) Police Agency, "Aum Shinrikyo: An Alarming Report on the Terrorist Group's Organization and Activities," *Shoten* (Tokyo), no. 252 (1995), pp. 10–12; Kaplan and Marshall, *The Cult at the End of the World*, pp. 10, 95–97, 121–125, 151, 211–221 and 232.

¹⁵⁹Following an outbreak of Ebola in Zaire in 1992, Asahara and 40 followers traveled to that country ostensibly on a humanitarian aid mission. Associated Press and Agence France-Presse, "Cult 'studied deadly Ebola virus'," *New York Times*, 25 April 1995. See also, Kaplan and Marshall, *The Cult at the End of the World*, pp. 96–97.

¹⁶⁰Kaplan and Marshall, *The Cult at the End of the World*, pp. 85, 126–133; 190–192 and 208; and, Sopko, 'The Changing Proliferation Threat', p. 13.

The group had also assembled an impressive array of conventional weaponry. Aum is believed to have purchased large quantities of small arms from Russian sources and to have been in the market for advanced weaponry, such as tanks, jet fighters, surface-to-surface rocket launchers, and even a tactical nuclear weapon. What is known is that Aum succeeded in obtaining a surplus twin-turbine Mi-17 helicopter—complete with chemical spray dispersal devices. The group also planned—and had gone as far as to acquire—sophisticated robotic manufacturing devices, to produce at least 1,000 operational replicas of Russia’s world-famous AK-47 assault rifle along with one million rounds of ammunition. Finally, the sect had determined how to manufacture TNT and the central component of plastic explosives, RDX.¹⁶¹

As this inventory of armaments and technological and engineering accomplishments suggests, Aum was no ordinary terrorist group. Rather than the handful of men and women with limited training, technical capabilities, and resources, that has long colored our conception of the archetypal terrorist organization, Aum was—by any measure—unique. It was a religious movement with upwards of 60,000 members, with offices in New York, Germany, Australia, and Sri Lanka—in addition to Japan and Russia.¹⁶² Aum had assets estimated to be as high as \$1 billion¹⁶³—at least in the hundred millions. It recruited graduates with scientific and engineering degrees from Japan’s leading universities and provided them with state-of-the-art laboratories and with lavish budgets to fund the group’s variegated weapons R&D programs.¹⁶⁴ Indeed, up to 80 scientific personnel were detailed to work on the group’s chemical weapons programs, according to one estimate; its biological weapons research, however, never employed more than perhaps 20 persons at most.¹⁶⁵

¹⁶¹See Kaplan and Marshall, *The Cult at the End of the World*, pp. 76, 88, 107–112, 151, and 190–193; Campbell, “Excerpts from Research Study: ‘Weapons of Mass Destruction Terrorism: Proliferation by Non-State Actors,’” pp. 35–37; Ron Purver, “Chemical Terrorism In Japan” (unpublished paper by the Canadian Security Intelligence Service, Ottawa, Canada, June 1995), p. 15; and, National Police Agency, “Aum Shinrikyo: An Alarming Report on the Terrorist Group’s Organization and Activities,” p. 10.

¹⁶²U.S. Senate, Committee on Governmental Affairs, Permanent Subcommittee on Investigations, *Global Proliferation of Weapons of Mass Destruction*, Part I (Washington, D.C.: U.S. Government Printing Office, 1996), p. 16. See also, Andrew Pollack, “Japanese Sect May Struggle To Get By Without Its Leader,” *New York Times*, 17 May 1995; Alessandra Stanley, “Russians Shut Down Branch of Japanese Sect,” *New York Times*, 30 March 1995; and, William J. Broad, “Seismic Blast: Bomb or Quake?,” *New York Times*, 23 January 1997. One account, however, puts Aum membership at 10,000 persons. See Kevin Sullivan, “Japan Cult Survives While Guru is Jailed,” *Washington Post*, September 28, 1997.

¹⁶³U.S. Senate Committee on Governmental Affairs, Permanent Subcommittee on Investigations, *Global Proliferation of Weapons of Mass Destruction*, p. 16; and, Broad, “Seismic Blast: Bomb or Quake?,” 23 January 1997. Indeed, when police searched Asahara’s office, they reportedly discovered 22 pounds of gold and about \$7.5 million in cash. See Shoichi Okawa, “Aum Shinrikyo,” at http://www.guardian.co.uk/cults/a-z-cults/a_cults.html.

¹⁶⁴Kaplan and Marshall, *The Cult at the End of the World*, pp. 199–222.

¹⁶⁵Telephone interviews by RAND research staff with Professor Anthony Tu, July 21, 1999, and Milton Leitenberg, July 16, 1999.

Despite Aum's considerable financial wealth, the technical expertise that it could call on from its well-educated members, and the vast resources and state-of-the-art equipment at their disposal, the group could not effect even a single truly successful chemical or biological attack. On at least nine occasions the group attempted to disseminate botulinum toxin (*Clostridium botulinum*) or anthrax (*Bacillus anthracis*) using aerosol means; each time they failed either because the botulinum agents they grew and enriched were not toxic or the mechanical sprayers used to disseminate the anthrax spores became clogged and inoperative.¹⁶⁶ Even the more successful sarin attack on the Tokyo subway would almost be laughable, if not for the tragic deaths of 12 persons and harm caused to thousands more. For all its sophisticated research and development, the best means the group could find to disseminate the nerve gas was in plastic trash bags that had to be poked open with sharpened umbrella tips to release the noxious mixture.¹⁶⁷

Finally, the group's distinct lack of success in wreaking the mass destruction or mass casualties ascribed to these types of weapons, despite the considerable resources at its disposal, speaks volumes about the challenges facing any less-endowed terrorist organization. New research has revealed that, of the 5,000 persons who received medical treatment in the aftermath of the subway attack, the vast majority suffered from shock or emotional upset, or evidenced some psychosomatic symptom. Accordingly, the number of persons physically injured or affected by the attack may be much lower than previously reported.¹⁶⁸

In sum, Aum's experience suggests—however counterintuitively or contrary to popular belief—the significant technological difficulties faced by any nonstate entity in attempting to weaponize and disseminate chemical and biological weapons effectively.¹⁶⁹ Although the Aum experience represents only a single point of reference, it provides a striking refutation of the claim about the ease with which such weapons can be fabricated and made operational. Public officials, journalists, and analysts, for example, have repeatedly alleged that biological attacks in particular are relatively easy for terrorists to undertake. According to one state emergency management official, biological weapons “are available—and easy to make. . . . One does not need a degree in microbiology to make this work, being able to read is enough. . . . It's not like enriching uranium.”¹⁷⁰ Similarly, both the White House and some senior FBI

¹⁶⁶Two attempts were made with anthrax and seven with botulinum toxin. Carus, *Bioterrorism and Biocrimes: The Illicit Use of Biological Agents in the 20th Century*, p. 62.

¹⁶⁷Brackett, *Holy Terror: Armageddon in Tokyo*, pp. 126 & 129.

¹⁶⁸Milton Leitenberg, “The Experience of the Japanese Aum Shinrikyo Group and Biological Agents,” *Terrorism and Political Violence*, vol. 11, no. 4 (Winter 1999), forthcoming.

¹⁶⁹Indeed, this same point can also be made of the formidable hurdles faced by many established states in developing their own effective weapons programs in the same areas of chemical, biological, and nuclear warfare.

¹⁷⁰Quoted in Grant Sasek, “Officials in State Warn of Biological Terrorism,” *Helena Independent Record* (http://billingsgazette.com/region.990125_reg009.html).

officials have previously argued that the information needed to develop chemical and biological weapons can be readily obtained from the Internet and other open sources.¹⁷¹ Although some biological and chemical agents may be easier to develop than others, such claims do not readily square with the facts known about the Aum incident, given Aum's experience and its concerted, years-long R&D activities.¹⁷²

While much information has emerged since the 1995 attack regarding Aum's chemical and biological warfare activities, crucial details are still missing or remain hidden that might conclusively reveal precisely why Aum's ambitious efforts in both these areas failed. Japanese authorities have released little public information, and the cult itself is believed to have destroyed key evidence regarding its bioterrorism programs. Moreover, a senior Aum official with extensive knowledge about these programs was himself murdered by the group.¹⁷³ Accordingly, the majority of what we do know has come mostly from court documents and testimony pertaining to the trials of leading cult members. According to one expert, who has followed both the Aum and other actual and putative biological terrorist incidents closely, "Too little is known about the Aum's activities to determine why they failed."¹⁷⁴

Nevertheless, it is possible to use the available unclassified information to make some informed, preliminary hypotheses about why the cult did not achieve its bioterrorism objectives. These fall into three interrelated categories:

First, Aum was unable to surmount the challenge of acquiring sufficiently lethal strains of botulinum toxin and anthrax bacilli. Although terrorists have obtained biological agents from nature or cultured these pathogens themselves, acquiring virulent strains appears to be a major challenge. While Aum apparently developed a

¹⁷¹See, for example, the White House, "Fact Sheet on Combating Terrorism: Presidential Decision Directive 62," May 22, 1998, accessed at <http://cns.miis.edu/research/cbw/pdd-62.htm>, which states that, "easier access to sophisticated technology means that the destructive power available to terrorists is greater than ever. Adversaries may thus be tempted to use unconventional tools, such as weapons of mass destruction, to target our cities and disrupt the operations of our government"; statement for the record before the Senate Select Committee on Intelligence, 28 January 1998, <http://www.fbi.gov/congress/98archives/threats.htm>, of FBI Director Louis J. Freeh: "The ease of manufacturing or obtaining biological and chemical agents is disturbing. Available public source material makes our law enforcement mission a continuous challenge."; and statement of Robert J. Burnham, Chief, Domestic Terrorism Section, before the U.S. House of Representatives Subcommittee on Oversight and Investigations, 19 May 1999, <http://www.fbi.gov/pressrm/congress/bioleg3.htm>, which states that, "literature containing recipes and modes of dissemination are available through 'how to' literature and over the Internet."

¹⁷²In the words of one senior intelligence analyst, "while popular culture can explore the potential BW threat, actually developing and using an effective biological weapon poses certain technological challenges." U.S. Congress, "Statement by Special Assistant to the DCI for Nonproliferation John A. Lauder on the Worldwide Biological Warfare Threat," House Permanent Select Committee on Intelligence, 3 March 1999, http://www.cia.gov/cia/public_affairs/speeches/lauder_speech_030399.html

¹⁷³Sheryl WuDunn, Judith Miller, and William J. Broad, "How Japan Terror Alerted World," *New York Times*, 26 May 1998.

¹⁷⁴Carus, *Bioterrorism and Biocrimes*, p 24.

lethal biological agent that they used to contaminate cult members' food, the strains of botulinum toxin and *B. anthracis* they used in their attacks, which were intended to cause mass casualties, were either insufficiently toxic or were disseminated in quantities too small to have any lethal effects.¹⁷⁵ The mistakes that Aum made in its attempt to develop a lethal strain might not be repeated in the future by other terrorists. Moreover, it is possible that terrorists in the future may steal highly lethal pathogens or toxins from government or private facilities. Indeed, illicit acquisitions of biological agents have already taken place. In May 1995, for example, the FBI arrested Larry Wayne Harris, a one-time member of the American white supremacist organization, the Aryan Nations, who had acquired freeze-dried *Yersinia pestis*, the organism that causes plague, from the American Type Culture Collection in Rockville, Maryland, using falsified documents.¹⁷⁶ Sophisticated terrorists may also seek to culture pathogens or toxins "in-house" or acquire them from nature; but as the Aum case suggests, this is a far greater challenge than is generally thought.

Second, Aum found that it was extremely difficult to prepare chemical and biological agents for dissemination and dispersal. As the group learned from its failed biological attacks, dissemination remains a major hurdle for any terrorist seeking to kill with biological agents on a mass scale. Drying anthrax spores or other living organisms for the purpose of aerosolization demands great skill as well as sophisticated equipment. Even if terrorists manage to acquire a lethal pathogen, it appears relatively easy to destroy large amounts of it unintentionally during the aerosolization process. An alternative to a dry aerosol is the use of a liquid slurry. But as Aum discovered when it attempted to disseminate anthrax bacillus from the roof of its Tokyo building, slurries are likely clog sprayers. Terrorists may overcome these dissemination hurdles by using a highly contagious agent, such as smallpox—itsself a highly infectious organism—assuming that they could overcome the difficulty in acquiring it.¹⁷⁷ According to a former Soviet biological warfare expert, "with smallpox, you [could simply] use people as disseminators."¹⁷⁸

¹⁷⁵Ibid., p. 62.

¹⁷⁶Ibid., pp. 184–185. It should be noted, however, that Harris maintained that he needed the cultures to pursue his interest in developing medical treatments for the disease. Subsequent investigations uncovered no information suggesting a more malevolent intention, and Harris was indicted only for wire fraud (e.g., for misrepresenting himself on the order form to purchase the organism).

¹⁷⁷Only two WHO-authorized repositories for smallpox exist. One is at the Centers for Disease Control in Atlanta, and one is in Russia, at the State Research institute of Virology and Biotechnology. There are suspicions, however, that illicit stockpiles of smallpox exist in other parts of Russia, and perhaps elsewhere.

¹⁷⁸Quoted in Richard Preston, "The Demon in the Freezer," *The New Yorker*, July 12, 1999, p. 56. Preston also quotes a bioterrorism expert who claims to have discovered a credit-card sized machine used by the silicon-chip industry that is capable of making "an invisible mist of particles in the one-to-five micron size range—that size hangs in the air for hours, and gets into the lungs. You can run it on a camcorder battery." Ibid., p. 60.

Third, there were the limitations imposed on Aum's biological weapons effort by the nature of the organization itself. Terrorists hoping to acquire and use biological weapons on a mass scale face a major hurdle within their own organizations. Unless terrorists steal or are given an effective system, they will have to create one. This requires scientific and other technical expertise, sophisticated equipment, financial resources, and the management and leadership to plan and organize a complex enterprise. Cult-like terrorist organizations—the ones that appear to have the greatest interest in biological weapons—may be least suited to meet the complex demands associated with a bioweapon program. Throughout the existence of its biological weapons program, Aum scientists seemed hampered by the cult's fickle and irrational leadership and by poor scientific judgment and a lack of experience in working with such agents as *B. anthracis* and botulinum toxin.¹⁷⁹ Aum scientists, socially and physically isolated and ruled by an increasingly paranoid leader, became divorced from reality and unable to make sound judgments.¹⁸⁰

¹⁷⁹Falkenrath et al., *America's Achilles' Heel*, p. 23.

¹⁸⁰Lifton, *Destroying the World to Save It*, p. 158.

IV. CONCLUSIONS AND RECOMMENDATIONS

On the publication date of this report, the Panel will have been formally conducting business for about six months, and will have had three official meetings—the most recent on December 13, 1999. During that time, substantial information and authoritative analyses have been presented to or have come to the attention of the Panel and its members. Moreover, the Panel is composed of members who have significant expertise and broad experience in this field.

Based on the information provided, the thorough analysis of the potential threats contained in this report, and the collective knowledge and experience of its members, the Panel has drawn some initial conclusions and is making several broad recommendations. In its two subsequent annual reports, the Panel will make more comprehensive and definitive recommendations on a variety of topics.

These initial conclusions and recommendations should not be construed to suggest that the Federal government—either in its executive or legislative branch—currently undertake a major restructuring for this (or any other) potential crisis. The recommendations are intended to propose solutions to this critical national problem to assist in making Federal programs and activities more effective and efficient.

It is axiomatic that, the better we prepare, through a broad spectrum of antiterrorism and counterterrorism activities, the more likely we are to reach the ideal situation—the deterrence, prevention, or interdiction of any terrorist event before it occurs. Given the nature of the potential threats, it is likely that no amount of preparation will cover all possible threat scenarios, and that adequate measures must be undertaken to respond, if an event should occur, in a way that will—first and foremost—minimize human casualties, and that will also mitigate damage to property and to the environment.

In order to achieve these inter-related goals—effective deterrence, prevention, interdiction, and response—efforts at all levels of government must be concerted, concentrated, and collective.¹⁸¹

Threat Assessments and Analyses

This report observes that there has not been universal agreement on several aspects of the potential threat or threats from terrorists who may use or attempt to

¹⁸¹The Panel notes with much interest the recent announcement by the Federal Bureau of Investigation of its plan to reorganize the bureau, creating a separate Counterterrorism Division, which will focus on terrorist threats, domestic preparedness, and critical infrastructure protection. See “FBI to Restructure, Adding Emphasis on Crime Prevention,” *The Washington Post*, November 11, 1999, p. A2.

use CBRN devices or other “weapons of mass destruction.” Early in its deliberations, the Panel determined that, for it to make well-reasoned and informed assessments and to offer substantive, comprehensive, and articulate policy recommendations to the nation’s executive and its legislature, a complete, current, and realistic analysis of the potential domestic threats from terrorists was an essential condition precedent to fulfilling the Panel’s legislative mandate. With some condensation, this report sets forth the analysis commissioned by the Panel.

That fundamental philosophy—the need for comprehensive, definitive, authoritative, articulate assessments and analyses of the potential domestic threats from terrorists on a continuing basis—has application to policymakers at all levels of government who may have any responsibility for addressing this issue.

Because the United States is very much an open society, it always will be vulnerable to terrorism. Nevertheless, it does not necessarily follow that, just because a particular locality or facility is vulnerable to terrorist attack at any point in time, a credible threat exists that can exploit that vulnerability. On the other hand, because of the potential catastrophic consequences of a successful incident perpetrated by a terrorist using a CBRN or other device that has the capability to cause “mass destruction” or “mass casualties,” agencies at all levels must be diligent in developing and assessing information on credible terrorists threats. Only through thorough, comprehensive, articulate, and continuing threat assessments and analyses will appropriate entities at the various levels of government be able to conduct the ensuing risk and vulnerability assessments, to develop and conduct activities to counter any credible threat, or to respond if an event occurs. A recent report of the United States General Accounting Office (GAO) entitled “Combating Terrorism: Need for Comprehensive Threat and Risk Assessments of Chemical and Biological Attacks,”¹⁸² succinctly states:

A formal assessment of the domestic-origin threat, combined with existing assessments of the foreign-origin threat, would provide an authoritative, written, comprehensive, intelligence community view on specific chemical and biological terrorist threats. . . . Soundly performed risk assessments could help ensure that specific programs and related expenditures are justified and targeted according to the threat and risk of validated terrorist attack scenarios generated and assessed by a multidisciplinary team of experts.¹⁸³

The Panel has indicated its concern about a preoccupation with the “worst-case scenario,” and the attendant assumption that any lesser incident can be addressed

¹⁸²GAO/NSIAD-99-163, September 1999. The report is the fourteenth comprehensive analysis in an impressive list of reports on combating terrorism. The report and its related predecessors may be ordered from the GAO or accessed at its Website at: <http://www.gao.gov>

¹⁸³Ibid., at p. 3.

equally well by planning for the most catastrophic threat—ignoring the fact that higher-probability/lower-consequence attacks might present unique challenges of their own. As noted, this approach may not be the best means of setting budgetary priorities and allocating resources. The Panel is convinced, therefore, that more attention should be directed to assessments of the higher-probability, lower-consequence end of the potential terrorist threat spectrum—not at the expense of, but in addition to, assessments and analyses of the higher-consequence threat scenarios.

The Panel has been provided with the recent FBI report on “Project Megiddo,” and considers that effort to be clearly within the ambit of the foregoing assessment and recommendations. With respect to this topic, and other recommendations and initiatives addressed elsewhere in this report (notably on the subject of information sharing, which follows), the Panel is sensitive to the civil liberties implications and issues that may arise in the course of such activities. In the interest of sustaining the broadest-possible public support, the Panel urges officials at all levels of government to ensure that the civil liberties of our citizens are protected.

A National Strategy

Based on the Panel’s threat analysis, other relevant information that has come to its attention, and the knowledge and experience of its own members, the Panel is convinced that a national strategy to address the issues of domestic preparedness and response to terrorist incidents involving CBRN and other types of weapons is urgently needed.

Combating terrorism is clearly a national issue, but the responsibility for the domestic response to a terrorist CBRN incident is not necessarily—and will almost never be exclusively—a Federal one. For a response to those incidents described as “higher probability, lower consequence,” the Federal role is essentially one of providing support to state and local responders, fundamentally in reaction to a request for assistance. It is at the local and state level where the task of the initial response and, in almost every case, the primary responsibilities lie. It is only in the case of a catastrophic event—certainly possible, but of the “lower probability, higher consequence” type—that major responsibilities will reside at the Federal level. Federal involvement in an incident, which could include numerous civilian departments and agencies as well as military entities, will be defined by the nature and severity of the incident. As an example, in any case where an incident may be a terrorist act, the FBI will have an initial involvement in an investigation; if the incident is determined to be terrorism, the FBI will assume a leading role. Nevertheless, the Federal role will, in most cases, be supportive of state and local authorities, who traditionally have the fundamental responsibility for responding.

At the same time, the Federal government can and must provide significant support and assistance, both in preparation and in the event that such an incident actually occurs. There are considerable Federal resources that can be brought to bear in the areas of planning, training, standards, research and development, and equipment. Consequently, there needs to be a “Federal Government Strategy” component of the national strategy—one which clearly articulates Federal responsibilities, roles, and missions, and distinguishes those from state and local ones. Federal funding, and the activities and programs of a number of Federal agencies, to address domestic preparedness and response to such incidents, have increased dramatically in recent years, especially in the wake of the New York World Trade Center and Oklahoma City bombings, and the Aum Shinrikyo attack in the Tokyo subway system. Despite good intentions, and recent improvements in coordination and implementation, Federal programs addressing the issue appear, in many cases, to be fragmented, overlapping, lacking focus, and uncoordinated. The Federal component of a national strategy can help to reduce the redundancy, confusion, and fragmentation of current Federal efforts.

Representatives of the National Domestic Preparedness Office (NDPO)(which will be discussed in more detail below) have stated that the NDPO will develop a “national strategy” to address domestic preparedness issues. Given the fact that the responsibility for the initial and, in large measure, continuing response to *any* such incident will likely fall most heavily on the backs of state and local responders, the Panel suggests that a true national strategy must have a “bottom-up” approach—that it be developed in close consultation and collaboration with state and local officials, and the law enforcement and emergency response communities from across the country. This Panel can help to forge that collaboration. Moreover, any such national strategy—despite its “bottom-up” structure—must have the direct leadership, guidance, and imprimatur of the President. Only that way can a strategy have a truly national tenor; but more importantly, it will contain a comprehensive, articulate expression by the nation’s chief executive of the appropriateness of and distinctions between the Federal role and missions and those at state and local levels.

By focusing on higher-probability/lower-consequence threats, while recognizing and addressing concerns about lower-probability/higher-consequence events, a national strategy can lay the groundwork for assessing and monitoring the threat, and for making adjustments to response strategies as required. As has been argued elsewhere, too much of the Federal effort to date—even those programs that ostensibly are designed to enhance state and local response capabilities—has been predicated on the tacit assumption that preparing for the “worst case” will automatically encompass lesser threats. The foregoing analysis suggests otherwise, because the nature and scale of the consequences can vary so widely. This needs to be recognized and articulated at the national level.

The Panel is aware of the “Five-Year Interagency Counterterrorism and Technology Crime Plan”—recently released (September 1999) by the Attorney General of the United States, under the auspices of Department of Justice “lead agency” responsibility—as well as the interagency working group process dedicated to “WMD preparedness” within the National Security Council structure. Although significant steps in the right direction, the five-year plan does not equate to a comprehensive, fully coordinated national strategy—nor for that matter even the Federal government component of such a strategy—one with clear, concise, and unambiguous leadership and direction from the President in consultation with all who share responsibility for related Federal efforts.

The Panel also recommends that any such strategy include, within its purview, incidents involving more conventional weapons—such as conventional high-explosive or fabricated weapons (e.g., the type used in the Oklahoma City bombing)—that have the potential to cause significant casualties or physical damage; as well as incidents involving CBRN devices that may not be capable of producing “mass casualties” but that can, nevertheless, produce considerable fear, panic, or other major disruptions to the infrastructure or economy of the potential domestic target.

Considering the serious nature and potential consequences of any terrorist incident, the Panel is convinced that comprehensive public education and information programs must be developed, programs that will provide straight-forward, timely information and advice both prior to any terrorist incident and in the immediate aftermath of any attack. The national strategy should lay the groundwork for those programs.

Complexity of the Federal Structure

As indicated by the charts at Appendix A, which depict departments and agencies that have various programs addressing antiterrorism or counterterrorism, or both, the Federal bureaucratic structure is massive and complex. In various forums, state and local officials consistently express frustration in understanding where or how to enter this bureaucratic maze to obtain information, assistance, funding and support. In addition, Federal programs, especially those involving grants for funding or other resources, may be overly complicated, time consuming, and repetitive.

In recent months, the Federal Bureau of Investigation, pursuant to its “lead-agency” role (specified in the related Presidential Decision Directives) for crisis management for terrorism involving weapons of mass destruction, was directed by the Attorney General of the United States to organize, within its own resources, a National Domestic Preparedness Office (NDPO). The ostensible purpose of the NDPO is to serve as a focal point and “clearinghouse” for related preparedness information and for directing state and local entities to the appropriate agency of the Federal government

for obtaining additional information, assistance, and support. There has been discussion about the issue of whether the FBI is the appropriate location or whether the NDPO structure and approach is the most effective way to address the complexities of the Federal organization and programs designed to enhance domestic response capabilities. The Panel is convinced that the *concept* behind the NDPO is sound, and notes with interest that the Congress has recently authorized and appropriated funds (\$6 million) for the operation of the NDPO. While that authority will give the NDPO some wherewithal to operate and to hire persons from outside the FBI, the Panel has seen no specific direction to other Federal agencies to provide personnel or other resources to the NDPO, to assist in a concerted, well-coordinated effort.¹⁸⁴

Congressional Responsibilities

In much the same way that the complexity of the Federal bureaucratic structure is an obstacle—from a state and local perspective—to the provision of effective and efficient Federal assistance, it appears that the Congress has made most of its decisions for authority and funding to address domestic preparedness and response issues with little or no coordination. The various committees of the Congress continue to provide authority and money within the confines of each committee's jurisdiction over one or a limited number of Federal agencies and programs.¹⁸⁵ The Panel recommends, therefore, that the Congress consider forming an *ad hoc* Joint Special or Select Committee, composed of representatives of the various committees with oversight and funding responsibilities for these issues, and give such an entity the authority to make determinations that will result in more coherent efforts at the Federal level.

Information Sharing

State and local officials express the need for more “intelligence”, and for better information sharing among entities at all levels on potential terrorist threats. While the Panel is acutely aware of the need to protect classified national security information, and the sources and methods by which it may have been obtained, the Panel believes that more can and must be done to provide timely information—up, down, and laterally, at all levels of government—to those who need the information to provide effective deterrence, interdiction, protection, or response to potential

¹⁸⁴Some Federal agencies have, however, agreed to “detail” personnel to the NDPO.

¹⁸⁵With coordination from the Office of Management and Budget, and the National Security Council staff, the budget submission from the Executive “rolls up”—for display purposes—all related programs to combat terrorism, including those designed to strengthen domestic preparedness. Nevertheless, representatives of the Executive Branch must “market” those programs to the individual oversight and appropriating committees.

threats.¹⁸⁶ This may entail granting security clearances to additional officials at the state and local level. And as noted, the FBI report on Project Megiddo, and the briefings of its findings to state and local officials, is salutary.

The Panel is also aware of efforts in the Los Angeles area, in connection with the operational area terrorism working group (TWG) composed of LA county and municipal agencies, and the area's terrorism early warning (TEW) group; and of the multi-jurisdictional effort in New England aimed at collective information sharing of terrorist and other criminal threats. Those initiatives, as well as others that have been formed under the auspices of the FBI program to establish joint terrorism task forces, could be models for other regional programs, and for Federal interface with state and local jurisdictions, to improve and facilitate information sharing.

The Panel is convinced that efforts in this area must be based on the use of the most modern information technology available.

Definitions and Terms of Reference

Many of the terms and definitions that are essential to the instant discussion are ambiguous and confusing. The definition contained in the Nunn-Lugar-Domenici (NLD) Act—which directed specific actions in this arena, and which has been used as the basis for the development of others—defines “weapons of mass destruction” as

- . . . any weapon or device that is intended, or has the capability, to cause death or serious bodily injury to a significant number of people through the release, dissemination, or impact of—
- (A) toxic or poisonous chemicals or their precursors;
 - (B) a disease organism; or
 - (C) radiation or radioactivity.

Nevertheless, 18 U.S.C, Section 2332a, which makes it a Federal crime—carrying a maximum penalty of death or life imprisonment—to use “certain weapons of mass destruction,” includes in its definition of such weapons not only definitional elements substantially similar to those contained in NLD, but also “any destructive device as defined in section 921” of that title, which includes

- (A) any explosive, incendiary, or poison gas
 - (i) bomb,
 - (ii) grenade,

¹⁸⁶From discussions at Panel meetings, and from comments that have been made by officials in other forums, information-sharing apparently has been improving in recent months.

- (iii) rocket having a propellant charge of more than four ounces,
- (iv) missile having an explosive or incendiary charge of more than one-quarter ounce,
- (v) mine, or
- (vi) device similar to any of the devices described in the preceding clauses;

(B) any type of weapon (other than a shotgun or a shotgun shell which . . . is generally recognized as particularly suitable for sporting purposes) by whatever name known which will, or which may be readily converted to, expel a projectile by the action of an explosive or other propellant, and which has any barrel with a bore of more than one-half inch in diameter; and

(C) any combination of parts either designed or intended for use in converting any device into any destructive device described in subparagraph (A) or (B) and from any combination of parts either designed or intended for use in converting any which a destructive device may be readily assembled.

While the Title 18 definition is more inclusive in terms of certain conventional explosive devices that do not fit within the traditional categories of chemical, biological, radiological or other nuclear devices, both definitions beg the question of what constitutes a “significant number of people.” A single CBRN or conventional weapon that is neither intended nor has the capability “to cause death or serious bodily injury to a significant number of people” is not included within the actions proscribed; but could, either alone or in a series of actual or threatened events create panic or other significant disruptions.

A recent GAO report on Combating Terrorism flatly states, “no federal agency has defined what constitutes ‘mass casualties’.”¹⁸⁷

And several Federal agencies (e.g., the FBI and the Department of Defense) have their own definition of terrorism.

The Panel recommends that there be a revision and codification of universal, unambiguous, and easily understandable definitions of the various terms used in this context.

¹⁸⁷GAO/NSIAD-99-163, at p. 6. The Department of Health and Human Services has arbitrarily determined that it will use the figure of 1,000 casualties for planning purposes in establishing its Metropolitan Medical Response System.

Standards, and Research, Development, Test and Evaluation

The Panel will devote significant attention during its current fiscal year activities to standards, especially for training and equipment. Given the likelihood that multiple jurisdictions in one or more states, as well as agencies of the Federal government, will be involved in any serious terrorist incident, it will be critical that every responder in a particular emergency function be trained to the same standard. The types of equipment used by response entities—detection devices, personal protective equipment, and communications equipment—must be compatible and inter-operable. The Panel commends the efforts being undertaken by the Interagency Board (IAB) for Equipment Standardization and InterOperability—composed of representatives of various Federal, state, and local entities, as well as some nongovernmental professional organizations—in its attempt to develop a national “standardized equipment list,” to provide responders at all levels with a resource with which to make better-informed decisions about the selection and acquisition of equipment. Such efforts are a positive step toward ensuring better compatibility and inter-operability of equipment among potential responders.

Local responders continue to express frustration at the vast array of devices and equipment available from industry that may have application for domestic preparedness for terrorist attacks. At the same time, some have expressed displeasure at the fact that certain items, previously purchased by local responders, do not measure up to the claims of manufacturers.

In order to develop and maintain operationally effective standards for equipment compatibility and inter-operability, the Panel has determined that more research and development is required to meet local responder needs. Given the significant costs associated with sophisticated equipment, such as certain chemical and biological detection devices, emphasis should be placed on the development of multi-purpose pieces of equipment, which can be used not only in the terrorism context, but which will also have application in other fields, such as the detection of naturally transmitted infectious diseases.

To help to reassure responders that the equipment that is being used is in fact capable of doing what it is designed to do, it is likely that an ambitious program of independent testing and evaluation will have to be undertaken. The Panel recognizes that any such program will likely have to be conducted—because of its national implications—under Federal sponsorship; and will require the addition or reallocation

of significant resources.¹⁸⁸ For reasons that are self-evident, local responders are insisting that testing be done with “live” agents.

The Panel is aware of a project being undertaken by the National Institute of Justice (NIJ), an agency the U.S. Department of Justice’s Office of Justice Programs, which is ultimately designed to be a “consumer report” catalogue of available equipment that meets certain listed standards.

The Issue of “Who’s in Charge”

Increasingly, the Panel and its supporting staff have heard the question raised, “When an incident occurs, who’s in charge?” The Panel has initially concluded that there is no single answer to the question—a determination will likely have to be made on a case-by-case basis, taking into consideration, among other factors, the nature of the incident; the perpetrator source; the actual or potential consequences immediately and over time; and the then-current capabilities for effective response at various levels. In every actual terrorist incident, non-Federal local responders will always be in charge initially, unless of course the incident occurs on a military or other Federal reservation which has its own response capability. Even in the latter case, an incident may be of such proportions that non-Federal responders may be just as engaged, if not more so, as the Federal responders on the government enclave may be.

The issue may be compounded by the fact that certain responsibilities at the Federal level have been bifurcated. Under the related Presidential Decision Directives, the Federal Bureau of Investigation has the “lead agency” responsibility for “crisis management,” while the Federal Emergency Management Agency is “lead” for “consequence management.” The “five-year plan,” recently released by the Department of Justice, acknowledges that

there is often no clear point in time when resolution of a terrorist incident moves from the crisis to the consequence management stage. Indeed, these phases may occur simultaneously or, in some cases, the consequence management phase may actually precede the identification of a terrorist event.¹⁸⁹

At this point, the Panel reserves judgment on the issue of whether changes should be made in Federal “lead agency” responsibilities, but will include the issue as a “thread”

¹⁸⁸At a recent conference of the IAB, it was noted by an official from the National Institute of Occupational Safety and Health that there are some 7,000 respiratory devices—mostly protective masks—that have potential application to a response to a chemical or biological incident, and that to test a device properly will take form four to six weeks—per device.

¹⁸⁹ “Five-Year Interagency Counterterrorism and Technology Crime Plan,” p. 21.

which runs throughout its consideration of many aspects of preparations for response at all levels.

Many local responders are also justifiably concerned that Federal agents will assume command following almost any terrorist attack. In more discrete terms, local responders express concern that, having established an excellent relationship with Federal agencies at the local or regional level, when the “planes from Washington” start to arrive, local agencies will be faced with an entirely new team—one which may set different ground rules than those to which local responders and their local or regional Federal counterparts have previously agreed. Nevertheless, in various forums, local responders have noted improvement in this area during the past year, especially in the out-reach and bridge-building initiatives of the Federal Bureau of Investigation.

When an actual incident is or becomes one that requires a major Federal response, to the point that a Federal entity may have to “take command” of an operation, the issue of when and how an appropriate “hand-off” from local to Federal authorities takes place continues to be a significant one for resolution—sooner rather than later. While the Panel is aware that the issue is being addressed in inter-agency and inter-governmental agreements, and is being included in a number of exercises, efforts by entities at all levels must, in the opinion of the Panel, be accelerated to provide the necessary agreed-on templates for such hand-offs to take place. This issue, especially any specific agreements that may be reached between Federal and local officials, should always be included in related training, exercises, and other appropriate forums, to ensure that any such transition will be as smooth as possible in an actual operation.

Summary

Regardless of the level of consequences from a terrorist event, we must as a nation ensure that we have programs that will provide the capabilities for local, state, and Federal authorities to respond effectively. Existing local, state and national response systems, used for a variety of emergency situations, may provide a solid foundation for preparedness for a terrorist incident. Managing the consequences of any type or size terrorist event may require, however, a somewhat different approach on the part of state and local officials and their Federal partners. Thus, we must ensure a basic ability for the three levels of government to integrate activities laterally and vertically in the development of policy and operational guidelines.

V. PLANNED PANEL ACTIVITIES FOR THE CURRENT FISCAL YEAR

Having obtained the comprehensive “benchmark” threat analysis contained in the foregoing sections of this report, and considering additional analyses and other significant information that has come to its attention, the Panel has embarked on an ambitious program of activities for the current fiscal year, which began October 1.

As noted in section one, the enabling legislation that created the Panel charged it with five specific responsibilities:

- To assess Federal agency efforts to enhance domestic preparedness for incidents involving WMD;
- To assess the progress of Federal training programs for local emergency responses to incidents involving WMD;
- To assess deficiencies in programs for response to incidents involving WMD, including a review of unfunded communications, equipment, and planning requirements, and the needs of maritime regions;
- To recommend strategies for ensuring effective coordination with respect to Federal agency WMD response efforts, and for ensuring fully effective local response capabilities for WMD incidents; and
- To assess the appropriate roles of state and local government in funding effective local response capabilities.¹⁹⁰

Activities in the current year will be particularly focused on the first three of the Panel’s responsibilities. The Panel, in its next annual report due to the President and the Congress on December 15, 2000, will provide a comprehensive report of those activities, along with additional analyses, conclusions, and recommendations. Comprehensive analyses, conclusions, and recommendations with respect to the fourth and fifth responsibilities, as well as those related to maritime regions, will be contained in the third and final annual report, due December 15, 2001. The Panel will likely make some interim recommendations in connection with those latter responsibilities in its next report.

Comprehensive Review and Analysis of Federal Programs

The panel, in conjunction with its supporting FFRDC, will undertake a thorough review and analysis of existing Federal programs that are designed, in whole or in part, to support or enhance domestic preparedness programs for terrorist incidents involving CBRN weapons. That review and analysis will include, among other things, consideration of:

¹⁹⁰For purposes of the Panel’s activities and recommendations, it has included the state level within the scope of its mandate.

- The complexity of the Federal organizational structure for providing information, assistance, or enhancements to local responders
- Duplicative or overlapping Federal programs for or obstacles to providing such information, assistance, or enhancements
- Analyses of the potential effectiveness and efficiency of each such program, based on the program description, additional information provided by the affected Federal agency, and other information available to the Panel

The review and analysis will place particular emphasis on those areas specifically mentioned in the enabling legislation: training, communications, equipment, planning requirements, the needs of maritime regions, and coordination among the various levels of government.

As a key element in its review and analysis of Department of Defense programs, the Panel will consider appropriate missions of the U.S. armed forces, in either direct or supporting roles, for responses to such terrorists incidents, with emphasis on an evaluation of the effectiveness of the current and proposed structure of military organizations for responses across the entire spectrum of potential threats.

Based on presentations given to the Panel, other information that has come to the Panel's attention from a variety of sources, and discussion among Panel members, the review and analysis of equipment issues will include a focus on research, development, testing, and evaluation of equipment currently available, as well as emerging technologies. In addition, the Panel's review and analysis will also place special emphasis on the development and timely dissemination of various categories of critical information between and among entities at the Federal, state, and local level.

Survey of Local Responders and State Emergency Management and Response Organizations

The Panel is cognizant of the fact that many local responders—"first responders" as they are frequently called—have participated in one or more surveys on the issues being addressed by this Panel. Nevertheless, given the dynamic nature of the potential threats, coupled with a number of initiatives and activities in this arena at the Federal, state, and local level, which have been and are proposed to be undertaken contemporaneously with the Panel's efforts, the Panel has determined that it is important to have current responses to questions about issues that may also have been addressed in prior surveys, as well as responses to specific questions that may not have been previously asked. As in the case of the review and analysis of Federal programs outlined above, the survey will be designed to elicit the views of those surveyed with respect to the efficacy of current Federal programs, particularly in the areas of training, equipment, planning, communications, and Federal agency coordination among the various levels of government. The survey will be conducted

with a targeted survey audience that will include all geographic regions of the country, and in states and localities with a broad range of population densities.

Interviews with Federal, State, and Local Officials

To complement the first two activities outlined above, members of the Panel and staff of the supporting FFRDC will conduct interviews with selected senior and mid-level officials at the Federal, state, and local level—including, at the local level, law enforcement, fire services, emergency and other medical providers, public health personnel, and other emergency service officials. The purpose of the interviews will be to obtain more detailed information on programs and activities currently being conducted in certain jurisdictions, as well as specific proposals or recommendations that any of those persons interviewed may have to improve or enhance Federal efforts designed to strengthen local emergency responses to any such incident.

The specific officials to be interviewed will be determined at the December 1999 and subsequent meetings of the Panel. As in the case of the survey, interviews will be conducted with officials in several geographic regions of the country, and in states and localities with a broad range of population densities. Certain officials will be selected based on the depth of involvement of that official, or his or her state or locality, in efforts already undertaken by that state or locality to prepare for responses to terrorist incidents involving CBRN weapons. Nevertheless, officials will also be interviewed in some jurisdictions or agencies that have undertaken little or no preparation for potential response operations.

Case Studies

With the assistance of its supporting FFRDC, and in collaboration with other entities, the Panel will conduct a series of case studies that will focus on lessons learned, in several jurisdictions, from actual incidents and hoaxes of terrorism involving the potential use of CBRN weapons or other “weapons of mass destruction”—including, in the latter terminology, more conventional weapons with actual or potential mass-casualty results; and of several jurisdictions at the state or local level that have devoted significant resources to the preparation for a response to such an incident. The purpose of the case studies will be to review and analyze, in a consolidated form, the full range of elements and issues involved in each specific plan or actual response.

Standards

In parallel with the foregoing efforts, the Panel and the staff of its supporting FFRDC will also undertake a comprehensive analysis of the issue of standards for

adequate preparation and response, which will include the status of existing, or the development of, appropriate standards in the areas of:

- Training for responders at all levels
- Equipment
- Notification procedures
- Communications
- Planning

On the assumption that no individual locality, arguably no individual state, will have the wherewithal by itself to respond to an incident that actually involves mass casualties or mass destruction—that responders from many jurisdictions will be required to augment or perhaps supplant responders in a locality where an incident occurs—standards in each of the areas listed above will be critical to an effective response.¹⁹¹ In conducting this analysis, the Panel will consult with a variety of law enforcement, fire services, emergency and other medical, public health, and other emergency services professional organizations, which have, in many cases, established standards for other purposes within their specific fields of endeavor. The Panel will also consult with various Federal entities—agencies within the Departments of Health and Human Services, Defense, and Justice, and the Federal Emergency Management Agency, to mention a few—which are or have been involved in establishing standards in other contexts. Assessment and analyses of the Panel will be designed to determine, among other things, certain “baseline” standards for both training and equipment. In the equipment category, determinations by the Panel will not include the endorsement of any particular commercial product.

Participation in Related Activities

Panel members and the staff of its supporting FFRDC will continue to attend and to participate in a variety of conferences, symposiums, exercises, meetings, and congressional hearings where terrorism, CBRN and WMD, and related domestic preparedness issues are discussed. As part of its continuing deliberations and in the development of its annual reports, the Panel will also review and analyze the reports and recommendations emanating from such activities, as well as relevant reports, recommendations, or analyses of other public and private organizations and experts in the field.

¹⁹¹The Panel is aware that the currency and sustainment of a particular level of training, as well as the maintenance of any equipment acquired by or provided to a response entity, are issues in this subject area. The Panel will, therefore, emphasize those issues in its research and analysis.

Continuing Threat Analysis

As indicated in previous sections of this report, the nature, scope, and sources of potential threats from terrorists, who may seek to use CBRN weapons, is exceptionally dynamic. A continuing, comprehensive analysis of the potential threats from terrorists, and attendant issues of the risks and vulnerabilities associated with those threats, will be critical to the development and implementation of any strategy, plan, or program to prepare for and to provide an effective domestic response to such an incident. As an integral part of its efforts, the Panel will continue to monitor, from a variety of entities and sources, related information and intelligence, both classified and open-source, on the nature and sources of potential threats.

Cyber Terrorism

This report does not specifically address any issues related to cyber terrorism. A strict interpretation of the Panel's enabling legislation, and related Federal statutes that provide definitions of "weapons of mass destruction," would indicate that the issue is not within the purview of the Panel's mandate. Nevertheless, the Panel has concluded that the issues of cyber terrorism and the forms of terrorist activities that the Panel has considered thus far are so inter-related that the Panel cannot ignore the issue. The Panel will, therefore, consider issues related to cyber terrorism in its activities, and include in its subsequent reports appropriate conclusions and recommendations on the subject.

Future Meetings of the Panel

The Panel has met and will plan to continue to meet at least once in each calendar quarter—normally in the last month of the quarter—for the duration of its existence.¹⁹² In the course of those meetings, the Panel will continue to obtain and to discuss information relevant to its congressional mandate. The Panel also plans to conduct several of its meetings in different parts of the country, to elicit the views and recommendations of the public at large on this issue of critical national importance.

¹⁹²The dates, times, and locations of the two upcoming meetings of the Panel will normally be determined at each of the Panel's quarterly meetings, and will subsequently be posted to the Panel's public Website at: <http://www.rand.org/organization/nsrd/terrpanel/>

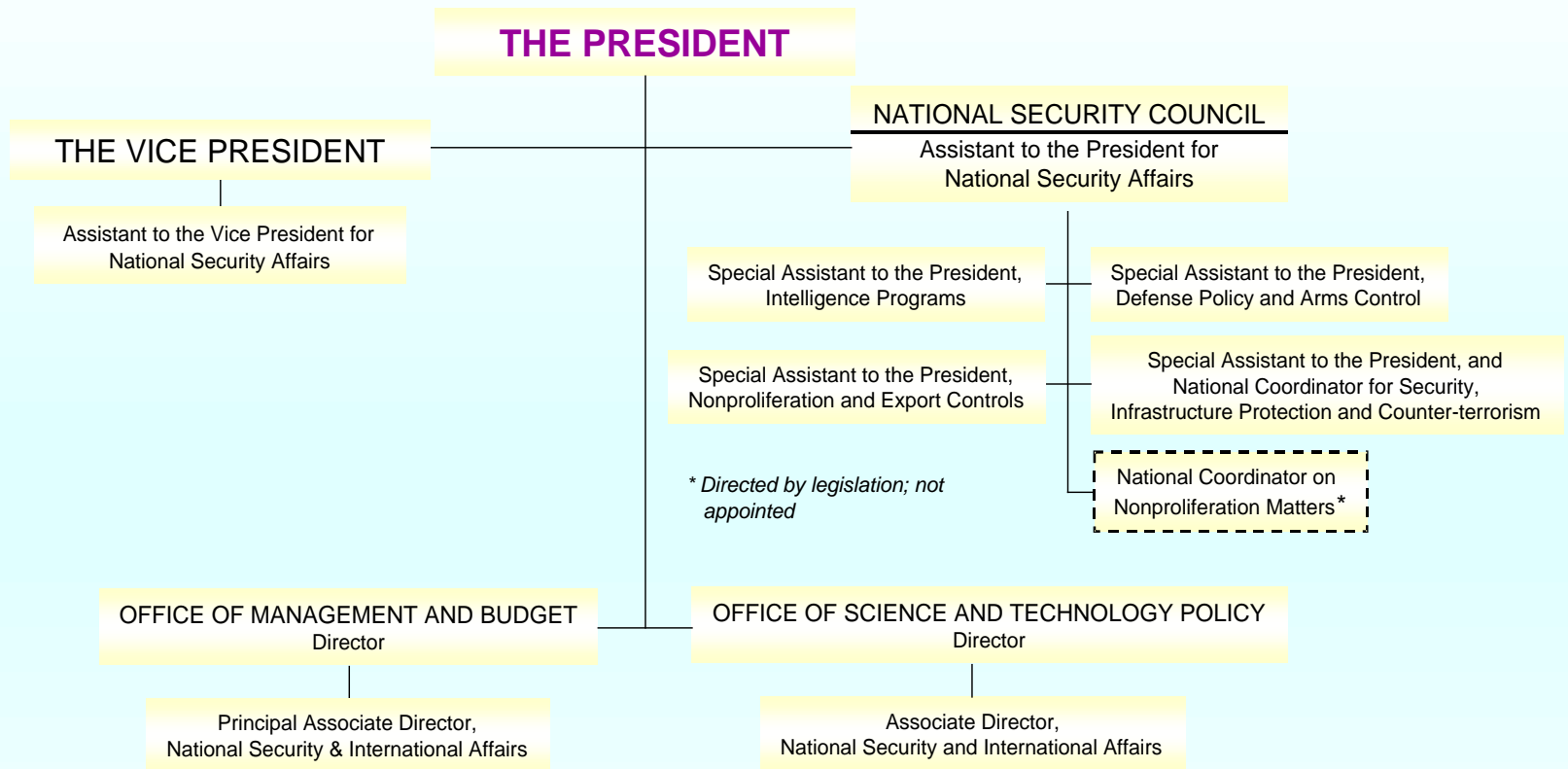
APPENDIX A—FEDERAL ORGANIZATION STRUCTURE FOR COMBATING TERRORISM

The charts that follow are intended to depict, in two-dimensional form, the organizational structure of the Federal government for dealing with all aspects of combating terrorism—intelligence, law enforcement, health and medical, energy, commercial, diplomatic, military, research and development—both domestically and internationally, including deterrence, prevention, interdiction, and response.

The charts include references to the interagency working group structure for “weapons of mass destruction preparedness” under the auspices of National Security Council structure, and to a similar intra-departmental structure with the Department of Defense.

The charts only depict structure down to the Assistant Secretary and the “bureau” or “agency” level, and do not, therefore, include every “program office” with any responsibility for these issues.

Federal Agencies with Responsibilities for WMD and Terrorism Issues



Federal Agencies with Responsibilities for WMD and Terrorism Issues

NSC Structure

NSC PRINCIPALS COMMITTEE¹

NSC DEPUTIES COMMITTEE²

Weapons of Mass
Destruction Preparedness
Group³

Counter-Terrorism
Security Group³

Critical Infrastructure
Protection Group³

1 - Assistant to the President for National Security Affairs
Secretary of State
Secretary of Defense
U.S. Representatives to the United Nations
Director of Central Intelligence
Chairman of the Joint Chiefs of Staff
Assistant to the President for Economic Policy
Assistant to the Vice President for National Security Affairs
[Others as Invited or Required]

2 - Deputy Assistant to the President for National Security Affairs
Under Secretary of Defense for Policy
Under Secretary of State for Political Affairs
Deputy Director of Central Intelligence
Vice Chairman of the Joint Chiefs of Staff
Assistant to the Vice President for National Security Affairs
Deputy Assistant to the President for Economic Policy
[Others as Invited or Required]

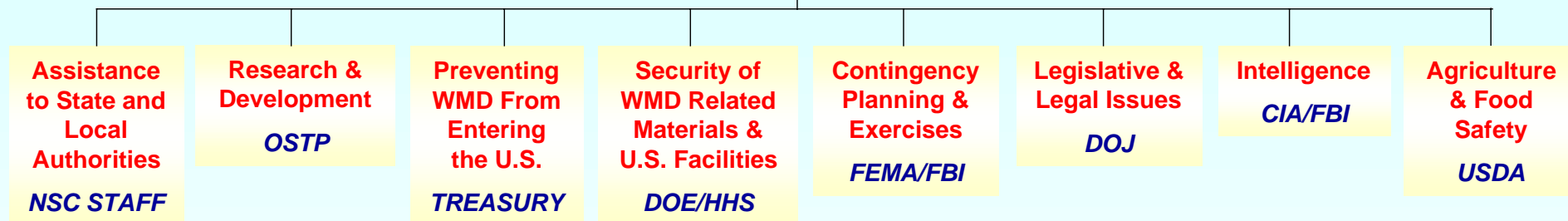
3 - Chaired by National Coordinator for Security, Infrastructure Protection, and Counter-Terrorism

Federal Agencies with Responsibilities for WMD and Terrorism Issues

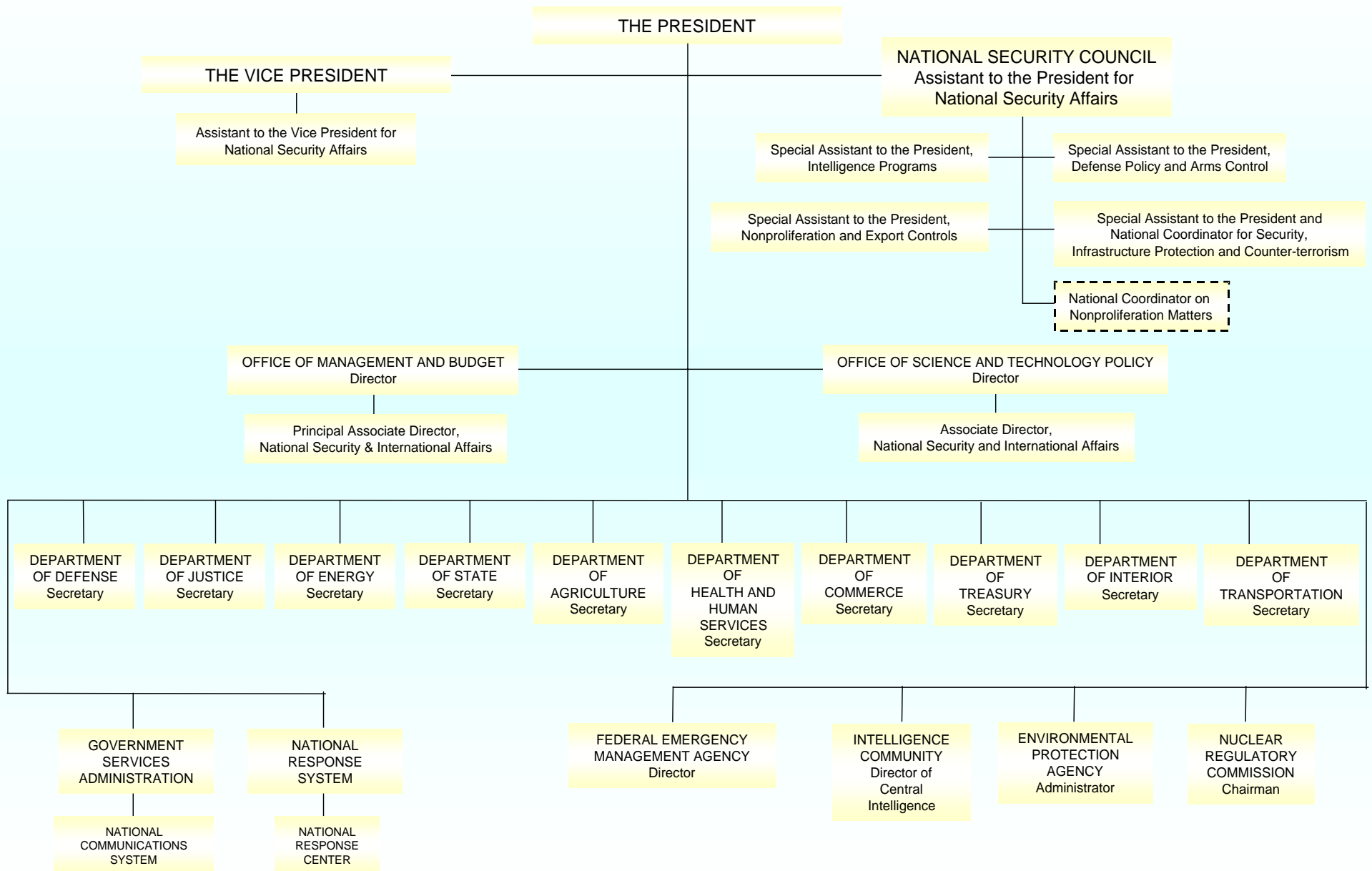
NSC Structure

Weapons of Mass Destruction Preparedness Group

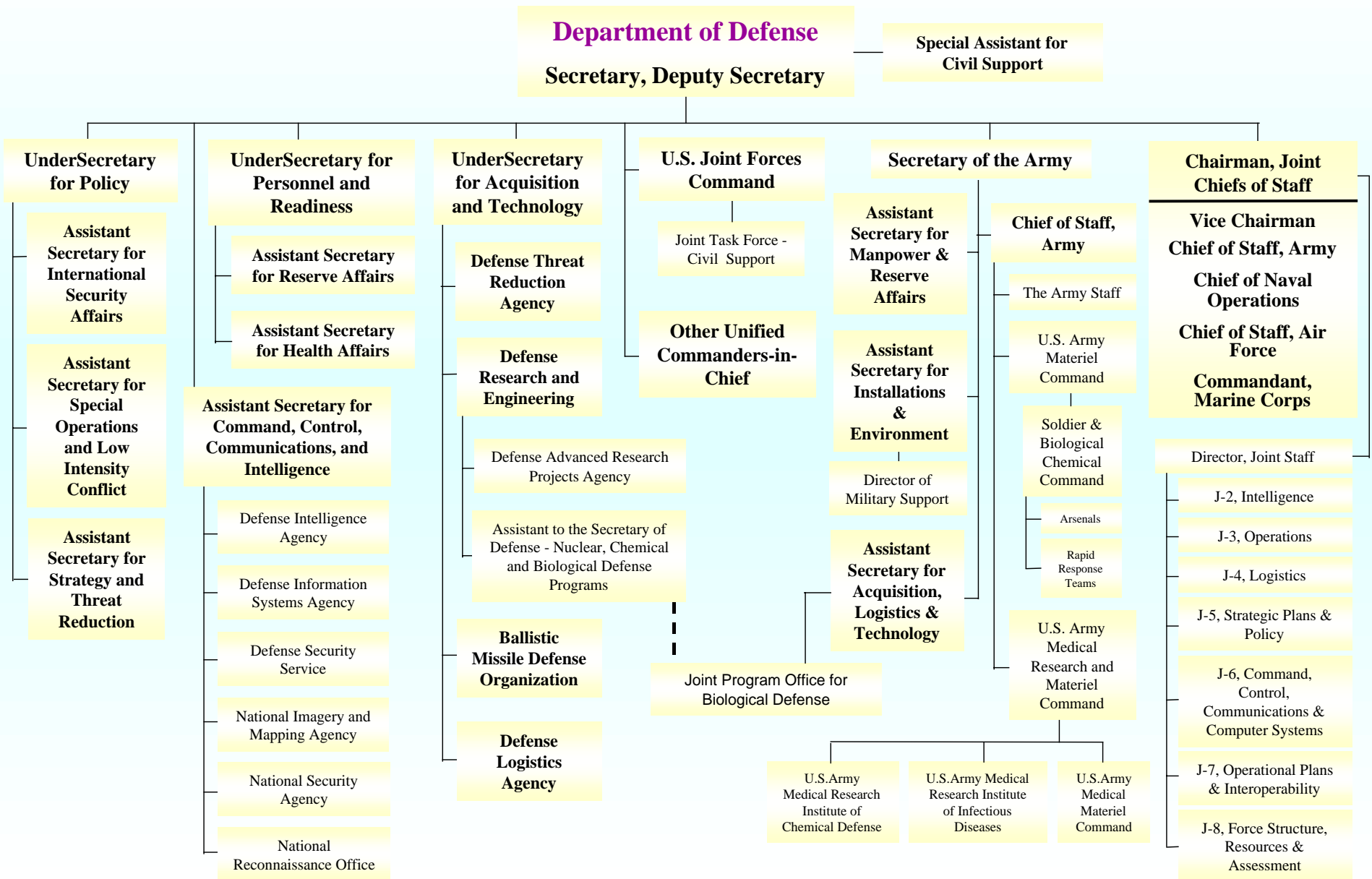
National Coordinator for Security, Infrastructure Protection, and Counter-Terrorism, Chair



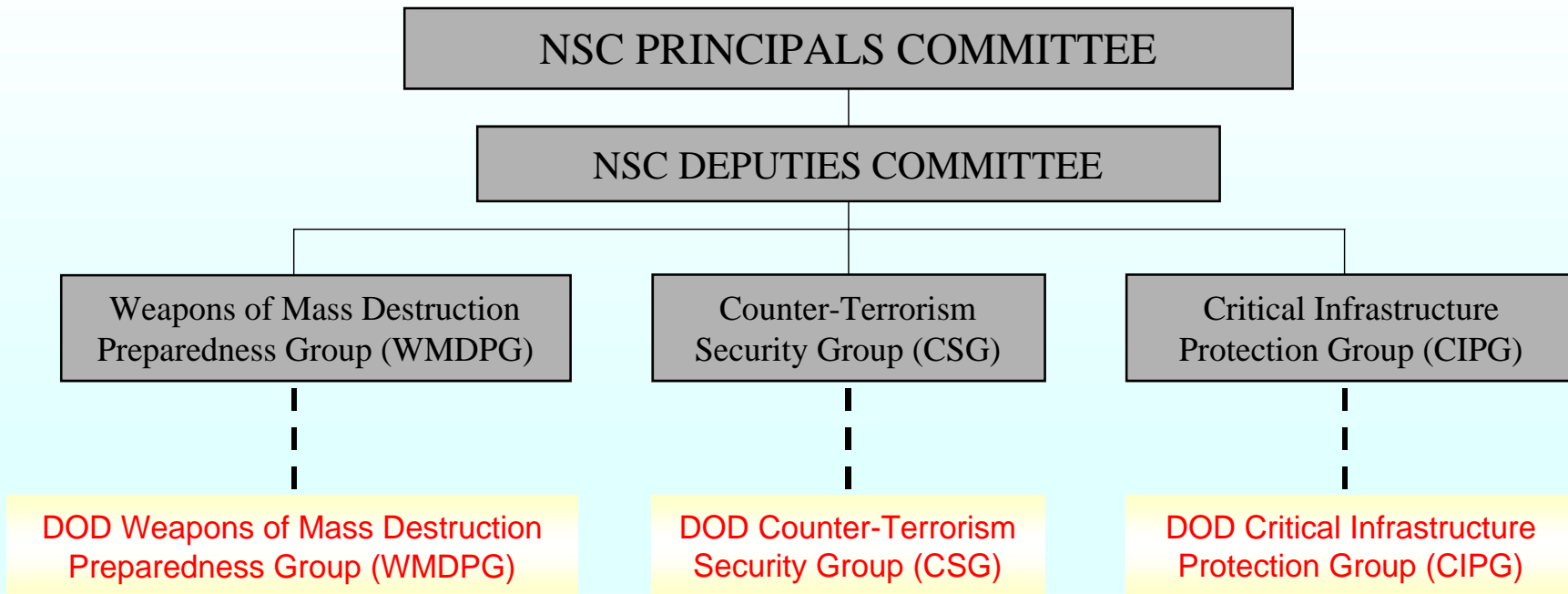
Federal Agencies with Responsibilities for WMD and Terrorism Issues



Federal Agencies with Responsibilities for WMD and Terrorism Issues



Federal Agencies with Responsibilities for WMD and Terrorism Issues



DOD PARALLEL SENIOR MANAGEMENT GROUPS

(DOD Chairs act as the single points of entry and coordination for all matters affecting DOD that emanate from the NSC Interagency Groups and will coordinate the appropriate DOD attendance at all NSC Interagency Group Meetings)

Federal Agencies with Responsibilities for WMD and Terrorism Issues

DOD WMDPG MEMBERSHIP

DOD WMDPG

Co-Chair: Principal Deputy UnderSecretary of Defense (Policy) (PDUSD(P))

Deputy Co-Chair: Principal Deputy UnderSecretary of Defense (Personnel and Readiness) (PDUSD(P&R))

Co-Chair for Implementation: Secretary of the Army (SecArmy)

Director, Joint Staff (DJS)

Assistant Secretary of Defense, Special Operations/Low Intensity Conflict (ASD (SO/LIC))

Assistant Secretary of Defense, Reserve Affairs (ASD (RA))

Assistant Secretary of Defense, Health Affairs (ASD (HA))

Assistant Secretary of Defense, Strategy and Threat Reduction (ASD (S&TR))

General Counsel (GC)

UnderSecretary of Defense, Comptroller (USD (C))

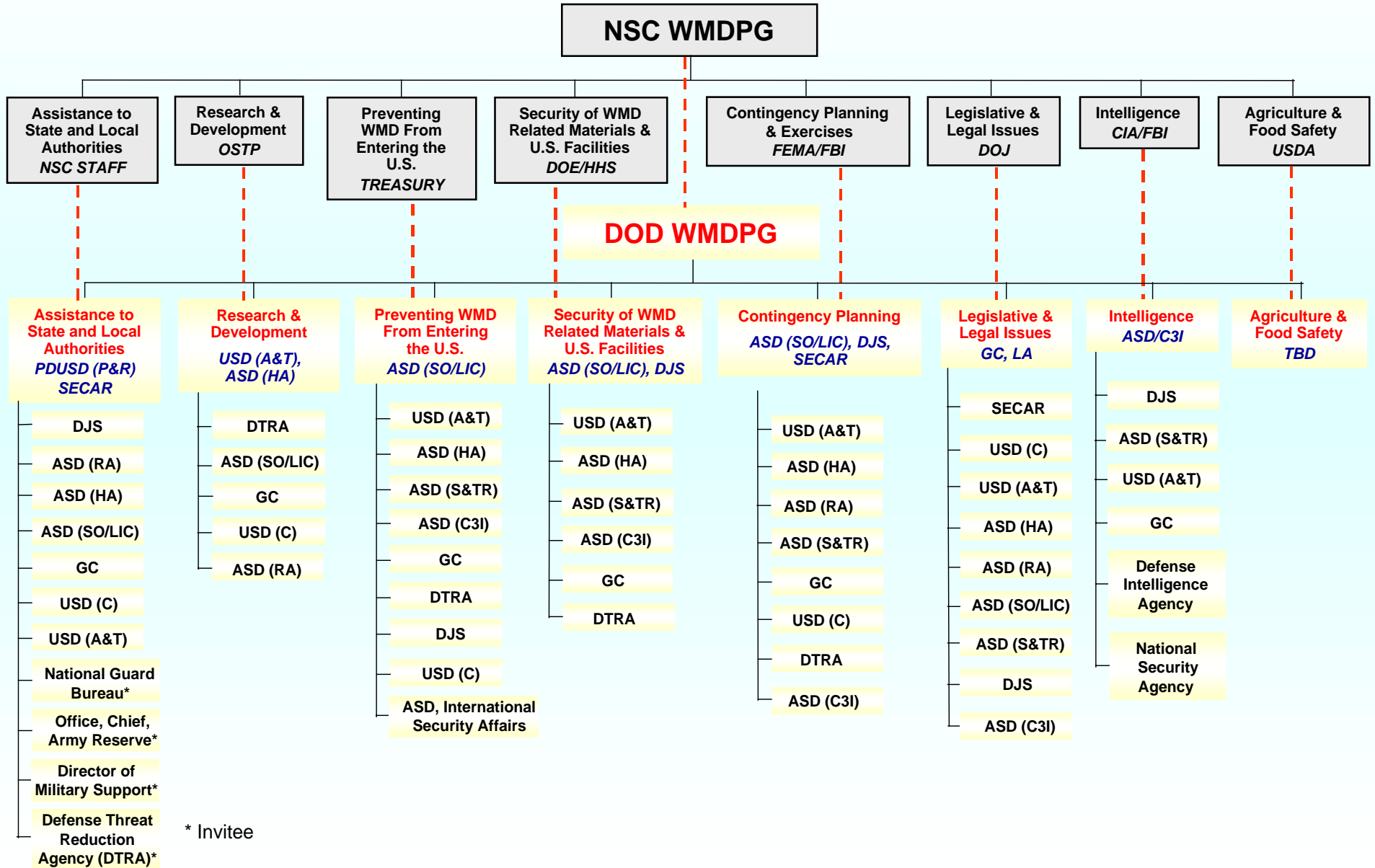
UnderSecretary of Defense, Acquisition and Technology (USD (A&T))

Assistant Secretary of Defense, Command, Control, Communications & Intelligence (ASD (C3I))

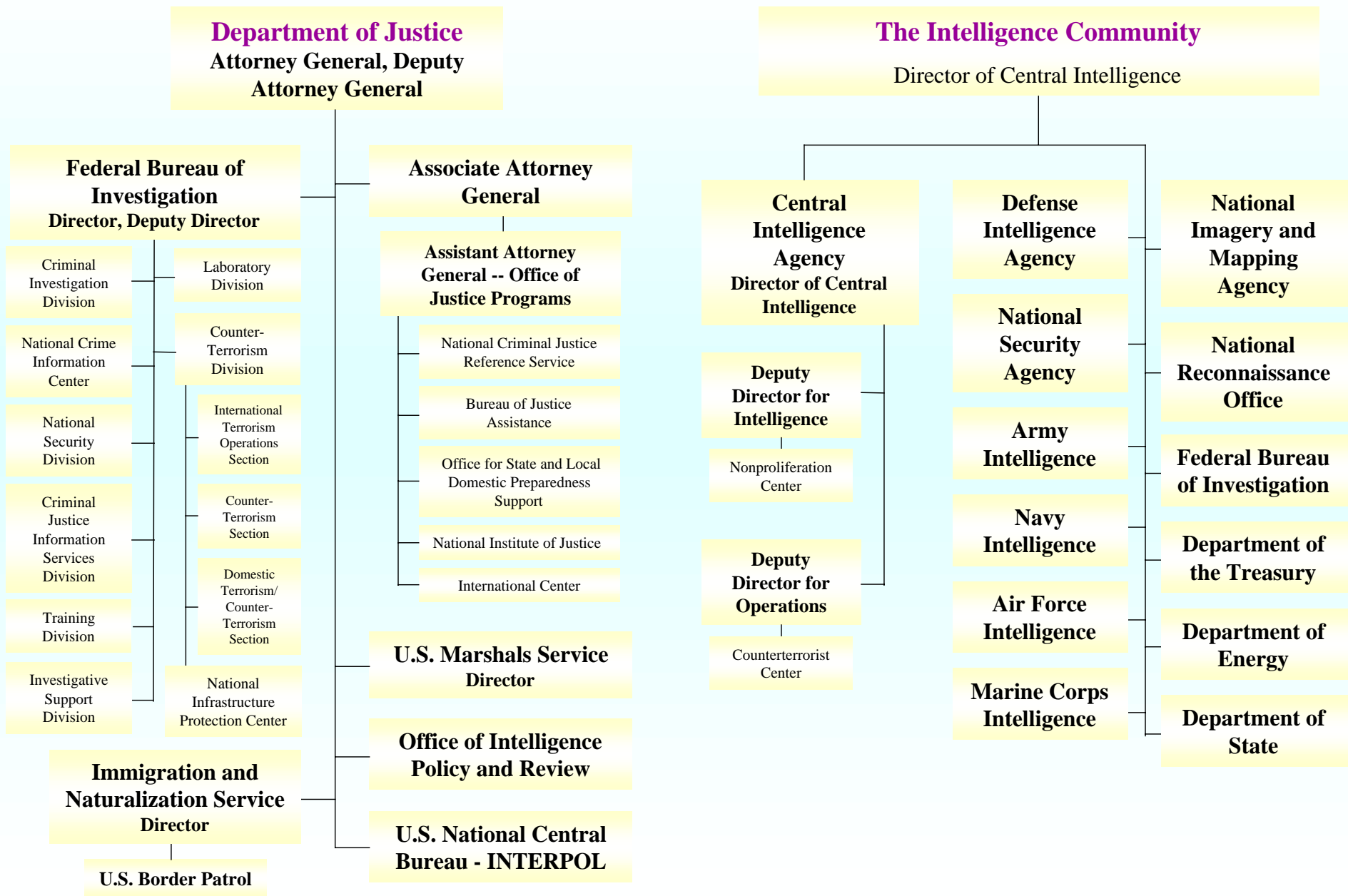
Assistant Secretary of Defense, Legislative Affairs (ASD (LA))

Federal Agencies with Responsibilities for WMD and Terrorism Issues

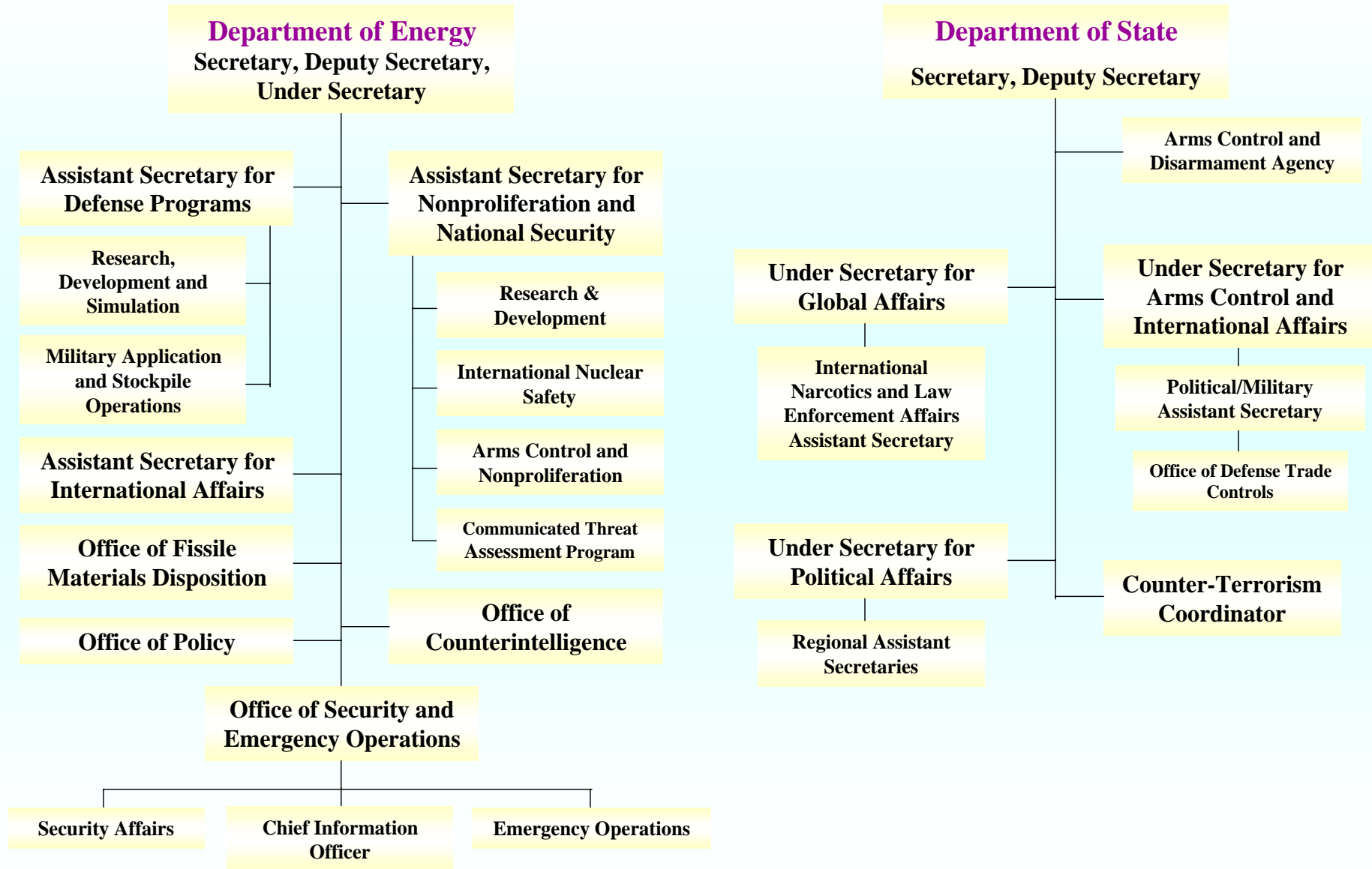
NSC and DOD WMDPG Sub-Group Comparison



Federal Agencies with Responsibilities for WMD and Terrorism Issues



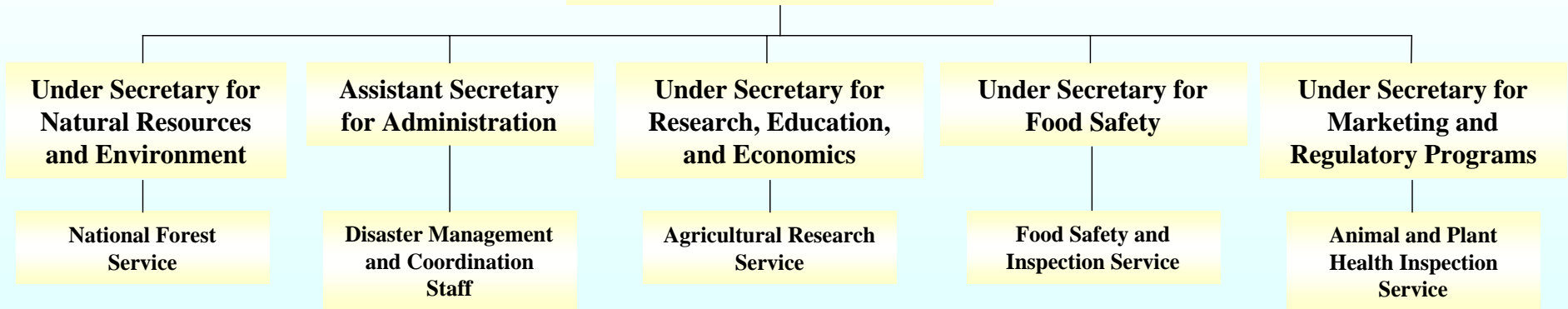
Federal Agencies with Responsibilities for WMD and Terrorism Issues



Federal Agencies with Responsibilities for WMD and Terrorism Issues

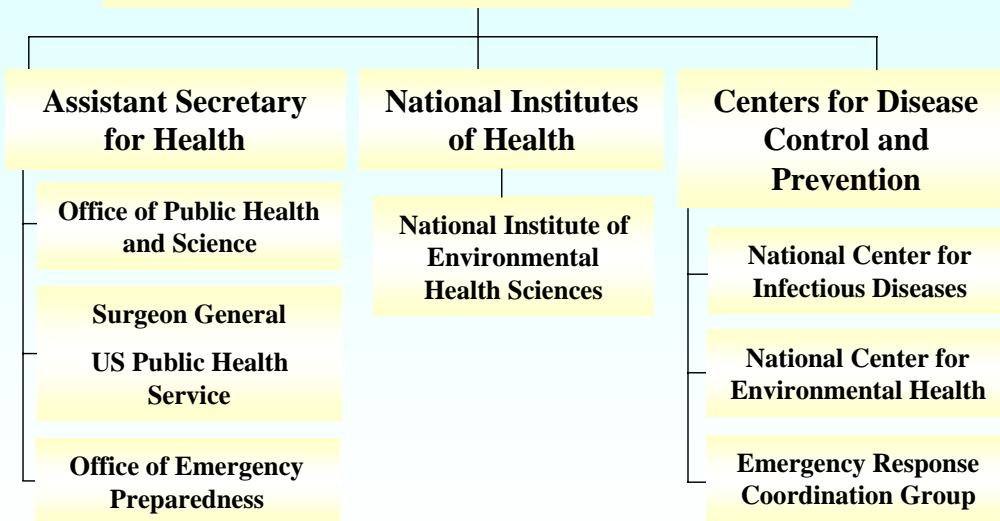
Department of Agriculture

Secretary



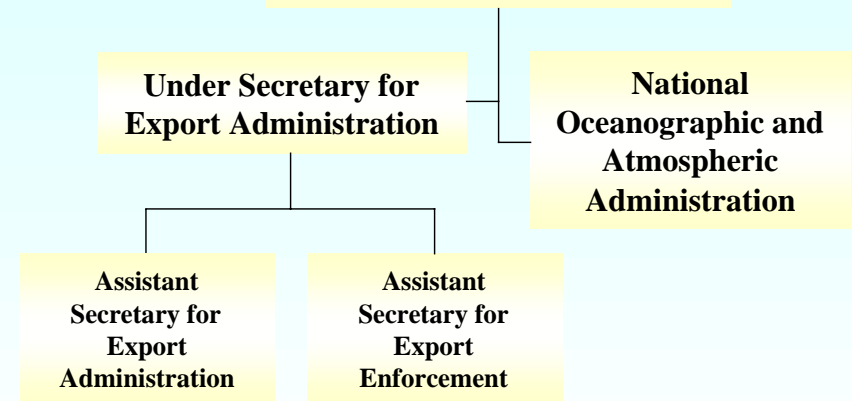
Department of Health and Human Services

Secretary

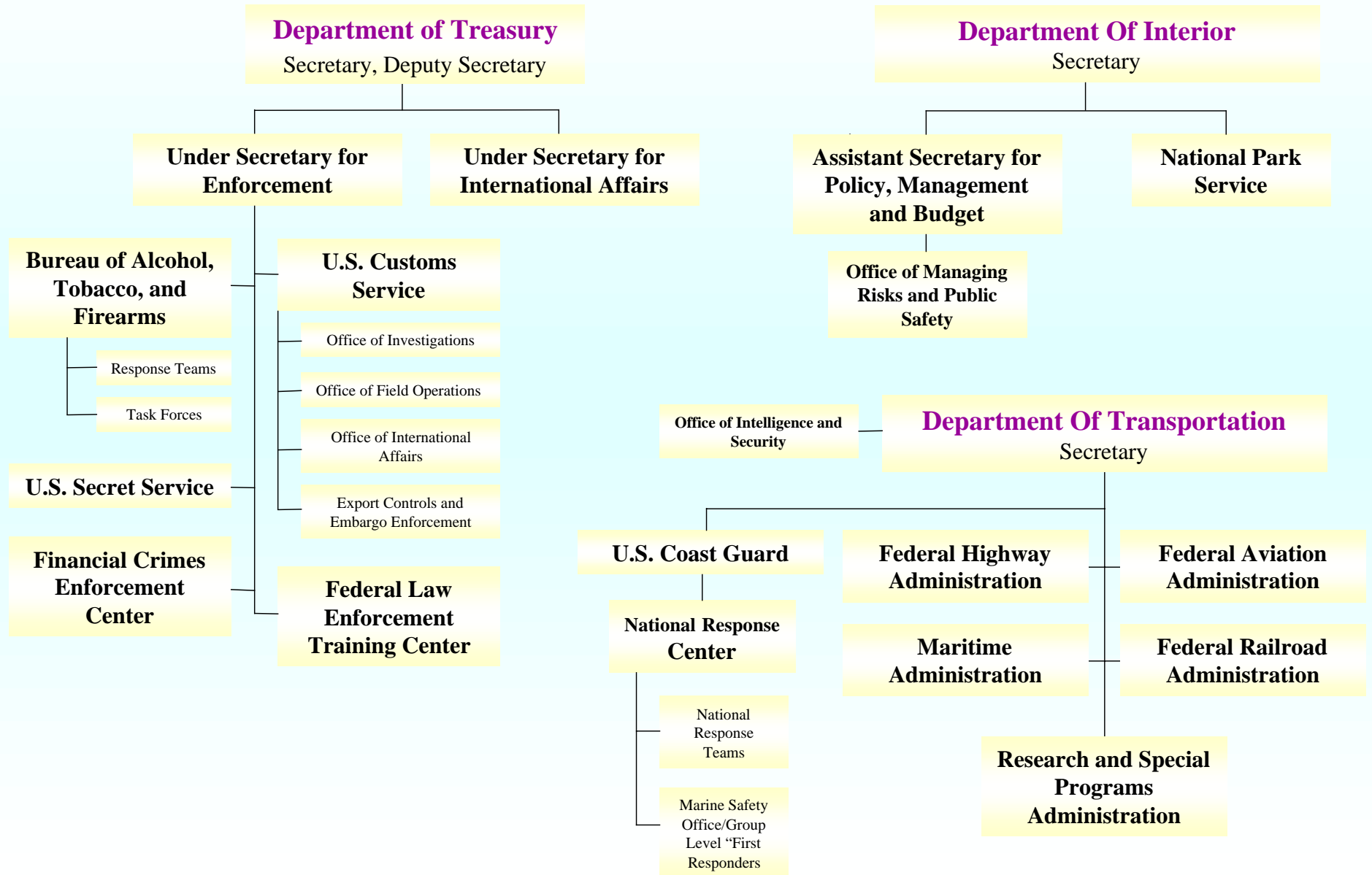


Department of Commerce

Secretary, Deputy Secretary



Federal Agencies with Responsibilities for WMD and Terrorism Issues



Federal Agencies with Responsibilities for WMD and Terrorism Issues



APPENDIX B—PANEL CHAIR AND MEMBERS

The Honorable James S. Gilmore, III, Governor of the Commonwealth of Virginia,
Chair

James Clapper, Jr. (Lieutenant General, U.S. Air Force, Retired), Private Consultant,
and Former Director, Defense Intelligence Agency, Vice Chair

L. Paul Bremer, Private Consultant, and Former Ambassador-at-Large for Counter-
Terrorism, U.S. Department of State

Raymond Downey, Commander, Special Operations, City of New York Fire Department

George Foresman, Deputy State Coordinator, Department of Emergency Services,
Commonwealth of Virginia

William Garrison (Major General, U.S. Army, Retired), Independent Consultant, and
Former Commander, U.S. Army Special Operations Command's Delta Force

Ellen M. Gordon, Administrator, Emergency Management Division, Department of
Public Defense, State of Iowa, and President, National Emergency Management
Association

James Greenleaf, Independent Consultant, and Former Associate Deputy for
Administration, Federal Bureau of Investigation

Dr. William Jenaway, Corporate Executive, and Chief of Fire and Rescue Services,
King of Prussia, Pennsylvania

William Dallas Jones, Director, Office of Emergency Services, State of California

Paul M. Maniscalco, Past President, National Association of Emergency Medical
Technicians, and Deputy Chief/Paramedic, NYFD EMSC

Ronald S. Neubauer, Chief of Police, St. Peters, Missouri, and Immediate Past
President, International Association of Chiefs of Police

Kathleen O'Brien, City Coordinator, City of Minneapolis, Minnesota

Dr. M. Patricia Quinlisk, Medical Director/State Epidemiologist, Department of Public
Health, State of Iowa

Patrick R. Ralston, Executive Director, State Emergency Management Agency;
Executive Director, Department of Fire and Building Services; and Executive Director,
Public Safety Training Institute, State of Indiana

William Reno (Lieutenant General, U.S. Army, Retired), Former Senior Vice President
of Operations, American Red Cross

Dr. Kenneth Shine, President, Institute of Medicine, National Academy of Sciences

Ellen Embry, U.S. Department of Defense Representative

APPENDIX C—PANEL ACTIVITIES DURING FISCAL YEAR 1999

For reasons that are stated in the main body of the report, the first two official meetings of the Panel (in June and September 1999) concentrated specifically on the potential threats of terrorism involving CBRN weapons. In the course of those meetings, the Panel received the following formal briefings:¹⁹³

- Dr. Christopher Davis, InSight International, “The Threat of State-Sponsored Biological Terrorism” (unclassified), which provided information on the CBRN weapons programs of the former Soviet Union and Russia, as well as CBRN programs in Iraq
- Larry K. Gershwin, National Intelligence Officer for Science and Technology, Central Intelligence Agency, “Threat Posed to the U.S. by International Terrorism Using Chemical and Biological Weapons” (classified)
- Commander John Weidner, Acting Director, Office of Emergency Response, Defense Programs, Department of Energy, “Nuclear Terrorism: The Threat from Explosives Employing Fissile and Non-Fissile Materials” (classified)
- Elizabeth Q. Ten Eyck, Director, Division of Fuel Cycle Safety and Safeguards, U.S. Nuclear Regulatory Commission, “Nuclear Terrorism: The Threat from Radioactive Release and Attacks on Commercial Power Plants” (classified)
- Lisa E. Gordon-Hagerty, Director, Combating Terrorism Transnational Threats, National Security Council, “Terrorism and WMD: The Threat to the U.S. and the National Policy in Response” (classified)
- Dr. Floyd P. Horn, Administrator, Agricultural Research Service, U.S. Department of Agriculture, “The Potential Terrorist Threat to U.S. Agriculture and Livestock” (unclassified)
- Robert M. Burnham, Section Chief, Domestic Terrorism/Counterterrorism Planning Section, Federal Bureau of Investigation, “The Threat of WMD Terrorism in the United States” (unclassified)
- Thomas Kuker, Director, National Domestic Preparedness Office, Federal Bureau of Investigation, “The National Domestic Preparedness Office: Roles and Responsibilities” (unclassified)

The Panel also received briefings from several individual members of the Panel on their personal and institution perspectives as local responders:

- Raymond Downey, Commander, Special Operations, Fire Department of the City of New York

¹⁹³Details of the Panel’s sessions and minutes from those meetings (as well as from the Panel’s organizational meeting in April 1999), an extract of the enabling legislation, a list of Panel members, and the Charter of the Panel, may all be accessed at the Panel’s dedicated web site at: <http://www.rand.org/organization/nsrd/terrpanel/>

- Paul M. Maniscalco, Past President, National Association of Emergency Medical Technicians, and Deputy Chief/Paramedic, NYFD EMSC
- Kathleen O'Brien, City Coordinator, City of Minneapolis, Minnesota

In addition, the Panel was also briefed by another Panel member, James Clapper (Lt. Gen., USAF, Retired), former Director, Defense Intelligence Agency, on the Integrated Threat Data Base Initiative, currently under consideration at the Department of Defense.

At its September 1999 meeting, the Panel also received a briefing from The Honorable Curt Weldon (R-PA), Chairman of the Military Research and Development Subcommittee, Committee on Armed Services, U.S. House of Representatives, the sponsor of the Panel's enabling legislation.

In parallel with these efforts, the RAND research staff, tasked with providing research and analytical support to the Panel, was directed to focus its attention on the threat issue during these first six months of the Panel's existence. RAND provided to the Panel members extensive threat-related research and analysis covering the broad spectrum of risks from CBRN devices and agents, and potential sources of terrorism involving their use.

APPENDIX D—BIBLIOGRAPHY

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APPENDIX E—INTERAGENCY COMMENTS

The Panel provided a draft of the Report to be circulated within the Federal interagency process. The following agencies provided comments on the draft report.

Following receipt of the comments, each agency was contacted given the opportunity to have its comments included in their entirety in this appendix. As of the date of the publication of the Report, the only agency that requested that its comments be included is the National Domestic Preparedness Office. In the event that an agency wants its comments provided separately after the report is published, those comments will be forwarded to the President and the Congress under separate cover.

Comments Received

DEPARTMENT OF DEFENSE

Office of the Assistant Secretary of Defense (Reserve Affairs)
Office of the Assistant Secretary of Defense (Strategy and Threat Reduction)
Office of the Assistant Secretary of Defense (Special Operations/Low Intensity Conflict]
Office of the Assistant Secretary of Defense
Defense Threat Reduction Agency
The Joint Staff
Department of the Army

FEDERAL BUREAU OF INVESTIGATION

National Domestic Preparedness Office
Domestic Terrorism/Counterterrorism Planning Section

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Office of Emergency Preparedness, National Disaster Medical System

DEPARTMENT OF ENERGY

Office of Emergency Response

DEPARTMENT OF TRANSPORTATION

U.S. Coast Guard

FEDERAL EMERGENCY MANAGEMENT AGENCY

ENVIRONMENTAL PROTECTION AGENCY

E-1-1

U.S. Department of Justice



Federal Bureau of Investigation

Washington, D. C. 20535-0001

December 1, 1999

MEMORANDUM TO: Ms. Ellen Embry
Special Assistant to the ASD/Reserve Affairs

FROM: Thomas Kuker /S/
Director
National Domestic Preparedness Office

SUBJECT: Draft Review: First Annual Report to the
President and the Congress of the
Advisory Panel to Assess Domestic Response
Capabilities for Terrorism Involving
Weapons of Mass Destruction (WMD)

Thank you for the opportunity to review the draft report of the Department of Defense WMD Advisory Panel. The National Domestic Preparedness Office (NDPO) appreciates the work of the Panel thus far and the thoroughness of the report.

The enclosed document constitutes the National Domestic Preparedness Office's (NDPO) input to the report. The NDPO point of contact for this matter is Unit Chief Gary Rohen, telephone (202) 324-9032, facsimile (202) 324-2224.

enclosure

E-1-2

The NDPO recommends that the draft report be edited to reflect the following changes:

Page 72, line 22:

Delete: **"Although representatives of the Federal Bureau of Investigation's NDPO have stated that the NDPO will develop a national strategy..."** replace with, **"the NDPO will develop a national strategy..."**

(The NDPO should not be referred to as "the FBI's" - it was conceptualized by the Attorney General, the NSC, and other agencies as an interagency office, which will ultimately include federal, state, and local representatives. For purely administrative purposes, it is housed in the FBI.) Additionally, the National Strategy is the foundation of the NDPO's mission, not merely a statement of NDPO representatives.)

Page 73, line 4:

add after last sentence:

"A coherent national strategy for domestic preparedness will depend on the needs and capabilities of individual jurisdictions. The NDPO's incorporation of state and local planning groups and state points of contact through each governor's office, as well as utilization of the State and Local Advisory Group to the NDPO, will ensure that a bottom-up approach is attained.

(The NDPO strongly concurs with the draft report requirement that the National Strategy have a "bottom-up" approach.)

Page 74, line 11:

delete **"has organized"**, replace with **"was directed by the Attorney General to organize..."**

Page 74, line 27: add after last sentence:

"When necessary, the Weapons of Mass Destruction Preparedness (WMDP) Group, as outlined in Presidential Decision Directive 62, will provide the conduit for interagency coordination and dispute resolution below the Principals level. The WMDP Subgroup I, Assistance to State and Local Authorities (ASLA) will be the vehicle to accomplish these tasks. Although the National Security Council is the Chair, the National Coordinator for Security, Infrastructure Protection, and Counterterrorism has offered to relinquish this position to the Director, NDPO, for this purpose, as the NDPO serves as the national voice of the state and local emergency communities. The appointment of the NDPO Director will serve to elevate issues of state and local stakeholders for resolution to the highest levels of government. This relationship between the ASLA Subgroup and the Director NDPO in no way alters the reporting or command channels between the NDPO and the Attorney General, and reflects the evolution of the NDPO in that the Federal Leadership Advisory Group is replaced by ASLA in an attempt to work through existing mechanisms for federal coordination and avoid duplication of effort among agencies."

Page 76, line 5:

insert after last sentence:

"In keeping with stakeholders' recommendations that the federal government improve the information sharing process with the state and local authorities, the NDPO will focus the majority of its resources and efforts to facilitate the dissemination of WMD-related information among federal, state, and local offices and agencies. The NDPO's Information Sharing program incorporates various mechanisms to accomplish this, including Special Bulletins, a toll-free assistance number, websites, a monthly newsletter, and public speaking assistance."

APPENDIX F—RAND STAFF PROVIDING ANALYTICAL SUPPORT TO THE PANEL

Project Leaders

Bruce Hoffman (1/99-9/99)
Michael Wermuth (9/99-Present)

Research Staff for the Report

Jennifer Brower
Peter Chalk
Bruce Hoffman
Gregory Jones
Richard Mesic
William Rosenau
Michael Wermuth

Administrative Support

Nancy Rizor
Priscilla Schlegel

Other RAND Research Staff Providing Analytical Support

James Bartis
Roger Brown
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William Hix
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Leslie Lewis
Kenneth Myers
Jonathan Schachter
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Lorne Teitlebaum
Traci Williams

International Security and Defense Policy Center (National Defense Research Institute)

Jeffrey Isaacson, Program Director

Forces and Resources Policy Center (National Defense Research Institute)

Susan D. Hosek, Program Director

APPENDIX G—TRANSMITTAL LETTERS

Following are reproductions of the original letters that were used to transmit the report on 15 December 1999 to the President, to the Vice President in his capacity as President of the U.S. Senate, and to the various Members of Congress in leadership positions.

TERRORISM INVOLVING WEAPONS OF MASS DESTRUCTION

15 December 1999

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James Clapper, Jr.
Vice Chairman

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Raymond Downey

George Foresman

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Kathleen O'Brien

M. Patricia Quinlisk

Patrick Ralston

William Reno

Kenneth Shine

Ellen Embrey*

**The President
The White House
Washington, DC 20500**

Dear Mr. President:

On behalf of the Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction, it is my pleasure to submit to you the first of three annual reports of the advisory panel. The advisory panel is authorized and the annual reports are required by Section 1405 of the National Defense Authorization Act for Fiscal Year 1999, Public Law 105-261 (H.R. 3616, 105th Congress, 2nd Session) (October 17, 1998).

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The report provides an analysis of potential U.S. domestic threats from terrorists. It contains several conclusions and recommendations for consideration by the President and the Congress, as well as information on the activities of the advisory panel for the current fiscal year. Subsequent reports will provide specific conclusions and recommendations on those issues specified in the enabling legislation.

Very respectfully,

/S/

**James S. Gilmore, III
Chairman**

* U.S. Department of Defense
Representative

Please address comments or questions to:

RAND

1333 H Street, NW, Washington, DC 20005-4707 Telephone: 202-296-5000 FAX: 202-296-7960

The Federally-Funded Research and Development Center providing support to the Advisory Panel

THE ADVISORY PANEL TO ASSESS DOMESTIC RESPONSE CAPABILITIES FOR
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* U.S. Department of Defense
Representative

**The Honorable Al Gore, Jr.
President of the Senate
United States Senate
Washington, DC 20510**

Dear Mr. President:

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**The Honorable J. Dennis Hastert
Speaker of the House
U.S. House of Representatives
Washington, DC 20515**

Dear Mr. Speaker:

On behalf of the Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction, it is my pleasure to submit to the Congress the first of three annual reports of the advisory panel. The advisory panel is authorized and the annual reports are required by Section 1405 of the National Defense Authorization Act for Fiscal Year 1999, Public Law 105-261 (H.R. 3616, 105th Congress, 2nd Session) (October 17, 1998).

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**The Honorable Strom Thurmond
President Pro Tempore
United States Senate
Washington, DC 20510**

Dear Mr. President:

On behalf of the Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction, it is my pleasure to submit to the Congress the first of three annual reports of the advisory panel. The advisory panel is authorized and the annual reports are required by Section 1405 of the National Defense Authorization Act for Fiscal Year 1999, Public Law 105-261 (H.R. 3616, 105th Congress, 2nd Session) (October 17, 1998).

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**James S. Gilmore, III
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* U.S. Department of Defense
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The Honorable Richard K. Armey
Majority Leader
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Leader

On behalf of the Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction, it is my pleasure to submit to the Congress the first of three annual reports of the advisory panel. The advisory panel is authorized and the annual reports are required by Section 1405 of the National Defense Authorization Act for Fiscal Year 1999, Public Law 105-261 (H.R. 3616, 105th Congress, 2nd Session) (October 17, 1998).

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The Honorable Richard A. Gephardt
Minority Leader
U.S. House of Representatives
Washington, DC 20515

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The Honorable Trent Lott
Majority Leader
United States Senate
Washington, DC 20510

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* U.S. Department of Defense
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The Honorable Thomas Daschle
Minority Leader
United States Senate
Washington, DC 20510

Dear Mr. Leader:

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