



Report on Activities and Programs for Countering Proliferation and NBC Terrorism

Volume I Executive Summary

July 2009

Counterproliferation Program Review Committee

Distribution Statement A. Approved for public
release; distribution is unlimited

Submitted by USD(AT&L)

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE JUL 2009		2. REPORT TYPE N/A		3. DATES COVERED -	
4. TITLE AND SUBTITLE Report on Activities and Programs for Countering Proliferation and NBC Terrorism, Volume I, Executive Summary (U)				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) UnderSecretary of Defense,Acquisitions, Technology, & Logistics (AT&L),Washington,DC,20301				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited					
13. SUPPLEMENTARY NOTES The original document contains color images.					
14. ABSTRACT See the report.					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UU	18. NUMBER OF PAGES 46	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

Report on Activities and Programs for Countering Proliferation and NBC Terrorism

Volume I Executive Summary

July 2009

Counterproliferation Program Review Committee



CONTENTS

INTRODUCTION.....	1
CPRC ORGANIZATION OVERVIEW	2
NATIONAL STRATEGY AND COMBATING WMD.....	2
AREAS FOR CAPABILITY ENHANCEMENT	3
ASSESSMENT OF PROGRESS IN MEETING COMBATING WMD GOALS	4
CAPABILITIES OR DEVELOPED ITEMS FIELDIED IN FY 2007-2009.....	10
COMBATING WMD PERSPECTIVES AND ACTIVITIES OF CPRC MEMBER ORGANIZATIONS.....	14
FUNDING OF CPRC-REPORTED PROGRAMS	27
2009 CPRC RECOMMENDATIONS	28
CONCLUSION.....	38
ABBREVIATIONS AND ACRONYMS.....	39
WORKS CONSULTED	43

FIGURES

1. STRATEGIC GUIDANCE FRAMEWORK	3
---------------------------------------	---

TABLES

1. AREAS FOR CAPABILITY ENHANCEMENT.....	4
2. ACE ASSESSMENT SUMMARY	5
3. HIGHLIGHTS OF DoD’S PROGRESS IN MEETING COMBATING WMD GOALS	17
4. HIGHLIGHTS OF DOE’S PROGRESS IN MEETING COMBATING WMD GOALS.....	21
5. HIGHLIGHTS OF DHS’S PROGRESS IN MEETING COMBATING WMD GOALS	24
6. HIGHLIGHTS OF DOS’S PROGRESS IN MEETING COMBATING WMD GOALS	27

INTRODUCTION

There are few greater challenges than those posed by chemical, biological, and particularly, nuclear weapons. Preventing the spread of these weapons, and their use, requires vigilance and obligates us to anticipate and counter threats.

– National Defense Strategy, June 2008

This *Report on Activities and Programs for Countering Proliferation and Nuclear, Biological, and Chemical (NBC) Terrorism* provides the latest findings of the interagency Counterproliferation Program Review Committee (CPRC). The CPRC was chartered by Congress in 1994 to report on the activities and programs of the Department of Defense (DoD), the Department of Energy (DOE), and the Intelligence Community (IC) that address improvements in the U.S. Government's efforts to combat weapons of mass destruction (WMD) and their means of delivery. In 1997, Congress broadened the CPRC's responsibilities to review those research and development (R&D) activities and programs related to countering terrorist nuclear, biological, and chemical threats. With the passage of the *National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2008*, Congress further broadened the scope of the CPRC by expanding its membership to include the Department of Homeland Security (DHS) and the Department of State (DOS), and by changing the IC's CPRC representative from the Director of Central Intelligence to the Director of National Intelligence (DNI). Congress also extended the committee's termination year to 2013 and changed the reporting requirement from being an annual report to a biennial report, thereby removing the requirement for a May 1, 2008 report to Congress.

This report is the principal Executive Branch report on activities and programs that provide technologies and capabilities to combat WMD. The term WMD used in this report refers to chemical, biological, radiological, and nuclear (CBRN) weapons that can kill large numbers of humans and/or cause great damage to man-made structures, natural structures, or the biosphere in general. Other interagency committees or department-specific groups also publish related, but separate, reports on nonproliferation, arms control, and combating terrorism programs. The findings and recommendations of the CPRC's biennial review are presented in this, its 15th report to Congress.

The report comprises two volumes. Volume I is the unclassified, publicly releasable, Executive Summary. It provides an overview of the offices and principals that make up the CPRC and its Standing Committee; the linkage of national strategy and guidance to CPRC efforts; Areas for Capability Enhancement (ACE); capabilities fielded since the publication of the 2007 CPRC report; a presentation of the main efforts of DoD, DOE, DHS, DOS, and the IC in combating WMD (CWMD); an overview of the FY 2009 and 2010 funding for CPRC-reported programs; recommendations; and the principal conclusions. The Executive Summary is available online at www.acq.osd.mil/cp.

Volume II contains the classified main report and appendices. It provides an introduction on the purpose of this report, including a summary of the national strategy context to combat WMD; an overview of the threat from WMD; progress achieved vis-à-vis the CPRC recommendations presented in the May 2007 CPRC report; an assessment of CWMD programs and

activities; limitations and impediments to the DoD's biological weapons counterproliferation efforts; recommendations; and appendices. The appendices provide information on the current law regarding the CPRC; the current participants in the process; data on DoD, DOE, DHS, DOS, and the IC programs and activities for CWMD, as well as Advanced Concept Technology Demonstrations (ACTDs) and Joint Capability Technology Demonstrations (JCTDs); the recommendations of the Chairman of the Joint Chiefs of Staff regarding programs' utility and requirements; and a discussion of programs in support of countering WMD terrorism.

CPRC ORGANIZATION OVERVIEW

The CPRC Standing Committee (SC) was established in 1997 by agreement of the member organizations and meets each year, as required, to address major issues. To update the purposes of the SC and respond to changes in the CWMD community, including the addition of DHS and DOS as new CPRC members, a memorandum of understanding (MOU) was completed in June 2009. The SC is currently composed of the Assistant to the Secretary of Defense for Nuclear and Chemical and Biological Defense Programs (ATSD(NCB)) (as chair); Assistant Deputy Administrator for Nonproliferation Research & Development, National Nuclear Security Administration, DOE (as vice chair); the Senior Strategist, National Counterproliferation Center (NCPC), Office of the Director of National Intelligence; the Deputy Director for Force Structure, Resources, and Assessment, Joint Staff (J-8); the Assistant Secretary of Defense for Global Strategic Affairs (ASD(GSA)); the Under Secretary of Homeland Security for Science and Technology (USHS(S&T)), DHS; the Director of the Office of Technology and Assessments, Bureau of Verification, Compliance, and Implementation, DOS; and the Director of the Defense Threat Reduction Agency (DTRA). DTRA was added as a full SC member in September 2008. Composition of the Standing Committee has changed over time to represent appropriate organizations.

An important goal of the SC is to include other Federal departments with significant CWMD responsibilities as participants in the CPRC process. Prior to their addition as formal CPRC members by the NDAA for FY08, DOS and DHS participated informally in SC and action officer meetings, as well as review processes for the CPRC report. The SC worked with congressional staffers to initiate appropriate legislation to add DHS and DOS as CPRC members. As part of the SC's ongoing effort to include other Federal agencies, the Department of Justice's (DOJ) Federal Bureau of Investigation (FBI) WMD Directorate began informal participation in CPRC processes in September 2008.

NATIONAL STRATEGY AND COMBATING WMD

National strategy forms the context to develop implementing guidance and policies, as well as doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) (see Figure 1). At its highest level, the essential task of national security strategy with regard to the threat of WMD is to *prevent our enemies from threatening us, our allies, and our friends with WMD*.¹ The 2002 *National Strategy to Combat Weapons of Mass Destruction* defines the three pillars of this essential task: strengthened nonproliferation (NP) to combat WMD proliferation, counterproliferation (CP) to combat WMD use, and consequence management (CM) to respond to WMD use. These national-level documents provide strategic

¹ 2006 *National Security Strategy of the United States of America*, p. 1.

guidance for U.S. Government departments and agencies to develop goals and objectives, identify capability requirements, and ultimately provide the material and nonmaterial solutions for CWMD.

High-level goals and objectives for the CPRC member organizations are published in strategic guidance documents tailored to the needs of their own internal communities:

- DoD: The Chairman of the Joint Chiefs of Staff's 2006 *National Military Strategy to Combat Weapons of Mass Destruction* defines eight broad CWMD mission areas for the Military Departments and other DoD organizations.
- DOE: The 2004 *National Nuclear Security Administration Strategic Plan* places emphasis on capabilities to stop or deter potential adversaries from proliferating or using WMD.
- DNI: The *National Intelligence Strategy for 2006-2008* and the *National Intelligence Plan for Countering Proliferation, 2009-2011* identify goals, priorities, and actions to proactively position the IC to provide information and insights the U.S. Government needs to combat the development and spread of WMD.
- DHS: The 2008 *Strategic Plan* focuses on preventing WMD from entering the Nation's borders and strengthening our capabilities to respond and recover from a WMD attack.
- DOS: The *Strategic Plan for Fiscal Years 2007-12* discusses CWMD objectives in terms of building international coalitions to interdict and disrupt proliferation of WMD, while also strengthening verification and compliance enforcement.



Figure 1. Strategic Guidance Framework

AREAS FOR CAPABILITY ENHANCEMENT

To organize efforts effectively, the CPRC Standing Committee established Areas for Capability Enhancement (ACE) categories. The ACEs address the three pillars of the *National Strategy To Combat Weapons of Mass Destruction*, and, beginning with the May 2005 CPRC report, have been the same as the eight mission areas identified in the *National Military Strategy To Combat Weapons of Mass Destruction*. During the current biennial report process, the SC added a ninth ACE to highlight intelligence capabilities as a strategic enabler, one of three such enablers identified in the *National Military Strategy To Combat Weapons of Mass Destruction*.² The ACE structure generally corresponds to required capability areas applicable to Federal government departments and agencies with CWMD missions. The ACEs provide a framework for reviewing progress, assessing CWMD requirements, and measuring investment in technolo-

² The other two enablers in the *National Military Strategy To Combat Weapons of Mass Destruction* are Partnership Capacity and Strategic Communication.

gies and capabilities for CWMD. It is important to maintain capabilities in all ACE areas in order to meet the U.S. Government's CWMD objectives. The ACEs are listed in Table 1.

Table 1. Areas for Capability Enhancement*

ACEs are broad and comprehensive areas for combating WMD. They reflect the National Military Strategy To Combat Weapons of Mass Destruction mission areas and strategic enablers, address DoD, DOE, DOS, and DHS's strategic goals and objectives, and include capability needs developed by the IC and other Federal departments and agencies.

Interdiction. Operations designed to stop the transit of WMD, delivery systems, associated and dual-use technologies, materials, and expertise between states of concern and non-state actors, whether undertaken by the Armed Forces or by other agencies of government.
Elimination. Operations to systematically locate, characterize, secure, disable, and/or destroy a state or non-state actor's WMD programs and related capabilities in hostile or uncertain environments.
Threat Reduction Cooperation. Activities undertaken with the consent and cooperation of host nation authorities to enhance physical security, emplace detection equipment, and to reduce, dismantle, redirect, or improve protection of a state's existing WMD program, stockpiles, and capabilities.
Passive Defense. Measures to minimize or negate the vulnerability and effects of WMD employed against U.S. and partner/allied armed forces, as well as U.S. military interests, installations, and critical infrastructure.
Security Cooperation and Partner Activities. Activities to improve partner and allied capacity to combat WMD across the eight mission areas through military-to-military contact, burden-sharing agreements, combined military activities, and support to international activities.
Offensive Operations. Kinetic (both conventional and nuclear) and/or non-kinetic options to deter or defeat a WMD threat or subsequent use of WMD.
Active Defense. Measures, to include but not limited to, missile defense (ballistic and cruise), special operations, and security operations to defend against conventionally and unconventionally delivered WMD.
WMD Consequence Management. Actions taken to reduce the effects of a WMD attack or event, including toxic industrial chemicals (TIC) and toxic industrial materials (TIM), and assist in the restoration of essential operations and services at home and abroad.
Intelligence. Timely collection, analysis, and dissemination of actionable intelligence to combat the development and spread of weapons of mass destruction and detect, identify, and characterize the location, nature, and ownership of WMD. This includes collection and analysis of intentions, motivations, and disincentives policymakers can use to dissuade, deter, and otherwise counter WMD.

* The CPRC ACEs are based on the descriptions of CWMD military mission areas found in the 2006 *National Military Strategy To Combat Weapons of Mass Destruction*. During the 2009 CPRC report process, the CPRC community added the Intelligence ACE and modified some of the descriptions of ACEs in order to accommodate activities other than those of the Armed Forces and more accurately reflect CWMD activities across the expanded CPRC membership.

ASSESSMENT OF PROGRESS IN MEETING COMBATING WMD GOALS

The assessment of progress of CWMD capabilities accounts for the broad range of activities reported by the CPRC member organizations and includes the unique perspectives of a widening community-of-interest (COI) for CWMD. Each of the member organizations provided prioritized shortfalls, current and projected future capabilities, and programmatic details of more than 200 CWMD programs and projects. The analysis of this information was supported by recent official U.S. Government reports and analytical products of congressionally appointed commissions, the R&D community, and CWMD issue-specific working groups. Overall, significant progress is being made, as illustrated by capabilities recently fielded, newly developed, or transitioned to end users, summarized in the section following Table 2. Table 2 presents a summary assessment of goals, ongoing efforts, shortfalls, and recommendations to address the shortfalls identified for each ACE. The table has been updated to reflect changes since the 2007 CPRC report to Congress.

Table 2. ACE Assessment Summary

Goals*	Ongoing Efforts	Recommendations
Interdiction		
<p>Develop plans, policy, and doctrine for interdiction.</p> <p>Enhance joint command and control (C²), communications systems, intelligence, surveillance, and reconnaissance (ISR), and capabilities to locate, tag, and track WMD and related materials and components and to link information on trade or transfer of WMD.</p> <p>Provide operational constructs, force structure, CWMD expertise, and interdiction capabilities, including non-lethal means, and special operations forces (SOF) capabilities.</p> <p>Improve logistics to support interdiction.</p> <p>Build and implement a Global Nuclear Detection Architecture (GNDA).</p> <p>Build allied and partner military capabilities to conduct WMD interdiction in support of their own national authorities.</p> <p>Focus intelligence collection on possible transfer methods and activities to identify and track the potential transfer of WMD-related material, technology, or expertise.</p> <p>Surveil and intercept the transit of suspected WMD materials and components by land, sea, or in the air.</p> <p>Identify and characterize the suspected WMD materials or components.</p>	<p>Implementation of solutions recommended by the WMD-Interdiction capabilities-based assessment (CBA) within the DoD Joint Capabilities Integration Development System (JCIDS) process.</p> <p>Establishment of the Combating Weapons of Mass Destruction Joint Integrating Concept as a framework to support future CWMD CBAs.</p> <p>Multilateral cooperative interdiction initiatives (e.g., Proliferation Security Initiative, Global Initiative on Nuclear Terrorism).</p> <p>Detection/sensors for high-priority threat materials.</p> <p>Intelligence and information management tools.</p> <p>Enhancement of interdiction architecture by DOE's Megaports radiological detection program.</p> <p>Coordination of nuclear/radiological detection technology R&D efforts between DHS, DoD, DOE, DOS, the FBI, and other agencies.</p> <p>Continuing installations of radiological/nuclear detection equipment by DOE/DHS at strategic international borders, airports, and feeder ports.</p> <p>Office of the Under Secretary of Defense for Acquisition, Technology and Logistics (OUSD(AT&L)) establishment of a Nuclear Defense Joint Assessment Team to review related nuclear defense activities and recommend actions.</p> <p>DoD Combating WMD Coordination Group efforts to improve planning and doctrine to facilitate WMD interdiction operations.</p>	<p>Improve intelligence gathering and analysis (e.g., information management systems, decision support systems, sensor development, and intelligence support) regarding state and nonstate WMD proliferation and development activities.</p> <p>Apply socio-behavioral models and assessments of adversaries to develop indicators of an individual or group's interest, motivation, and intent to develop, acquire, and use WMD.</p> <p>Provide threat-based warnings to border and immigration officials in the United States and abroad to enhance screening of known or suspected WMD-related persons.</p> <p>Develop detector materials and systems to locate and identify nuclear/radiological materials at stand-off distances.</p> <p>Improve maritime interdiction capabilities to prevent illicit CBRN material from entering U.S. ports and harbors (in progress).</p> <p>Improve portability of CBRN sensor systems by leveraging both commercial and government-developed sensor technologies.</p> <p>Develop or adapt, and operationally prove capabilities for in-transit detection of nuclear/radiological materials aboard ships and aircraft.</p> <p>Improve connectivity for operational elements in order to enable remote access to subject matter expertise.</p> <p>Provide threat-based technical assessments and reachback assistance to border officials to enhance screening operations of weapons-useable materials, components, devices, and other materials of concern.</p>

*ACE goals were initially developed in preparation for the 2006 CPRC report. These goals were and continue to be based largely on goals identified from ongoing CBAs in the CWMD mission areas. In addition to the goals reflected in the CBAs, CPRC organizations also provide updated goals to reflect current priority areas for CWMD.

Table 2. ACE Assessment Summary (continued)

Goals	Ongoing Efforts	Recommendations
Elimination		
<p>Develop plans, policy, and doctrine for elimination.</p> <p>Enhance joint C², communications systems, ISR, and capabilities to locate, detect, identify, characterize, tag, and track WMD production and storage.</p> <p>Provide operational constructs, force structure, and WMD render-safe skills and capabilities, to include reachback.</p> <p>Improve logistics to support elimination.</p> <p>Secure suspected WMD sites, material, equipment, or personnel.</p> <p>Destroy, dismantle, remove, transfer, or dispose of an adversary's WMD material, weapons equipment, and infrastructure.</p> <p>Conduct intelligence exploitation of program experts, documents, and other media as well as secure weapons, material, agents, delivery means, and related processes and facilities.</p> <p>Monitor, redirect and convert elements of an adversary's WMD program to ensure that eliminated programs are not reconstituted.</p>	<p>Implementation of solutions recommended by the DoD WMD-Elimination CBA.</p> <p>Training/exercise development.</p> <p>SOF detection and location capabilities.</p> <p>Agent defeat/neutralization capabilities.</p> <p>U.S. Army Nuclear and Combating WMD Agency Planning Assistance Teams.</p> <p>Expansion of 20th Support Command capabilities for command and control for WMD elimination missions.</p> <p>Expansion of render-safe technologies and teams.</p>	<p>Improve intelligence gathering, analysis, and fusion (e.g., information management systems, decision support systems, sensor development, intelligence support) regarding state and non-state WMD proliferation and development activities.</p> <p>Encourage and fund research in agent-environment interaction and novel high-energy material science.</p> <p>Explore applicability of commercial technologies for CBRN remediation for possible use in elimination missions.</p> <p>Improve capability to conduct exploitation of WMD sites, including characterization of local WMD, onsite analysis, and data exfiltration.</p> <p>Provide reliable, secure transportation and storage for further disposition of WMD-related materials.</p>
Threat Reduction Cooperation		
<p>Enhance capabilities to improve safeguards, physical security, and materials protection, control, and accounting of CBRN stockpiles.</p> <p>Enhance capabilities to consolidate, reduce, or dismantle CBRN stockpiles and capabilities.</p> <p>Expand threat reduction activities outside the former Soviet Union by adapting existing or developing new cooperative frameworks and diplomatic initiatives.</p> <p>Increase transparency through confidence-building arrangements and encourage higher standards of conduct in controlling CBRN materials.</p> <p>In coordination with all relevant federal agencies, enable international partners to detect and capture WMD crossing their borders.</p> <p>Develop plans, policy, and doctrine for Threat Reduction Cooperation.</p>	<p>Ongoing CBA within the DoD JCIDS process to define Threat Reduction Cooperation requirements and potential solutions.</p> <p>Multilateral safety and security initiatives.</p> <p>Proliferation prevention training and equipment.</p>	<p>Improve detection of nuclear materials.</p> <p>Improve development of more discriminating and sensitive sensors to monitor strategic transportation nodes.</p> <p>Increase biological threat reduction activities to consolidate and secure pathogens and to build detection and response systems to provide early warning of a disease outbreak or bio-attack.</p> <p>Improve intelligence gathering and analysis (e.g., information management systems, decision support systems, sensor development, and intelligence support) regarding state and non-state WMD proliferation and development activities.</p> <p>Continue to fund nonproliferation efforts.</p> <p>Coordinate U.S. threat reduction cooperation efforts through a coordinating committee or group.</p>

Table 2. ACE Assessment Summary (continued)

Goals	Ongoing Efforts	Recommendations
Passive Defense		
<p><i>Sense.</i> Provide real-time and continuous capability to detect, identify, and quantify all potential or validated CBRN threats in all operational environments and on personnel, equipment or facilities.</p> <p><i>Shape.</i> Characterize CBRN hazards throughout the operational environment through the collection and fusion of information from all CBRN defense assets and integration of that data with other relevant information and C², communications, and ISR systems.</p> <p><i>Shield.</i> Protect personnel and equipment from degradation caused by CBRN hazards by preventing or reducing exposures, mitigating negative physiological effects, and protecting critical equipment.</p> <p><i>Sustain.</i> Enable the quick restoration, recovery, and maintenance of combat power or essential functions that are free from the effects of CBRN hazards and return to pre-incident operational capability as soon as possible.</p> <p><i>Deter.</i> Provide significant CBRN defensive capabilities to deny potential adversaries from achieving their desired effects of creating a catastrophic event with WMD.</p>	<p>Updating CBAs within the DoD JCIDS process to define CBRN passive defense requirements.</p> <p>Development of network-centric sensor reporting and coordination of medical information and reporting systems for early warning of biological attack.</p> <p>DTRA/DHS memorandum of agreement (MOA) with DHS/DNDO to provide rigorous, repeatable test and evaluation support for nuclear, radiological, and fissile material detection, standoff detection technologies, and prototype systems.</p> <p>Legacy Aircraft CBRN Contamination Survivability Initial Capabilities Document (ICD).</p> <p>Fielding of CBRN installation protection and response capabilities.</p> <p>Continued integration of national bio-monitoring efforts at DHS and other federal agencies, including the Centers for Disease Control, Environmental Protection Agency, and Federal Bureau of Investigation.</p> <p>Ongoing development is occurring at DARPA to advance CBRN sensing abilities and countermeasures.</p> <p>Ongoing DoD Chemical and Biological Defense Program (CBDP), which develops and fields capabilities to address the Sense, Shape, Shield, and Sustain goals.</p> <p>Continuing efforts to establish full operational capability of the Air Force Counter-Biological Warfare Concept of Operations (CONOP).</p>	<p>Emphasize development of new laboratory technologies that reduce the time required to conduct multiplex assays.</p> <p>Investigate new detection methods that identify common pathogenic mechanisms or properties of biological agents.</p> <p>Develop advanced sensors and techniques, including higher resolution detectors and more efficient analysis algorithms.</p> <p>Improve methods and technologies for detecting secondary products or surrogate signatures of special nuclear materials.</p> <p>Continue efforts to transition mobile laboratory capabilities for analyzing samples to identify non-traditional chemical agents.</p> <p>Continue to investigate the operational viability and performance of distributed sensor networks.</p> <p>Continue procurement of collective protection systems and R&D for integration of protective fabrics into existing shelters.</p> <p>Continue fielding tiered CBRN Installation Protection Program (IPP) capabilities to CONUS and OCONUS military installations.</p> <p>Continue development of investigative new drugs (IND) using broad spectrum approaches against viruses and bacterial pathogens.</p> <p>Continue efforts to integrate and coordinate U.S.-international partnering activities to reduce duplication.</p> <p>Provide WMD threat awareness outreach and technical reachback to state and local authorities through intelligence fusion centers and other information sharing initiatives.</p> <p>Provide indicators to state and local law enforcement officials to recognize and report suspicious activities that may involve WMD materials, devices, components, and infrastructure.</p> <p>Conduct joint threat analysis with state and local analysts to characterize events.</p>

Table 2. ACE Assessment Summary (continued)

Goals	Ongoing Efforts	Recommendations
Security Cooperation and Partner Activities		
<p>Develop, implement, and support focused cooperative activities, particularly research and development between the United States and its international partners, to improve their capabilities to combat WMD.</p> <p>Provide technologies and systems to monitor and verify global regimes restricting the production, storage, and testing of WMD, WMD-related materials, and components.</p> <p>Secure, control, monitor, and track WMD materials and related components through increased commitments from foreign governments.</p> <p>Develop plans, policy, and doctrine for Security Cooperation and Partner Activities.</p>	<p>Ongoing CBA within the DoD JCIDS process to define Security Cooperation and Partner Activities requirements and potential solutions.</p> <p>Multilateral arms control and nonproliferation treaties and agreements.</p> <p>Expansion of DHS Container Security Initiative (CSI) to additional strategic locations around the world to examine high-risk maritime cargo.</p> <p>Ongoing assessments of critical verification technology programs.</p>	<p>Improve detection of nuclear materials sufficiently to distinguish proliferation activity in nuclear facilities.</p>
Offensive Operations		
<p>Plan operations.</p> <p>Detect and identify targets.</p> <p>Conduct decisive operations; employ offensive capabilities against in-transit, fixed, or WMD-related targets or infrastructure with little or no collateral effects.</p> <p>Assess engagements.</p> <p>Deter potential adversaries through significant WMD defeat capabilities as a viable response to WMD use or threats against the United States, its friends, or allies.</p>	<p>Implementation of solutions recommended by the DoD WMD-Offensive Operations CBA.</p> <p>C², communications, and ISR systems (e.g., detection, location, targeting).</p> <p>Strike capabilities (e.g., kinetic and non-kinetic).</p> <p>Ongoing hard and deeply buried target (HDBT) efforts in DTRA, DARPA, USAF, and DIA/Underground Facility Analysis Center.</p> <p>Ongoing agent defeat/neutralization capabilities to address the employment of offensive capabilities with little or no collateral damage.</p>	<p>Improve intelligence and near-term detection.</p> <p>Conduct research and development for capabilities to improve conventional prompt global strike.</p> <p>Tailor investment in hard and deeply buried target defeat (HDBTD) capabilities to objective criteria defined in HDBTD Mission Area ICD.</p> <p>Improve fidelity and reliability of predictive tools for design and development of optimized weapons and concepts through rock, soil, and other structures.</p>
Active Defense		
<p>Continue to develop and field a single, integrated, layered Ballistic Missile Defense System (BMDS) to protect the United States, its deployed forces, and its allies and friends against ballistic missiles at all ranges and in all phases of flight.</p> <p>Maintain and sustain an initial capability to defend the United States, its deployed forces, and its allies and friends against rogue nation attacks.</p> <p>Develop and field an integrated cruise missile defense capability and an unmanned aerial vehicle (UAV) defense capability.</p> <p>Enable U.S. forces to neutralize WMD threats worldwide—be they from national military programs, paramilitary organizations, or terrorists—by means of specially developed capabilities.</p> <p>Develop options to dissuade current rogue state and near-peer threats.</p>	<p>Ongoing BMDS efforts</p> <p>Cruise missile defense program.</p> <p>SOF programs.</p> <p>Ongoing CBAs within JCIDS process to define integrated air and missile defense requirements.</p>	<p>Continue to fund and develop comprehensive ballistic and cruise missile defense capabilities using a test-validated and sustainable building block approach.</p>

Table 2. ACE Assessment Summary (continued)

Goals	Ongoing Efforts	Recommendations
WMD Consequence Management		
<p>Provide integrated material solutions to enable joint commanders and others to respond, mitigate, and restore services in a post-engagement scenario characterized by damage and collateral hazard from CBRN attack inside or outside the continental United States.</p> <p>Develop processes and systems to ensure effective communication and coordination with domestic authorities.</p> <p>Provide specialized expertise, operational personnel, or capabilities to the U.S. homeland or friendly nations, as required, to respond to or recover from attacks or disasters associated with WMD.</p>	<p>Equipment initiatives.</p> <p>Advisory and augmentation assets (e.g., Federal, state, local coordination).</p> <p>Ongoing CBAs within the DoD JCIDS process to define WMD CM requirements.</p> <p>DoD/Department of Health and Human Services (DHHS) interagency agreement to implement a single, integrated national stockpile for Anthrax and Smallpox vaccines, meeting the requirements for the Strategic National Stockpile. The agreements will result in a cost avoidance of more than ten million dollars, annually.</p> <p>DoD/DHS collaborative efforts to co-locate bio-detection technologies for BioWatch at DoD installations.</p>	<p>Improve capability for rapid biological and chemical detection, identification, and characterization, including at standoff distances.</p> <p>Continue research in the medical/genomics field.</p> <p>Develop improved individual protection capabilities.</p> <p>Establish a readiness and training reporting system for installation protection.</p> <p>Develop and expand joint-service, multiservice, and interagency CM doctrine.</p>
Intelligence		
<p>Acquire high-value intelligence to support U.S. policies and actions to discourage, prevent, rollback, deter, and mitigate threats and consequences of WMD.</p> <p>Provide planning, integration and improvements to U.S. Government nuclear forensics capabilities.</p> <p>Develop capability for robust assessments of CW or BW alleged use and attribution.</p>	<p>Ongoing CBAs within the DoD JCIDS process to define National Technical Nuclear Forensics requirements.</p> <p>Collaboration efforts with international partners in the areas of nuclear detection, collection, and forensics.</p> <p>Ongoing collaborative working relationships between DNDO, DOE, DTRA, and the FBI within the National Technical Nuclear Forensics Center.</p> <p>Ongoing development of the Biodefense Knowledge Management System (BKMS) at the DHS Biodefense Knowledge Center.</p> <p>Forensic capabilities (e.g., attribution).</p>	<p>Develop next-generation pattern analysis tools to support the identification of nuclear forensic signatures.</p> <p>Initiate international discussions to develop memoranda of understanding for pathogenic strains.</p>

CAPABILITIES OR DEVELOPED ITEMS FIELDIED IN FY 2007-2009

Numerous ongoing efforts reported fielded capabilities since the last report in May 2007. Capabilities were fielded in the following areas:

Interdiction. The Joint Staff issued the Maritime Counterproliferation Interdiction Execute Order (EXORD), which revised an order previously promulgated under the WMD Maritime Interdiction EXORD.

Elimination. The U.S. Army Nuclear and Combating WMD Agency achieved full operational capability in FY07. It provides planning assistance support to Army component CBRN planners, improved connectivity and staffing, better support for reachback to technical information, and timely coordination resulting in improved Army support to joint capability. The Army's 20th Support Command Operational Command Post achieved initial operational capability in FY07, providing a deployable headquarters command and control capability for WMD elimination missions.

Threat Reduction Cooperation. The Cooperative Threat Reduction (CTR) program had significant capability achievements. Under CTR's Biological Threat Reduction (BTR) program, especially dangerous pathogen collections from Azerbaijan and Georgia were transferred to the United States for further diagnostic analysis. In 2007, the BTR program also completed infrastructure elimination of biological weapons facilities at Stepnogorsk, Kazakhstan and Tblisi, Georgia.

Passive Defense (CBRN detection). In support of national strategies, the DoD Chemical and Biological Defense Program (CBDP) (Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD)) provides dual-purpose capabilities that address the broadened threat context. The *Joint Biological Agent Identification and Diagnostic System Block I (JBAIDS Blk I)* is an ongoing fielding effort. The Air Force and Army are now at full operational capability with 103 and 91 JBAIDS systems, respectively. Fielding events began in FY08 to provide the Marine Corps with 16 systems. Fielding events for the Navy began in December 2008. The *Joint Biological Point Detection System (JBPDS)* program fielded (interim) systems in limited quantities to the Army and Navy in FY07. Full Rate Production for JBPDS is expected to begin in the 3rd Quarter of 2009. The *Joint Service Lightweight Standoff Chemical Agent Detector* will be employed on the *Stryker Nuclear, Biological, Chemical Reconnaissance Vehicle*. Increment 1 began low-rate initial production fielding in March 2007. Since 2007, the *Chemical, Biological, Radiological and Nuclear Installation Protection Program (CBRN IPP)* fielded CBRN protection and response capabilities to 89 military installations. It also established the *CBRN IPP Portal* to provide CBRN awareness information to military members and their families and information on national initiatives to emergency managers on military installations world-wide. The *Army Emergency First Responder Program* fielded equipment to first responders at 89 Army installations. In 2008, the DoD CBDP (JPEO-CBD) fielded tiered CBRN detection and response capability to an additional 27 continental United States (CONUS) and six outside CONUS (OCONUS) military installations through the CBRN IPP.

Generation 1 and Generation 2 of the *BioWatch System* transitioned to DHS's Office of Health Affairs on April 1, 2007. BioWatch is an early warning system that can rapidly detect trace amounts of biological materials in the air, whether they are due to intentional release or due to minute quantities that may occur naturally in the environment. The system assists public health experts and provides early warning indication of the possible presence of a biological agent release, allowing federal, state, and local officials to more quickly determine emergency response, medical care and consequence management needs. At the time of transition, the BioWatch system was being operated in more than 30 U.S. cities in partnership with the Centers for Disease Control, Environmental Protection Agency (EPA), the FBI, and state and local partners. Over the long term, BioWatch and other federal bio-monitoring efforts will become part of the National Integrated Bio-Monitoring System, as described in the National Bio-monitoring Architecture. The *Rapidly Deployable Chemical Detection System (RDCDS)* transitioned to the Office of Health Affairs in September 2007, after successful field demonstration and testing. RDCDS is a deployable chemical monitoring system for use at National Special Security Events and other high priority special events.

Passive Defense (individual and collective protection). The DoD CBDP (JPEO-CBD) *Protective Clothing* program provides the Warfighter with a chemical biological protective ensemble in NBC environments. This program fielded the following systems in FY07: 1) *Joint Service Lightweight Integrated Suit Technology (JSLIST)*, *Block 2 Glove Upgrade Non-Flame Resistant (NFR)*; and 2) *JSLIST Chemical/Biological Footwear System Alternative Footwear Solution (AFS)/Integrated Footwear Solution (IFS)*. The *JSLIST Block 2 Glove Upgrade NFR* provides hand protection against liquid, vapor, and aerosol CBRN agents and is semi-permeable to prevent excessive moisture buildup and improve user comfort. Its performance will not be degraded by exposure to petroleum, oils, lubricants, or field contaminants. The *Joint Service General Purpose Mask (JSGPM)/Joint Service Chemical Environmental Survivability Mask (JSCESM)* program provides a lightweight protective mask system to protect U.S. forces from anticipated threats. JSGPM began fielding in FY08. JSCESM fielded in FY07.

In 2008, the Navy fielded the new chemical and biological (CB) protective flight suit known as the *Joint Protective Aircrew Ensemble (JPACE)*. The suit is ready for issue upon deployment for all naval aircrews. In 2008, the Navy also fielded the new *CB Integrated Footwear System* for aviation and special warfare missions.

The Air Force expanded its non-material capabilities substantially over the past two years. In late 2007, the Air Force successfully instituted the *Counter-Chemical Warfare (C-CW) Concept of Operations (CONOP)* throughout the Air Force. This was accompanied by confirmation by the Joint Services of the effectiveness of the Air Force-developed Split Mission Oriented Protective Posture concept, which uses modeling and detection capabilities to optimize mission effectiveness and force survivability. In 2009, the Chief of Staff of the Air Force formally approved the *Counter-Radiological Warfare (C-RW) CONOP*. The C-RW CONOP integrates radiological defense technologies and information sources, while optimizing the coordinated employment of existing specialized teams and programs. It also provides specific guidance on operational risk management decisions in a radiation-contaminated environment.

The *Collective Protection Systems Backfit* program completed fielding aboard the LHD-7 (USS IWO JIMA) and the LHA-4 (USS NASSAU) in FY07. This program for filtering air to the most critical interior spaces remains one of the most effective ways of protecting ship

personnel. This capability has been backfitted to 11 Navy amphibious ships in 2008. Another four ships will be completed in the 2009 to 2011 timeframe.

Passive Defense (decontamination). In FY08, the DoD CBDP (JPEO-CBD) began fielding the *Joint Service Personnel Decontamination System* with *Reactive Skin Decontamination Lotion (RSDL)*. RSDL is a Food and Drug Administration (FDA)-cleared, individually-carried skin decontamination kit. It provides the Warfighter with the ability to decontaminate the skin after exposure to chemical and biological warfare agents. RSDL supports the immediate and thorough personnel decontamination operations—an improved capability over the previous M291 skin decontaminating kit. RSDL neutralizes, as opposed to removing, the agent. Additionally, it can be used to decontaminate individual equipment, weapons, and casualties (unbroken skin only). The CBDP (JPEO-CBD) is conducting new equipment training with RSDL, both in CONUS and OCONUS.

The DoD CBDP (JPEO-CBD) *Joint Service Transportable Decontamination System—Small Scale (JSTDSS-SS)* completed all testing in preparation for a full rate production decision in FY09. The JSTDSS-SS will be used to decontaminate tactical and non-tactical vehicles, ship exterior surfaces, crew-served weapons, aircraft, aircraft support equipment, building/facility exteriors, and terrains that have been exposed to chemical warfare agents/contamination.

Passive Defense (medical systems). In FY08, the DoD CBDP (JPEO-CBD) obtained FDA approval for two *Joint Biological Agent Identification and Diagnostic System* assays. Also in FY08, the DoD CBDP (JPEO-CBD) delivered 440,000 doses of Smallpox vaccine and 1.3 million doses of Anthrax vaccine to the Strategic National Stockpile and fielded 31 JBAIDS assays. In FY08, the DoD entered into agreements with the Department of Health and Human Services to implement a single, integrated stockpile for Anthrax and Smallpox vaccines, meeting the requirements for the Strategic National Stockpile established in *Homeland Security Presidential Directive-21, Public Health and Medical Preparedness*, and the recommendations from the *Government Accountability Office Report 08-88, Actions Needed to Avoid Repeating Past Problems with Procuring New Anthrax Vaccine and Managing Stockpile of Licensed Vaccine*. The agreements will result in a cost avoidance of more than \$10 million dollars, annually.

Offensive Operations. The DTRA *Target Assessment Technologies* program provides development, integration, and application of technologies to find, characterize, and assess hard and deeply buried targets (HDBTs) and WMD facilities for the combatant commands and the Intelligence Community. Initiation of a WMD threat research and analysis capability in collaboration with the Defense Intelligence Agency (DIA) began in FY08.

Air Force simulation systems have improved CWMD targeting and planning. The *Simulation Environment & Response Program Execution Nesting Tool (SERPENT)*, version 2.2, improved the prediction of chemical and biological agent behavior to support target analysis for conventional and agent defeat weapons. Improvements to the *Empirical Lethality Methodology (ELM)* program enhanced prediction of the neutralization effects that various environments have on chemical and biological agents.

Active Defense. In FY07, FY08, and the first half of FY09, the Missile Defense Agency (MDA) made major strides in the fielding, deployment, and support of an integrated missile defense capability. MDA emplaced 14 *Ground Based Interceptors (GBI)*; completed *Missile Field 3* at Fort Greely, Alaska; delivered 41 *Standard Missile (SM)-3 interceptors* and 17 *Aegis*

BMD-capable ships; transitioned the *X-band radar and command and control, battle management and communications (C2BMC) equipment* to Shariki Air Base, Japan; delivered an *X-band radar* to Vandenberg AFB; completed work toward delivery of the *Sea-Based X-band (SBX) radar*; delivered additional capability to the Beale (California) and Fylingdales (United Kingdom) *upgraded early warning radars*; completed integration of the Fylingdales upgraded early warning radar into the Ballistic Missile Defense System (BMDS); delivered an *X-band radar* to Israel; updated the *fire control software* for our long-range defenses; dedicated initial operations of the *24/7 BMDS Network Operations Security Center*, and fielded the *C2BMC Spiral 6.2 software* for operational use. The Air Force delivered sensors for a *Highly Elliptical Orbit host satellite* for the *Space Based Infrared System High* configuration, adding a critical element of the Nation's next-generation missile warning system.

WMD Consequence Management. DoD participates in WMD Consequence Management operations, such as the U.S. Northern Command (USNORTHCOM) *Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives (CBRNE) Consequence Management Response Force (CCMRF)*. U.S. Code, Title 50, Section 2314 directs DoD to develop and maintain at least one terrorism response team capable of aiding federal, state, and local officials in responding to CBRNE incidents. As a result, DoD established the requirement for three CCMRFs to be trained and ready to respond to a request from civil authorities.³ The mission of the CCMRFs is to provide CBRNE consequence management support, as approved by the Secretary of Defense, or as directed by the President, in response to deliberate or inadvertent CBRNE incidents. The CCMRFs will be employed at the request of DHS or designated lead agency when the effects of a CBRNE event exceed state and local capabilities.

The current fielding plan incrementally sources three separate CCMRFs to provide the capability to respond to multiple near-simultaneous CBRNE events. CCMRF #1, comprised primarily of Active component units, has been operational since October 1, 2008. The Army's 3rd Infantry Division/1st Brigade Combat Team and the 1st Medical Brigade provide the current core force structure of CCMRF #1. Specialized units, such as the Marine Corps *Chemical Biological Incident Response Force (CBIRF)* and Air Force *Radiation Assessment Team (AFRAT)*, round out this capability. CCMRFs #2 and #3, comprised primarily of Reserve component units, are scheduled to become operational October 1, 2009 and October 1, 2010, respectively, resulting in three CCMRFs by October 1, 2010.

Two additional DoD *WMD Civil Support Teams (WMD-CSTs)* received their certification on June 1, 2009: the 23rd WMD-CST (Virgin Islands) and the 94th WMD-CST (Guam). This increases the number of certified WMD-CSTs to 55. *WMD-CSTs* provide local and state officials in every U.S. state and territory with expert assistance and ready access to WMD CB detection, mobile CB agent laboratory analysis, and interoperable communications equipment. The *WMD-CST Equipment* program has fielded 62 *Analytical Laboratory Systems (ALS)*, 64 *Unified Command Suites (UCS)*, *Increment 1*, and 36 *Advanced Echelon Vehicles* since FY07. In FY08, the DoD CDBP (JPEO-CBD) completed fielding of a significantly upgraded communications package for the UCS to 55 WMD-CSTs. The DoD CDBP (JPEO-CBD) fielded enhanced CBRN detection and identification capabilities for the ALS to ten WMD-CSTs. The

³ A CCMRF is comprised of forces with unique CBRNE-trained and equipped personnel, as well as general purpose forces trained to operate in a CBRNE environment. Each CCMRF is a multi-Service, task-organized force comprised of various Active, Reserve, and National Guard units, numbering approximately 4,700 personnel.

Marine Corps has acquired the *Marine Air Ground Task Force (MAGTF) Consequence Management* sets. These sets will increase the MAGTF commander's awareness of the operational environment through specialized teams capable of operating in environments too hazardous for more commonly fielded CBRN equipment. This ability to detect, identify, and mitigate hazards is critical to force protection and mission accomplishment when dealing with CBRN/toxic industrial materials (TIM) threats.

DHS's *Biological Warning and Incident Characterization (BWIC)* system was introduced in three BioWatch cities and transitioned to DHS's Office of Health Affairs. BWIC is a set of software integration tools to help local public health and emergency management officials more rapidly and effectively assess the public health significance when BioWatch systems yield positive results for biological agents. It was designed with strong input from the local organizations and has been very well received by them.

The DHS *Portable High-throughput Integrated Laboratory Identification System (PHILIS)* implements a rapidly deployable, mobile chemical laboratory system to support high-throughput analysis (several hundred samples per day) of environmental samples that may contain toxic industrial chemicals (TICs) and chemical warfare agents (CWAs). This capability was transitioned to the EPA in March 2008 and will allow for the onsite, high-throughput analysis of environmental samples thus facilitating an accelerated disposition of the high volume of samples that are collected during the hazard mapping, decontamination, and remediation phases of a chemical attack or release.

COMBATING WMD PERSPECTIVES AND ACTIVITIES OF CPRC MEMBER ORGANIZATIONS

The CPRC members universally agree that the WMD threat from hostile states and terrorist groups, combined with the existence of potentially unsecured WMD materials, technology, or knowledge in regions of concern, is one of the most serious security challenges facing the United States. The CWMD activities of CPRC member organizations are integrated, but each member organization has separate responsibilities for CWMD.

DoD's activities span all three pillars of the *National Strategy to Combat Weapons of Mass Destruction*. DoD is pursuing an integrated CWMD approach with a combination of offensive operations capabilities, missile defenses, and cooperative threat reduction activities. DOE's principal CWMD goals are to ensure a safe, secure, effective and reliable nuclear weapons stockpile; promote international nuclear safety, and nonproliferation; and reduce the global danger from WMD.

DHS seeks to enhance the Global Nuclear Detection Architecture (GNDA) through the implementation of the domestic portion of the GNDA, while also providing the Nation with an enhanced defensive posture against high-consequence events through investments in biological, chemical, and agricultural defense capabilities. DOS provides oversight of both policy and resources on all matters relating to verification of compliance with international arms control, nonproliferation and disarmament agreements and commitments. The IC concentrates its CWMD activities on acquiring high-value intelligence to support U.S. policies and actions that discourage, prevent, rollback, deter, and mitigate the consequences of WMD. The CPRC members' CWMD perspectives are presented in Volume II, Section 4.

Tables 3 through 6 highlight selected CWMD activities for DoD, DOE, DHS, and DOS, respectively, that have occurred since the issuance of the 2007 CPRC report. The highlights presented in the tables meet three important criteria: (1) fulfilling specific ACE goals and performance measures; (2) meeting the requirements of corresponding policy guidance or international agreements; and (3) reducing identified shortfalls or capability gaps within an ACE.

DOD SELECTED ACTIVITIES TO MEET COMBATING WMD GOALS

DoD activities and programs cover the full spectrum of CWMD, providing Warfighters with required capabilities to defeat, deter, defend, respond to, and recover from WMD and related threats or attacks. Key elements of DoD's approach include maintaining a strong deterrence capability; developing capabilities to identify, characterize, destroy, and interdict the production, transfer, storage, and weaponization of WMD; developing active defenses to intercept delivery means; developing passive defenses to provide detection, medical countermeasures, decontamination, and individual and collective protection; training and equipping U.S. forces to operate effectively in a WMD-contaminated environment; developing the ability to restore operations and manage the consequences of WMD use; and developing capabilities to support the National Technical Nuclear Forensics program. In environments where international partners have agreed to cooperate to reduce the threat of WMD, DoD's contributions of expertise and technology for international cooperation are crucial to the success of these nonproliferation missions. The key elements of these international cooperative efforts are supporting U.S. diplomacy, arms control, and export controls; and encouraging U.S. allies and coalition partners to address CWMD as part of their planning.

Quadrennial Defense Review Report. The 2006 *Quadrennial Defense Review (QDR) Report* outlined four main priority areas that frame the capabilities needed to address future challenges identified in the *National Defense Strategy*: (1) defeating terrorist networks; (2) defending the homeland in depth; (3) shaping the choices of countries at strategic crossroads; and (4) preventing hostile states and nonstate actors from acquiring or using WMD.

The QDR report also identified important capabilities needed by DoD for CWMD. These capabilities are cross-referenced here to the ACEs.

Interdiction

- Capabilities to locate, tag, and track WMD, their delivery systems and related materials, including the means to move such items.
- Capabilities to detect fissile materials, such as nuclear devices, at standoff ranges.
- Interdiction capabilities to stop air, maritime, and ground shipments of WMD, their delivery systems, and related materials.

Elimination

- Joint command and control tailored for the WMD elimination mission.
- Persistent surveillance over wide areas to locate WMD capabilities or hostile forces.
- Capabilities to detect fissile materials, such as nuclear devices, at standoff ranges.
- Capabilities and specialized teams to render safe and secure WMD.

- Special operations forces (SOF) to locate, characterize, and secure WMD.
- Non-lethal weapons to secure WMD sites so that materials cannot be removed.

Threat Reduction Cooperation

- Capabilities to help friendly governments improve controls over existing weapons, materials and expertise.

Passive Defense

- Capabilities to shield critical and vulnerable systems and technologies from the catastrophic effects of electromagnetic pulse (EMP).
- New defensive capabilities in anticipation of the continued evolution of WMD threats, such as EMP, man-portable nuclear devices, genetically engineered biological pathogens, and next generation chemical agents.

Offensive Operations

- Persistent surveillance over wide areas to locate WMD capabilities or hostile forces.
- Capabilities to maintain a robust nuclear deterrent.
- Strike capabilities, including prompt global strike capabilities, to defend and respond in an overwhelming manner against WMD attacks.
- Capabilities to deploy, sustain, protect, support, and re-deploy SOF in hostile environments.

Active Defense

- Integrated defenses against short-, intermediate-, and intercontinental-range ballistic, and cruise missile systems.

WMD Consequence Management

- New or expanded authorities to improve access to National Guard and Reserve forces for use in the event of a man-made or natural disaster.

Intelligence

- Human intelligence, language skills, and cultural awareness to understand better the intentions and motivations of potential adversaries and to speed recovery efforts.
- Persistent surveillance over wide areas to locate WMD capabilities or hostile forces.

During the QDR, the senior leadership of the Department considered transformational changes already underway and identified desired future force characteristics. As a result, the QDR report proposed a CWMD capability portfolio, among others. Although CWMD was not adopted as a Tier I portfolio in DoD's most recent Joint Capability Areas framework, approved in January 2009, a portfolio concept for CWMD is still valuable for those organizations responsible for oversight of CWMD.

U.S. Strategic Command's (USSTRATCOM) Role in CWMD. Another important development in the Nation's approach to CWMD has been the work of USSTRATCOM to synchronize planning and advocate for CWMD capabilities in DoD. USSTRATCOM has

engaged in discussions within DoD's Office of the Secretary of Defense, DOE, and other Federal agencies to improve coordination. USSTRATCOM completed Concept Plan (CONPLAN) 8099-08, *Global Combating Weapons of Mass Destruction Campaign Plan*, in March 2009. The CONPLAN incorporates national-level guidance for CWMD with the *Guidance for Employment of the Forces (GEF)* and *Joint Strategic Capabilities Plan 2008 (JSCP 08)*. CONPLAN 8099-08 synchronizes DoD CWMD plans by providing a common framework and methodology for CWMD planning which puts into effect a global strategy to combat WMD. USSTRATCOM also completed a Joint Integrating Concept, approved in December 2007, for CWMD that describes how a Joint Force Commander will conduct future CWMD operations. Based on CONPLAN 8099 and other analytical efforts not previously captured in Joint Capabilities Integration and Development System (JCIDS) documentation, USSTRATCOM produced a CWMD Joint Capabilities Document (JCD). The JCD, which was approved in October 2008, documents and prioritizes combatant command capability needs. Accordingly, the CWMD JCD forms the basis for initiating programs and making associated decisions and funding requests. Warfighter prioritization of CWMD shortfalls is provided in Volume II, Section 4.

DoD activities in the CWMD mission areas are highlighted in Table 3.

Table 3. Highlights of DoD's Progress in Meeting Combating WMD Goals

Interdiction
DTRA sponsored a successful demonstration of an Idaho National Laboratory Bremsstrahlung-Gamma radiation active interrogation system to detect the presence of radiological and/or nuclear (rad/nuc) material.
Elimination
<p>U.S. Army Pacific (USARPAC) has successfully demonstrated and started the transition process for the Chemical Unmanned Ground Vehicle (CUGV) as part of the Chemical Unmanned Ground Reconnaissance ACTD. This robotic platform will allow initial entry into sensitive sites or HAZMAT incidents without endangering personnel and provide an array of sensor information, live video footage, and data for follow-on exploitation/response.</p> <p>CBRNE Command has retained one CUGV for deployment/incident response and additional training for units in the area of responsibility (AOR) once they are fielded.</p> <p>USSTRATCOM, in coordination with U.S. Joint Forces Command, established the Joint Elimination Coordination Element to provide joint command and control for Elimination Operations.</p>
Threat Reduction Cooperation
<p>U.S. Code, Title 22, Section 5963 expanded the authority of the Cooperative Threat Reduction (CTR) program to expend funds outside the states of the former Soviet Union, facilitating the program's ability to draw down WMD stockpiles in a broader range of countries.</p> <p>The U.S. Additional Protocol (AP) with the International Atomic Energy Agency (IAEA) is designed to strengthen IAEA nuclear safeguards in the United States. Current DoD AP implementation efforts are focused on interagency coordination and discussions with IAEA counterparts to establish the necessary procedures and requirements to implement the AP in the U.S., while also protecting U.S. national security.</p> <p>The DoD CTR program completed updates to the physical security systems at 24 nuclear weapons storage sites in support of the Bratislava commitments.</p> <p>In FY07-08 the DoD CTR program eliminated 84 SS-25 ICBMs, 54 SS-25 road-mobile launchers, and twelve SS-N-20 SLBMs as part of the Strategic Offensive Arms Elimination program. In addition, the last Russian SS-24 ICBM was eliminated in April 2008 under that program.</p>

**Table 3. Highlights of DoD's Progress in Meeting Combating WMD Goals
(continued)**

Passive Defense
<p>The Office of Naval Research supported research to enhance understanding of bacterial cell-cell communication mechanisms, with a goal of exploiting these to develop new antibiotics or vaccines that target highly conserved communication pathways.</p> <p>The CBDP Advanced Technology Development Program completed feasibility studies on using Raman spectroscopy for the detection/identification of biological materials; developed models to predict passive standoff technology response to aerosols; completed development of portable technology to completely sequence entire pathogen genomes based upon the sequencing through synthesis concept.</p> <p>The CBDP Basic Medical Research Program established basic research to support the future production of monoclonal antibodies, enhanced active immunization, and novel therapeutic targets for bacterial and viral pathogens. It identified common biomarkers for several classes of pathogenic agents and investigated novel modeling to speed the future drug approval process. These projects also investigated in-silico and other methodologies to identify potential therapeutics from genetic sequences of chemical agents and continue to leverage advances in genomics, proteomics and systems biology studies. These projects conducted basic research experiments to identify mechanisms of injury and common sites for therapy against chemical warfare agent exposure. Additionally, in vitro and in vivo model systems were developed, improving upon existing human tissue models and molecular modeling capabilities against the action of multiple classes of chemical agents.</p> <p>JPEO-CBD established the Decontamination Family of System to look at a range of possible solutions for the replacement of high test hypochlorite, super-topical bleach, and decontamination foam-200.</p> <p>The CBRN IPP was fielded to 89 installations, and the CBRN IPP Portal was established to provide CBRN awareness information to military members and their families and information on national initiatives to emergency managers on military installations world-wide.</p> <p>The IPP partnered with the U.S. Army Tank-Automotive and Armaments Command Life Cycle Management Command to execute integrated sustainment of CBRN IPP equipment at Army installations.</p> <p>The Army Emergency First Responders Program was fielded to 89 installations.</p> <p>The Spectral Sensing of Bio-Aerosols Program has developed a standardized approach and testbed to evaluate point trigger sensor performance for aerosolized bio-threat agent simulants in cluttered environments.</p> <p>The Stryker Nuclear, Biological, Chemical Reconnaissance Vehicle completed production verification testing and initial operational test & evaluation in 2007 and achieved MS III Extended LRIP in 2008.</p> <p>The CBRN Defense Life Support Program began the Readiness Assistance Visit Program in late 2007. The program completed visits to 22 ships prior to their deployment. It also completed ship installation of eight Biological Point Detectors.</p> <p>The CBDP Biological Vaccine Procurement Program fielded Anthrax Vaccine Absorbed, Smallpox Vaccine, and Vaccinia Immune Globulin Intravenous vaccines.</p> <p>DoD entered into interagency agreements with the Department of Health and Human Services to implement a single, integrated stockpile for Anthrax and Smallpox vaccines, meeting the requirements for the Strategic National Stockpile, and resulting in cost avoidance of more than \$10 million, annually.</p> <p>DoD launched a new initiative, called the Armed Forces Institute of Regenerative Medicine, a multi-institutional interdisciplinary network managed and primarily funded by the U.S. Army Medical Research and Materiel Command, leveraging cutting-edge medical technologies and aimed at developing advanced treatment options, such as patient personalized stem cell therapy for assisting severely wounded servicemen and women for CWMD and/or managing WMD consequences.</p>
Security Cooperation and Partner Activities
<p>DTRA provided indirect support to the Moscow Treaty's Bilateral Implementation Commission in the form of technical advice to the Office of the Under Secretary of Defense for Policy.</p> <p>DTRA developed and continues to administer and maintain the Global Initiative Information Portal, a web-based portal to promote information sharing pertaining to the suppression of acts of nuclear terrorism and their facilitation among the partner nations of the Global Initiative to Combat Nuclear Terrorism.</p> <p>USARPAC will field and train two additional federal fire departments in Japan. This increases the protection of forces stationed on the installations and critical infrastructure facilities by providing almost immediate detection and presumptive analysis in the event of a WMD/HAZMAT incident.</p> <p>The DoD International Counterproliferation Program conducted 34 training events in 13 Former Soviet countries and two additional courses in two additional countries in FY08. The training was conducted in partnership with the FBI and DHS, and focused on WMD investigations, border security, and hazardous material response.</p>

**Table 3. Highlights of DoD's Progress in Meeting Combating WMD Goals
(continued)**

Offensive Operations
<p>DTRA conducted more than 80 test events to evaluate data regarding the phenomenology effects of a variety of advanced energetic explosive materials that could be employed against in-transit, fixed, or WMD-related targets or infrastructure.</p> <p>DTRA conducted several test and evaluation events to collect, analyze, verify, and validate data to improve fidelity and reliability of predictive tools for design and development of optimized weapons and concepts to effectively penetrate and operate through rock, soil, and other structures. This included a unique test and evaluation event to collect, analyze, and provide weapon effects data regarding the ability of existing conventional weapons to defeat/destroy HDBTs with little or no collateral effects.</p> <p>Air Force analytic tools provided enhanced validated predictions of CB agent effects to support target analysis for conventional and agent defeat weapons (SERPENT); and neutralization effects of various environments on CB agents (ELM).</p>
Active Defense
<p>MDA expanded its capabilities to defend against limited long-range missile threats by emplacing 14 Ground Based Interceptors, upgrading early warning radars, and completing Missile Field 3 at Fort Greely, Alaska. MDA also expanded capabilities to defense against short- to medium-range missile threats by delivering 41 Standard Missile (SM)-3 interceptors and 17 Aegis BMD-capable ships. MDA completed five Aegis BMD intercept tests and three Terminal High-Altitude Area Defense (THAAD) intercept tests, building on capabilities that can be employed to defend U.S. deployed forces and allies from theater and regional medium-range missile threats.</p> <p>In flight tests since the beginning of FY07, MDA completed two successful intercepts of targets using Ground Based Interceptors, 6 successful intercepts of targets using SM-3 Block 1A interceptors, and 5 successful intercepts of targets using THAAD interceptors. The December 2008 test using a GBI was the first long-range intercept of an operationally realistic target within the integrated missile defense sensor framework.</p>
WMD Consequence Management
<p>The DoD CBDP (JPEO-CBD) fielded the Analytical Laboratory System (Increment 1), Unified Command Suite (Increment 1) and the Advanced Echelon vehicle to provide improved command and control and mobile analytical laboratory capabilities to WMD Civil Support Teams.</p> <p>DoD established the Chemical, Biological, Radiological, Nuclear, and High Yield Explosives (CBRNE) Consequence Management Response Forces (CCMRF) to provide a robust, timely and effective federal response to a request for assistance from civil authorities in a CBRNE crisis. The first of three CCMRFs is allocated to USNORTHCOM under its DoD Support to Civil Authorities mission. Two more CCMRFs will be developed and allocated over the next two years.</p> <p>USEUCOM is completing a Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facilities (DOTMLPF) Change Recommendation for OCONUS consequence management, describing and proposing theater-based CBRN solutions and capabilities, both for installation protection and assisting friends and allies.</p> <p>The USSTRATCOM Center for CWMD (SCC-WMD) conducted an evaluation of geographic combatant command OCONUS Consequence Management mitigation capability requirements against combatant command-stated gaps and provided a briefing with recommendations to address gaps in the combatant commands' ability to respond to CBRN incidents in their respective AORs to the Joint Staff's Force Protection Functional Capability.</p> <p>The SCC-WMD is developing an operations concept for using CONUS-based CBRN CM capabilities to support combatant commands' responses to CBRN incidents overseas.</p> <p>DoD and DHS continued cooperation on the Interagency Biological Restoration Demonstration (IBRD) to provide a coordinated systems approach to the recovery and restoration of wide-urban areas following the aerosol release of a biological agent.</p> <p>USARPAC is creating an Active component first response capability within the 71st (Hawaii) and 95th (Alaska) Chemical Companies, scheduled to reach initial operational capability by the 3rd Quarter of FY09, with the capability to conduct CBRN CM independently or as augmentation to a WMD-CST within the USPACOM AOR.</p> <p>The Office of the Deputy Assistant to the Secretary of Defense for Nuclear Matters (ODATSD(NM)) continued to further consequence management goals via exercises and exchanges through its relationship with the North Atlantic Treaty Organization (NATO).</p>
Intelligence
<p>ODATSD(NM) enhanced collaboration with the United Kingdom and France in the areas of nuclear detection, collection, and forensics. DTRA is leading the development of collection, analysis and evaluation capabilities for post-detonation National Technical Nuclear Forensics (NTNF).</p> <p>ODATSD(NM) co-chaired the Attribution Working Group under the Office of Science and Technology Policy's Nuclear Defense Research and Development Subcommittee.</p> <p>The Air Force began executing DoD's NTNF responsibilities, which include fielding the objective DoD NTNF capability; providing support to nuclear forensic activities; planning, programming, and budgeting to satisfy NTNF requirements; and supporting combatant commands in which NTNF operations occur.</p>

DOE SELECTED ACTIVITIES TO MEET COMBATING WMD GOALS

The National Nuclear Security Administration (NNSA) is the DOE agency responsible for enhancing national security through the military application of nuclear energy. NNSA maintains and enhances the safety, security, reliability, and performance of the U.S. nuclear weapon stockpile without nuclear testing; works to reduce global danger from weapons of mass destruction; and responds to nuclear and radiological emergencies in the United States and abroad. Within the NNSA, the Office of Defense Nuclear Nonproliferation (DNN) detects, prevents, and reverses the proliferation of WMD, while mitigating the risks from nuclear operations. The *National Nuclear Security Administration Act for Fiscal Year 2000* made DNN the organization within the NNSA responsible for preventing the spread of materials, technology, and expertise relating to WMD, and for eliminating inventories of surplus fissile material. DNN accomplishes its mission by working closely with its international and regional partners as well as key federal agencies.

DOE activities that address the nonproliferation mission include the following:

- Developing next-generation detection technologies and methods to detect and monitor foreign nuclear materials, weapons production, and prohibited nuclear explosions worldwide.
- Preventing and countering WMD proliferation by providing policy and technical support to implement and monitor transparent WMD reductions; strengthening indigenous international safeguards and export controls systems in other countries; transitioning WMD expertise and infrastructure to peaceful purposes; and improving international and multi-national safeguards, export control, and interdiction regimes.
- Working in Russia, Libya, and other regions of concern to secure and eliminate vulnerable nuclear weapons and weapons-usable material, and install detection equipment at border crossings and megaports to prevent and detect the illicit transfer of nuclear material.
- Enabling the Russian Federation to permanently cease production of weapons-grade plutonium by replacing plutonium-producing nuclear reactors with fossil-fueled powerplants to provide alternative sources of heat and electricity and provide for the shutdown of the reactors.
- Eliminating surplus Russian plutonium and surplus U.S. plutonium and highly enriched uranium.
- Identifying, securing, removing, or facilitating the disposition of high-risk, vulnerable nuclear and radiological materials around the world that pose a potential threat to the United States and the international community.

DOE supports CWMD missions through its nuclear proliferation prevention and counterterrorism activities as well as through access to the many sites engaged by its scientific cadre. DOE plays a critical role, through its core nuclear work, in addressing inspection and monitoring activities of arms control agreements and regimes; protection of WMD and WMD-related materials and components; detection and tracking of these materials and components; removal of materials from compliant nation states; and export control activities. DOE is working closely

with DoD, DHS, DOS, and the IC to detect, characterize, and defeat WMD and WMD-related facilities.

DOE activities in the CWMD mission areas are highlighted in Table 4.

Table 4. Highlights of DOE's Progress in Meeting Combating WMD Goals

Interdiction
NNSA's Second Line of Defense (SLD) Core Program, working closely with DHS, completed installations of equipment to detect the illicit trafficking of nuclear and other radiological materials at an additional 63 strategic borders, airports, and strategic feeder ports in Russia and other countries, for a cumulative total of 213 sites completed. The SLD Core Program also concluded cooperation agreements with Mongolia, Latvia, Bulgaria, Kyrgyzstan, Romania, and Estonia. The SLD Megaports Initiative completed installations at an additional seven Megaports, for a cumulative total of 19 Megaports completed. The Megaports Initiative also concluded agreements with three additional countries.
Elimination
<p>The Proliferation Detection Program completed several multi-agency tests to characterize, validate, and integrate advanced remote sensing instrumentation for detection of nuclear and other weapons of mass destruction proliferation activities.</p> <p>The Nuclear Detonation Detection Program delivered operational space-based nuclear detection sensors to the Air Force on time in support of Air Force launch schedules—sustaining the nation's capability to monitor and report nuclear detonations that occur on or above the earth's surface. It completed development and testing of the next-generation space-based optical explosion monitor sensor. This enhanced sensor will improve the nation's monitoring capability for very small atmospheric nuclear explosions and is now the baseline for all future optical payloads.</p>
Threat Reduction Cooperation
<p>NNSA's Global Threat Reduction Initiative (GTRI) Program removed or disposed of an additional 425 kilograms of nuclear material (plutonium and highly enriched uranium), increasing the program total to 1,791 kilograms—enough for over 65 crude nuclear weapons. The GTRI Program protected an additional 100 high priority radiological sites, increasing the program total to 600 sites containing eight million curies—enough for over 8,000 radiological dirty bombs.</p> <p>The Zheleznogorsk (Russia) Plutonium Production Elimination Project is currently expected to meet its December 2010 completion date on cost and schedule. The completion will provide district heat, allowing shutdown of the Zheleznogorsk reactor and eliminate 400 kgs of plutonium production annually.</p> <p>The International Radiological Threat Reduction (IRTR) Program completed installation of equipment to secure radiological material at 92 IRTR sites, increasing the total number of sites secured to 590.</p> <p>In FY08, material protection, control, and accounting (MPC&A) upgrades were completed on 39 additional buildings containing weapons-usable material within the Rosatom (Russia) weapons complex and civilian nuclear sites. In FY09, NNSA plans to complete MPC&A upgrades to an additional 33 buildings containing weapons-usable material.</p>
Security Cooperation and Partner Activities
<p>NNSA developed and delivered several new technologies, systems, and methods to verify declared nuclear activities and detect undeclared nuclear materials and activities, including technologies that will strengthen the overall effectiveness and efficiency of IAEA safeguards.</p> <p>NNSA worked with former WMD scientists, engineers and technicians at over 180 institutes in the former Soviet Union and Middle East to redirect their skills to non-weapons related purposes. They trained over 4,100 U.S. and international export control officials in over 46 countries on strategic trade controls and identification of WMD-related items.</p> <p>NNSA completed MPC&A upgrades to five Russian Strategic Rocket Forces (SRF) sites, increasing the total SRF sites secured with either completed rapid or comprehensive upgrades to 19 sites.</p>
Offensive Operations
<p>The NNSA Office of Defense Programs manages the science-based Stockpile Stewardship Program. The Stockpile Stewardship Program maintains the safety, security, and reliability of the U.S. nuclear weapons stockpile in the absence of full-scale nuclear testing. The U.S. nuclear weapons stockpile contributes to the defense policy goals of assuring our allies, deterring our adversaries, and dissuading other countries from developing WMD capabilities. The nuclear weapons stockpile was determined to be safe, secure, and reliable during the FY08 stockpile assessment process.</p>

IC SELECTED ACTIVITIES TO MEET COMBATING WMD GOALS

The IC provides strategic, tactical, and operational intelligence on WMD threats to all U.S. Government organizations, a critical enabling function that cuts across all ACEs. The National Counterterrorism Center, under the Office of the Director of National Intelligence (ODNI), continues to mature and gain acceptance in its efforts to better manage, direct, and coordinate IC activities and interagency support in the areas of combating terrorism and homeland security.

The ODNI's National Counterproliferation Center was established as a result of recommendations from the *Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction*. The Center conducts strategic counterproliferation planning for the IC to support policy efforts to dissuade, prevent, deter and otherwise counter the proliferation of WMD, their delivery systems and related materials and technologies. It works with the IC to identify critical intelligence gaps or shortfalls in collection, analysis, or exploitation, and develop solutions to ameliorate or close these gaps; identify long-term proliferation threats and requirements; and develop strategies to ensure that the IC is positioned to address these threats. NCPC also works with elements inside and outside of the IC and the U.S. Government to identify new methods or technologies that can enhance the capabilities of the IC to detect and defeat future proliferation threats.

IC activities in support of the CWMD mission are reported annually to Congress in the classified document *Report to the Director of National Intelligence on the State of the Counterproliferation Intelligence Community*.

DHS SELECTED ACTIVITIES TO MEET COMBATING WMD GOALS

The *National Strategy for Homeland Security* and the *Homeland Security Act of 2002* served to mobilize and organize the nation in the mission of securing the homeland from terrorist attacks. This complex mission requires a focused effort. To this end, one primary reason for the establishment of DHS was to provide the unifying core for the vast national network of organizations and institutions involved in efforts to secure our nation. DHS coordinates with DoD, DOE, the IC, DOS, and other federal departments to enhance CWMD capabilities.

The Domestic Nuclear Detection Office (DNDO) was chartered within DHS on April 15, 2005, through National Security Presidential Directive (NSPD)-43/Homeland Security Presidential Directive (HSPD)-14 to coordinate efforts of federal, state, and local partners to strengthen national radiological and nuclear (rad/nuc) detection capabilities to address the threat of nuclear terrorism. Together with the Departments of State, Energy, Defense, and Justice, DNDO will develop and deploy a comprehensive system to detect and report any attempt to import, assemble, or transport a nuclear device, or fissile or radiological materials within the United States.

The DHS Chemical and Biological Division (CBD), within the Science and Technology Directorate, conducts analyses for better threat characterization and prioritization of chemical and biological threats; develops detection systems to provide early warning of a possible attack; conducts forensic analyses to support attribution; and helps develop technologies and systems to enable rapid decontamination and restoration from CB attacks. While the primary target

beneficiary of these programs is the nation's citizenry and infrastructure, component solutions from these programs may see beneficial application in DoD and other departments and agencies' areas of concern. DHS works closely with multiple Federal partners to enable broad coordination and to leverage national investments in WMD defense of civilians and infrastructure. DHS efforts in CWMD mission areas address primarily the Passive Defense and Consequence Management ACEs.

DHS activities with direct relevance to CWMD include the following:

- Developing the underlying strategy that guides the U.S. Government's nuclear detection efforts.
- Developing a Global Nuclear Detection Architecture (GNDA) that will contribute to a robust, layered defense for the United States.
- Coordinating rad/nuc detection technology R&D programs, ensuring collaboration between DHS, DoD, DOE, DOS, the FBI, and other agencies.
- Enhancing and coordinating Federal, state, and local efforts to detect and protect against nuclear and radiological terrorism against the United States.
- Screening cargo at overseas seaports to detect and interdict terrorists' weapons and other illicit material before arrival on U.S. shores.
- Leading the development, among executive branch departments, of a coordinated architecture for bio-monitoring that includes biosurveillance, aerosol detection, clinical syndrome detection, mail room observation, and suspicious substance management.
- Increasing the nation's preparedness against chemical and biological threats through improved threat awareness, advanced surveillance and detection, and protective countermeasures.
- Developing policies, methods, plans and applied technologies to restore large urban areas, DoD installations, and critical infrastructures following a biological attack.
- Serving as the lead Federal facility to conduct and facilitate the technical forensic analysis and interpretation of materials recovered following a biological attack in support of the appropriate lead federal agency.

DHS activities in the CWMD mission areas are highlighted in Table 5.

Table 5. Highlights of DHS's Progress in Meeting Combating WMD Goals

Interdiction
<p>DNDO and U.S. Customs and Border Protection (CBP) worked together to secure the Southern border at 100 percent, Northern border at 97 percent and Seaports at 98 percent.</p> <p>DNDO conducted test campaigns with DHS/CBP at Andrews Air Force Base to evaluate rad/nuc scanning systems in the international general aviation environment, as well as controlled laboratory tests using next-generation human portable devices.</p> <p>DNDO initiated the West Coast Maritime Preventive Radiological and Nuclear Detection (PRND) Pilot Project in Puget Sound, Washington, in support of the DHS Small Vessel Security Strategy; conducted a test campaign to characterize the performance of rad/nuc detection equipment in the maritime environment; and led a maritime symposium to engage relevant stakeholders in the maritime community with regard to PRND programs.</p> <p>DNDO continued implementation of the Securing the Cities initiative in the New York City region, enabling state and local jurisdictions to coordinate and execute PRND screening operations for various events.</p> <p>DNDO worked with DOE/NNSA, the Nuclear Regulatory Commission, and the manufacturers and users of irradiators to develop low-cost engineering upgrades to make cesium chloride irradiators less vulnerable to terrorist attack.</p> <p>DNDO supported DHS/CBP in completing congressionally mandated covert testing at the top 22 seaports.</p> <p>DNDO conducted a red team assessment of the California Highway Patrol's PRND capability.</p> <p>DNDO established the Graduated Rad/Nuc Detector Evaluation and Reporting Program to facilitate independent testing and assessment of commercially available rad/nuc detection equipment against American National Standards Institute (ANSI) N42 performance standards to inform the government procurement and grant process.</p> <p>DNDO executed seven distinct data collection or test campaigns for rad/nuc detection systems and four data collection efforts with stakeholders to support future radiation test campaigns for on-dock rail.</p>
Passive Defense
<p>The Biological Threat Characterization Center, as part of its systematic end-to-end risk assessments on both traditional and engineered biological agents, completed Population Threat Assessments for all the traditional biothreat agents of significant public health concern in 2007.</p> <p>The Secretary of DHS issued Material Threat Determinations (MTDs) for nine additional biological agents in September 2007. These MTDs are required under Project BioShield before a countermeasure can be considered for acquisition.</p> <p>The DHS Science & Technology Directorate/Chemical Biological Division (DHS S&T) completed the 2008 biennial update of its quantitative probability-based risk assessment to guide development of countermeasures against highest risk biological agents and acquisition of medical countermeasures by DHHS.</p> <p>DHS S&T completed the first comprehensive quantitative chemical risk assessment, providing guidance in the development and deployment of countermeasures against highest risk chemical agents (including toxic industrial chemicals, chemical warfare agents, non-traditional [chemical] agents) and completed four Population Threat Assessments on four classes of chemical agents.</p> <p>DHS S&T completed the first Integrated CBRN quantitative risk assessments, providing a basis for comparing risks due to agents across the chemical, biological, and radiological (CBR) spectrum.</p> <p>The BioWatch and Rapidly Deployable Chemical Detection Systems were developed and transitioned to DHS Office of Health Affairs for operations.</p> <p>The next-generation BioWatch Gen 3 candidate Biological Autonomous Networked Detector, an automated stand-alone biological identifier targeted to provide more rapid detection of biological releases in the BioWatch framework, completed field testing.</p> <p>Chemical detection systems for use by responders and for building protection were advanced to prototype stage and placed in operational environments for extensive testing.</p> <p>In December 2008, DHS S&T and DoD USD(AT&L) signed an MOU on cooperation in the areas of CB defense to minimize duplication of effort, leverage capabilities, and promote interoperability.</p>
Security Cooperation and Partner Activities
<p>DHS/CBP expanded the Container Security Initiative (CSI) by increasing participating ports to 58. CSI now screens 86 percent of U.S.-bound maritime containers.</p> <p>DNDO partnered with other nations, the International Atomic Energy Agency (IAEA), and the European Union through the Global Initiative to Combat Nuclear Terrorism to develop model guidelines for a GNDA that will serve as a plan for an integrated defense-in-depth strategy.</p>

**Table 5. Highlights of DHS's Progress in Meeting Combating WMD Goals
(continued)**

WMD Consequence Management
DHS S&T completed and transitioned to EPA a mobile laboratory capable of high-throughput analysis of environmental samples containing TICs and CWAs.
DHS S&T completed and transitioned to local authorities two prototype labs for screening of suspicious materials that may be of explosive, chemical, or radiological nature to protect the infrastructure of public health laboratories.
DHS S&T advanced the capability of fixed laboratories in the NY and DC regions to analyze environmental samples containing CWA contamination.
DHS S&T drafted templates guiding the restoration of critical infrastructure after contamination with biological or chemical agents.
DHS S&T continued to lead interagency efforts to advance the coordination of the nation's laboratory response networks to provide requisite analytical support in surveillance, characterization, and restoration from attacks with CBR agents via air, food, and water against humans, animals, and plants.
DHS and DoD continued the Interagency Biological Restoration Demonstration, a joint initiative that seeks to reduce the time and resources necessary to recover and restore wide urban areas, military installations, and critical infrastructure following a large-scale biological attack.

DOS SELECTED ACTIVITIES TO MEET COMBATING WMD GOALS

DOS leads the interagency policy process on nonproliferation and manages global U.S. security policy, principally in the following areas: Nonproliferation, including the missile and nuclear threat areas, as well as chemical, biological, and conventional weapons proliferation; Arms control, including negotiation, ratification, verification and compliance, and implementation of agreements on strategic, non-conventional, and conventional forces; and regional security and defense relations regarding U.S. security commitments worldwide, the use of U.S. military forces in unilateral or international peacekeeping roles; and arms transfers and security assistance programs and arms transfer policies. DOS also provides foreign policy input into the interagency processes overseeing research and development of nonproliferation, arms control and counterterrorism technologies that have applications to CWMD missions.

Within DOS, the Under Secretary of State for Arms Control and International Security serves as Senior Adviser to the President and the Secretary of State for issues of arms control, nonproliferation, and disarmament. The Bureau of International Security and Nonproliferation (ISN) leads U.S. efforts to prevent the spread of WMD (nuclear, chemical, and biological weapons) and their delivery systems and is responsible for managing a broad range of nonproliferation, counterproliferation, and arms control functions. The Bureau of Verification, Compliance and Implementation (VCI) provides oversight of both policy and resources on all matters relating to verification of compliance with international arms control, nonproliferation and disarmament agreements and commitments and supports the Secretary and the Under Secretary for Arms Control and International Security in developing and implementing robust and rigorous verification and compliance policies.

DOS activities that address CWMD include the following:

- Promoting international consensus on WMD proliferation through bilateral and multi-lateral diplomacy.
- Addressing WMD proliferation threats posed by non-state actors and terrorist groups by improving physical security, using interdiction and sanctions, preventing the

spread of WMD and applicable expertise, and actively participating in the Proliferation Security Initiative, the Global Initiative to Combat Nuclear Terrorism, the G-8 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction (G-8 Global Partnership), and promoting the aims of the United Nations Security Council Resolution (UNSCR) 1540 and other international nonproliferation regimes.

- Working closely with international institutions and organizations to reduce and eliminate the threat posed by WMD.
- Supporting efforts of foreign partners to prevent, protect against, and respond to the threat or use of WMD by terrorists.
- Ensuring that appropriate verification requirements and capabilities are fully considered and integrated throughout the development, negotiation, and implementation of new treaties, agreements and commitments.
- Assessing other nations' compliance with arms control, nonproliferation, and disarmament treaties, agreements and commitments.
- Serving as the principal policy liaison to the U.S. Intelligence Community for verification and compliance matters.
- Ensuring the effective implementation of existing nuclear arms control treaties and agreements with Russia, Ukraine, Belarus, and Kazakhstan.
- Leading U.S. efforts to develop and implement the elimination and verification requirements for the denuclearization of North Korea.
- Working bilaterally and multilaterally with the international community to resolve longstanding concerns regarding other states' compliance with their arms control, disarmament, and nonproliferation obligations.
- Establishing the scientific, institutional, and organizational arrangements to ensure that the U.S. Government can effectively discriminate between naturally occurring outbreaks of disease and a biological weapons attack and identify the perpetrator.
- Managing the Key Verification Assets (V) Fund and co-chairing the interagency Nonproliferation and Arms Control Technology Working Group (NPAC TWG) and Technical Support Working Group (TSWG), which identify and develop arms control, nonproliferation, and counterterrorism technologies that can also find applications to CWMD missions.

DOS activities in the CWMD mission areas are highlighted in Table 6.

Table 6. Highlights of DOS's Progress in Meeting Combating WMD Goals

Elimination
<p>VCI co-chaired the NPAC TWG, which coordinates the R&D response to arms control and nonproliferation.</p> <p>VCI managed the V-Fund, which provides stopgap funding to preserve existing assets, provide impetus for new acquisitions, and support R&D on new technologies.</p> <p>VCI, working through the U.S.-UK-Libya Trilateral Steering and Cooperation Committee, reviewed Libya's compliance with its agreement to eliminate its WMD programs.</p>
Threat Reduction Cooperation
<p>Working closely with DOE and other USG agencies, ISN focused its scientific engagement, redirection and biological security efforts in countries and regions where the threat of terrorism and proliferation is greatest, including Pakistan, Iraq, Indonesia, and other key nations and regions. For scientist redirection activities in Russia and the former Soviet Union, ISN focused efforts on ensuring self-sustainability for key personnel and their institutes.</p>
Passive Defense
<p>The Office of the Coordinator for Counter-Terrorism (S/CT) co-chaired the TSWG, interagency R&D forum for combating terrorism.</p> <p>The TSWG CBRN Countermeasures subgroup developed useful technologies in the Passive Defense and WMD Consequence Management mission areas.</p>
Security Cooperation and Partner Activities
<p>ISN, along with the Department of the Treasury, ensured implementation of Executive Order 13382, which authorizes the U.S. Government to freeze assets and block transactions of designated entities and persons engaged in proliferation activities.</p> <p>ISN led negotiations with selected countries on peaceful nuclear cooperation and managed diplomatic aspects of the Global Nuclear Energy partnership.</p> <p>ISN successfully promoted geographic expansion of the G-8 Global Partnership to address WMD threats worldwide.</p> <p>ISN furthered the goals of the Global Initiative to Combat Nuclear Terrorism and promoted UNSCR 1540.</p> <p>VCI continued focused verification and compliance efforts with North Korea, Iran, Russia, China, Libya, and Iraq and promoted full compliance with agreements and commitments, including the Nuclear Nonproliferation Treaty and the Chemical Weapons Convention.</p>

FUNDING OF CPRC-REPORTED PROGRAMS

Improving the Nation's capabilities to meet and respond to the threat of WMD requires continued and substantial investment throughout many U.S. Government organizations. This report includes more than \$29.6 billion in FY09 and \$26.4 billion in FY10 of planned investment from DoD, DOE, DOS, and DHS. The IC's total investment in CWMD is not included in these CPRC-reported summary figures but is reported to Congress through other fora.⁴ All budget figures in this report are consistent with the President's Budget. More detailed budget information on DoD, DOE, DOS, and DHS programs is presented in Volume II, Chapter 4 and Appendix C.

DoD's planned investment is \$22.4 billion for FY09 and \$19.1 billion for FY10, compared to the FY08 level of \$14.3 billion reported in the May 2007 CPRC report. The higher level of funding is due primarily to increases associated with the inclusion in this year's report of funding for nuclear strike forces and assets and the Chemical Demilitarization Program. DoD's main investments are in the areas of ballistic missile defense, nuclear strike forces and assets, treaty obligations for reducing chemical agent stockpiles, detection of CW and BW agents, threat reduction cooperation activities; and medical countermeasures against WMD threat agents.

⁴ Appendix C of the classified Volume II of this report contains some portions of the IC budget for selected programs.

DOE's planned investment of \$6.6 billion in FY09 and \$6.8 billion in FY10 includes NNSA's nuclear weapons surety, safety, and security activities—a newly-tracked capability area in this report—in addition to the nonproliferation activities that have been included in past editions of the CPRC report. Nonproliferation investment is \$1.2 billion in FY09 and \$1.6 billion in FY10, compared to \$1.7 billion in FY08. DOE's FY09 and FY10 investments include additional emphasis on global threat reduction activities, international cooperation to protect nuclear materials, and capabilities to respond to and mitigate nuclear and radiological incidents worldwide.

DHS's planned investment is \$670 million in FY09 and \$528 million in FY10 for activities to respond to nuclear, chemical, and biological threats to the U.S. homeland. This is the first CPRC report to include DHS's CWMD budgets. The budgets for FY09 and FY10 support improved capabilities for chemical and biological defense countermeasures, detection and interdiction of nuclear and radiological materials and threats, advanced surveillance and detection of chemical and biological threats, and protection and response to WMD attacks against critical infrastructure.

Along with DHS, DOS became a formal member of the CPRC in FY08. DOS's Bureau of Verification, Compliance and Implementation (VCI) and Bureau of International Security and Nonproliferation (ISN) are specifically charged with the missions of putting constraints on WMD and their means of delivery, and reducing the threat to the United States and its allies. VCI and ISN support overseas preparedness against WMD attacks, diplomatic activities to engage foreign states in formal and informal arrangements for WMD threat cooperation, and verification and compliance of existing WMD-related treaties and agreements. The VCI CWMD budget requests for FY09 and FY10 are \$1.5 million, and \$3.7 million, respectively.

2009 CPRC RECOMMENDATIONS

The 2009 CPRC Report recommendations are summarized below. The recommendations generally follow from shortfalls identified in this report. They are presented below in order of the ACEs they address. In many cases, the recommendations apply to more than one ACE. The recommendations are numbered for readability, not indicative of priority.

This report identifies and discusses shortfalls and priorities in CWMD capabilities. The President's Budget development considers all necessary aspects of budget development for applicable years. This report supports the programs in the FY10 President's Budget request.

Recommendation 1: Undertake a broad analysis of U.S. and allied non-kinetic capabilities and technologies, which may have CWMD applications, and determine how they may be better exploited.

Applicable ACE(s): Interdiction, Active Defense, Offensive Operations, Elimination

CWMD capabilities might benefit from application of non-kinetic technologies currently deployed by the defense community, as well as those technologies still in development. A number of DoD programs in Appendix C of this report are exploring non-kinetic technologies as

options to traditional kinetic technologies for offensive operations. DTRA, for example, is investigating kinetic and non-energetic solutions to hold WMD assets and associated infrastructure at risk. Non-lethal disruptive radio frequency and other electronic countermeasures, such as those being investigated in the Navy's Joint Counter Radio Controlled Improvised Explosive Device Electronic Warfare program, are being used more frequently in counter-terrorism efforts and could find application supporting the Interdiction, Active Defense, Offensive Operations, and Elimination ACEs. Additionally, CWMD-dedicated application of other government functions, such as diplomatic, economic, and intelligence, should be continued or enhanced, as recommended by the 9/11 Commission.

Recommendation 2: *Develop, test, and deploy improved capabilities for standoff or remote detection of chemical, biological, nuclear, and radiological (CBRN) materials related to WMD. The improved capabilities should enable detection from a greater distance than current capability provides, and, for biological threat agents in particular, decrease the time between detection and identification of the biological agent to enable effective warning and treatment.*

Applicable ACE(s): *Interdiction, Passive Defense, WMD Consequence Management, Intelligence*

Improved standoff or remote detection of CBRN materials continues to be a capability that would benefit all organizations with CWMD missions. Attacks of a biological and nuclear nature have the most potential to cause catastrophic damage and are the two areas that require the most attention at this time. In the case of nuclear standoff detection, increasing the range at which nuclear weapons and related components or materials can be detected translates into a wider search area and an increased probability of interdicting nuclear devices, whether at fixed transit and border points or through gap areas over land, at sea, or in the air.

In terms of more rapid detection and identification of biological threat agents, a longer term goal is to be able to detect and identify specific agents in a mass pathogen attack in near real time. This would allow authorities the maximum amount of time to issue warnings and take actions to protect, remove, or treat populations in the event of an attack. A nearer term goal, such as that of the Department of Homeland Security's BioWatch Generation 3 system, is to detect and determine the specific threat agent involved in a suspected attack within 3-6 hours for a wide range of biological threat agents.

Section 3 of this report, "Discussion and Assessment of the Status of May 2007 CPRC Report Recommendations," describes some modest progress in detection capabilities. However, fielded capabilities in certain detection areas—notably standoff detection—are several years away. Only one standoff biological detection system, DoD's Joint Biological Standoff Detection System, Increment II, mentioned in Section 3, with programmatic details provided in Appendix C, is scheduled to reach initial operational capability by FY12. For standoff nuclear detection, all of the programs covered in this report are in early stages of research and development.

There still exists a need for integration and coordination of rapid standoff or remote detection efforts being developed by several U.S. Government departments and agencies for many

potential applications. One example, provided in Section 3, is the need to pursue high-risk/high-payoff research, such as the work of the National Institutes of Health in developing a standalone, automated, genomic identification capability for biological surveillance. A task force may be useful to facilitate the synchronization of efforts across government agencies.

Recommendation 3: *Develop a range of capabilities to improve U.S. abilities to conduct conventional prompt global strike.*

Applicable ACE(s): *Elimination, Offensive Operations*

The need for capability to engage time-critical targets worldwide was identified as an ongoing capability gap. In 2006, the conference report accompanying the FY07 Department of Defense Appropriations Act (H.R. 5631/Public Law 109-289) directed the National Academy of Sciences to conduct a study to analyze the mission requirement for using existing Trident II (D5) missiles with conventional payloads to provide a prompt global strike capability, and, where appropriate, consider and recommend alternatives that meet the prompt global strike mission in the near term (1-2 years), mid-term (3-5 years), and the long term. A 2007 CPRC Report recommendation reaffirmed conventional prompt global strike as a deficiency area. As noted in Section 3 of this report, Congress removed all FY08 funding for the Conventional Trident Modification (CTM) and redirected a portion of the funding to alternative technologies for conventional prompt global strike technologies. Although CTM is no longer being pursued, conventional prompt global strike, as noted in the Strategic Deterrence discussion in Section 4.6.2, remains a highly desired capability that offers the possibility of new, and, possibly better, options for deterrence than currently exist.

Near-term options for prompt global coverage are limited to nuclear-armed, intercontinental ballistic missiles, and, to some extent, cruise missiles. Cruise missiles provide some capability, but do not meet the critical requirements of timeliness, range, and global coverage. Specifically, due to their longer flight times, cruise missiles are generally not viable against time-urgent or fleeting targets. Moreover, given their range limitations, cruise missiles are highly dependent on the location of the associated U.S. ships and aircraft used as launch platforms. Technology options for conventional prompt global strike systems need to be developed to deal with the nexus of rogue states, nonstate actors, and terrorists armed with WMD.

In addition to options for new or improved delivery systems, areas in need of work include weapons effects on targets; weaponizing tools; programmed intelligence, surveillance, and reconnaissance (ISR) and command and control (C²) to support weapon systems and operations; and battle damage assessment systems. In FY03, DTRA began a research and development program to provide integrated support to global strike planning, execution, and assessments, including development of a long-range combat assessment system using weapon-borne sensors. This program has evolved to focus primarily on prototyping of a battle damage assessment sensor system and includes ongoing studies relative to dispensing sensors from hypersonic delivery vehicles. Other DoD studies have been conducted to evaluate new concepts for hypersonic glide vehicles, novel test platforms, and basing alternatives. Based upon this body of work, DoD should develop capability options for conventional prompt global strike.

Recommendation 4: *Develop better, or improve existing, coordination mechanisms and information systems to support communities of interest (COI) awareness of ongoing security cooperation activities in foreign regional areas of responsibility.*

Applicable ACE(s): *Threat Reduction Cooperation, Security Cooperation and Partner Activities*

The diverse nature of security cooperation activities in foreign regions requires information-sharing among multiple departments and agencies of the U.S. Government. The Department of State's CWMD perspective in Section 4 illustrates the web of agencies involved in international CWMD activities. DOS cooperates with DHS for border control issues; DoD for counterterrorism, counternarcotics and arms transfers; the Department of Energy for nuclear nonproliferation issues; the Department of Justice for rule-of-law issues; and the Department of Commerce for export control matters. Another case in point is threat reduction cooperation activity in the former Soviet Union, which involves offices in DOS, DOE, DoD, and two geographical combatant commands (U.S. European Command and U.S. Central Command). Geographical combatant commands have suggested that improvements are needed to ensure mutual awareness of activities by and between all organizations involved in a region. The issues identified may be remedied, to some extent, by establishing common notification procedures (e.g., conveying information to the agencies through a central information venue, such as embassies or consulates in the region). However, there is a need for an overarching information system to provide a common operational picture of appropriate granularity to stakeholders with overlapping responsibilities in the region.

The agencies involved in these activities should establish processes to discuss problems in this issue area and propose information-sharing solutions to address the counter terrorism and CWMD capability deficiencies they have identified.

Recommendation 5: *Develop, test, and deploy capabilities for detection, medical countermeasures, decontamination, and protection against Non-traditional [chemical] Agents and emerging biological agents.*

Applicable ACE(s): *Passive Defense, WMD Consequence Management*

Non-traditional [chemical] agents (NTAs) and toxic industrial materials and chemicals may pose challenges to current detectors.⁵ Current sensors are not sensitive enough to detect sublethal, but still harmful, levels of chemical or biological agents. Such a detection capability would support safe, unprotected operations at fixed and mobile sites, adequate collective protection in a contaminated environment, and provide verification of the completeness of personnel and equipment decontamination.

⁵ Non-traditional agents are novel chemical threat agents or toxicants requiring adapted countermeasures. Toxic industrial materials and chemicals are toxic substances in liquid or gaseous form that are used or stored for use for military or commercial purposes. *Homeland Security Presidential Directive (HSPD) – 18*, "Medical Countermeasures against Weapons of Mass Destruction," January 31, 2007.

CPRC organizations, as discussed in this report, are working toward the development of capabilities to counter NTAs, but these are in early stages of R&D. For example, Appendix C, Table C-14 provides details for DHS's Non-traditional Agent – Laboratory Capability program, a newly initiated effort to develop conceptual designs for high-throughput analysis of NTAs; it is scheduled to reach initial operational capability in FY12. DHS also is conducting proof-of-concept decontamination demonstrations against NTAs, traditional agents, and persistent TICs in the FY10-13 timeframe. DoD is currently conducting considerable work to increase scientific understanding in physical and chemical properties, toxicity, and agent fate to facilitate NTA defense capability developments. DoD's Chemical and Biological Defense Program completed the design parameters for an NTA chamber that will assist with the development, testing, and fielding of countermeasures against NTAs by providing capabilities to challenge technologies in an NTA atmosphere. Significant efforts are needed to address NTAs in the areas of detection, medical countermeasures, decontamination, and individual protection.

Biological agents remain significant potential threats to the United States and its allies. It is anticipated that, over the next decade, the threat from non-state use of biological agents is likely to become more complex due to the increased variety of agents and the sophistication of clandestine development programs. Section 5, "Discussion of Limitations and Impediments to the DoD's Biological Weapons Counterproliferation Efforts," emphasizes that the dual-use nature of the biological industry will continue to make discovery of these clandestine programs increasingly complex. Such agents are easier and cheaper to develop than nuclear weapons and are potentially destructive to unprotected military forces or civilian populations. Additionally, adversaries may use humans by infecting themselves or others to spread certain biological agents within a civilian or military population. Emerging biological agents⁶ have been viewed as potential threats from non-state entities. Therefore, it is critical to develop and leverage new technologies to advance capabilities to monitor, detect, and counter next generation chemical agents and emerging biological agents.

Recommendation 6: *Create a global community of interest to matrix existing and future international partnerships to share information to more fully understand all ramifications of the present WMD challenge.*

Applicable ACE(s): *Security Cooperation and Partner Activities, Threat Reduction Cooperation, Interdiction, Intelligence*

Responses to WMD threats require collaborative approaches. This is articulated in DOS's CWMD perspective in Section 4, which recognizes that strengthening our common capacity to prevent, deter, and manage the consequences of WMD is best achieved through building and working through international partnerships. Experience has demonstrated that no single country has sufficient information to understand all aspects of the WMD challenge. For example, intelligence agencies operating largely on the basis of classified information will see, at best, only part of the puzzle. The CWMD community needs to more aggressively and systematically exploit the broad reservoir of knowledge that exists among experts and specialists around

⁶ Emerging agents are previously unrecognized pathogens that might be naturally occurring and present a serious risk to human populations, such as the virus responsible for Severe Acute Respiratory Syndrome.

the world, both inside and outside of the governments. Tapping this knowledge base requires a networked COI focused explicitly on WMD threats and response capabilities.

A potential example of this approach, although at a smaller scale, is within the counter-drug mission space to create a collaborative forum, both virtual and face-to-face, for multidisciplinary task forces, working groups and research. This multidisciplinary approach would involve, not only the international law enforcement community through its work on antiterrorism, illicit networks, and global interrelationships, but also the diplomatic, financial, and intelligence communities through their knowledge networks. Bringing these communities together presents significant challenges due to conflicting organizational cultures and priorities, but the framework for success should be established by building these global partnerships.

Recommendation 7: *Conduct a comprehensive assessment of the future technology requirements of the nuclear weapons arsenal and stockpile, accounting for the fundamental role of deterrence and the importance of maintaining a credible nuclear deterrent.*

Applicable ACE(s): *Offensive Operations*

The Strategic Deterrence discussion in Section 4.6.2 of this report states that maintaining safe and credible nuclear forces are fundamental elements of our strategic deterrence. However, the U.S. nuclear weapon arsenal and stockpile are aging, bringing some critical elements into question. Most of the current warheads in the stockpile were built in the 1970s and 1980s, and their designs and technologies have not been updated since that time period. Although the Stockpile Stewardship Program currently maintains and replaces weapon components, the reliability of the refurbished weapons cannot be experimentally confirmed due to the U.S. moratorium on nuclear testing, in place since 1992. Not only are the material nuclear weapon assets aging, the scientific base of knowledge has been declining since the 1990s with the loss of scientific expertise through retirement, attrition, or lack-of-interest in the nuclear-related fields. These developments point to a legitimate concern about capabilities to continue to maintain a credible deterrent beyond the near future.

The strategic assumptions behind the force structure requirements of our nuclear weapons are scheduled for review during the 2009 Nuclear Posture Review (NPR). Future technology requirements for our nuclear assets also should be assessed according to the guidance and assumptions of the new NPR. A comprehensive assessment should take place over the next 2-3 years, the results of which should yield sizing requirements of our nuclear forces and weapon stockpile, future technology options for maintaining a credible deterrent with a combination of nuclear and conventional forces, and well-supported cost estimates associated with the technology options.

Recommendation 8: *Develop, test, and deploy capabilities for enhanced consequence management efforts, communications, awareness (i.e., common operational picture), and infrastructure to improve local responders' capabilities to deal with mass casualties. Continued exercises and education, training more personnel, and dedicating more resources to preparedness are also needed to improve nation-wide CWMD consequence management capabilities.*

Applicable ACE(s): *WMD Consequence Management*

DoD and DHS have worked with state and local authorities to improve first responder expertise in dealing with WMD mass casualty events. Providing an integrated response architecture to enhance coordination, optimization, and capacity of laboratory response networks to support restoration of public health, critical infrastructure, and key resources after high-consequence CBR attacks remains a high-level DHS priority, as represented in their shortfall priorities list in Section 4 of this report. Table 4-2 on “Capabilities Fielded in FY07-09” and the program details provided in Table C-14 document examples of DHS programs that provide WMD consequence management capabilities to state and local authorities. The National Guard has established 17 Chemical, Biological, Radiological, Nuclear and High-yield Explosive (CBRNE) Enhanced Force Packages (CERFP) to provide immediate response personnel, and 55 WMD Civil Support Teams (CSTs) to assess hazards, advise civil authorities, and facilitate military support of civil authorities during emergencies and incidents of suspected WMD. In addition, the CSTs advise civilian responders on appropriate actions through on-site testing and expert consultation, and assist and facilitate the arrival of follow-on state and federal military forces. DoD exercise programs provide opportunities for DoD components to practice cooperation with state, local, and tribal authorities as well as interagency response forces in consequence management, communications, and other crisis response activities. This includes national-level exercises to train the USNORTHCOM CBRNE Consequence Management Response Force.

Much remains to be done to improve command, control, and response capabilities among local political, medical, public information and law enforcement entities. In particular, there is a need for federal agencies to maintain continuous coordination with state, tribal, and local elements before during and after a WMD event. DHS and DoD are the main conduits of capabilities for state and local elements. Although DHS has the lead on domestic WMD CM, DoD maintains considerable WMD recovery expertise and equipment and must be prepared to support civilian entities responding to WMD events. Consequently, domestic WMD CM capabilities may benefit through additional training and equipping activities supplied to Federal Emergency Management Agency (FEMA) regions through DoD's Defense Coordinating Officers.

Recommendation 9: *Improve foreign WMD consequence management (FCM) capabilities by establishing more international cooperative agreements with allied host nation governments in coordination with DOS and accounting for variations in countries organic capabilities. Specifically, these should define roles, responsibilities, and procedures for host nation and U.S. military WMD consequence management.*

Applicable ACE(s): *WMD Consequence Management, Security Cooperation and Partner Activities*

FCM agreements with all countries hosting U.S. military installations, or those requiring U.S. FCM assistance, are needed to define roles and responsibilities for response to a WMD incident. Some agreements are in place now, but the process of establishing them is very complex. Experience has shown that some countries have varying levels of capability and sensitivities about U.S. involvement in FCM on their soil. Some are wholly self-sufficient, some include commercial chemical companies to augment their organic government capabilities, and others have very little capability. Currently, the DoD and DOS have independent efforts to establish FCM memoranda of agreement. Those efforts could be integrated to improve the process and to inform each department of the other's initiatives and capabilities. Coordination of these efforts also should lead to the review of FCM planning requirements for the geographic combatant commanders to enable better DoD capability alignment in support of USG FCM efforts.

Recommendation 10: *Develop, test, and deploy capabilities for improved WMD forensics, to include improvements to coordination procedures among relevant national and local agencies.*

Applicable ACE(s): *Intelligence, WMD Consequence Management, Passive Defense*

Attribution, the capability to accurately determine the source of illicit WMD materials and devices, both pre- and post-attack, remains an important factor in deterring or preventing a WMD attack. A theme of this report, as discussed under Strategic Deterrence in Section 4.6.2, is the need to seek improvements that would contribute to highly effective deterrence against adversaries with WMD. If the two main elements of effective deterrence are (1) the capability to respond with overwhelming force to an adversary pursuing WMD, and (2) the capability to deny him benefits despite his actions, attribution provides the "foundation for deterrence," according to *Homeland Security Presidential Directive (HSPD) – 10*, "Biodefense for the 21st Century." In this regard, strong forensic capabilities serve notice to an adversary that his deeds will not go undiscovered.

It is important to note that nuclear and biological forensics are distinct attribution processes that present unique challenges requiring individual attention. Nuclear forensics may be complicated by many factors, including elevated radiation levels, the accessibility of the detonation site, and the highly specialized scientific capabilities required to conduct technical nuclear

forensics. In the case of a biological attack, the source of the materials may be far removed in space and/or time from the scene of the event.⁷

This year's CPRC Report illustrates significant interagency collaboration on the National Nuclear Technical Forensics program. In the discussion of near-, mid-, far-term capability options in Section 4, DHS identifies strong collaboration between the Domestic Nuclear Detection Office and DOE on nuclear forensics. Details of DTRA's participation in the NTNPF program are listed in Table C-5 in Appendix C. In terms of chemical and biological forensics capabilities, DHS's CWMD perspective in Section 4 and its programs in Table C-14 indicate that, among CPRC member organizations, DHS has assumed a significant role in chemical and biological forensics capabilities.

Despite the aforementioned forensics efforts, significant challenges remain for improving both biological and nuclear forensics capabilities. Improvements in both areas of forensics will necessitate increased investments in technological advancements, better interagency coordination, cross-discipline communication, training and exercise, as well as a much greater degree of international collaboration on forensic data collection and interpretation.

Recommendation 11: *Improve intelligence gathering, analysis, and dissemination (e.g., information management systems, decision support systems, sensor development, and intelligence support) regarding state and non-state WMD proliferation and development activities.*

Applicable ACE(s): *Intelligence*

The need for improved capabilities for gathering, analysis, and dissemination of intelligence information is ongoing. Improvements should be made to place more emphasis on data fusion from law enforcement, intelligence partners, and sensors to support the common operating picture. In particular, technologies to correlate and fuse sensor data into a comprehensive representation are needed. A step in the right direction, discussed in Section 3, is DTRA and DIA's effort to put together intelligence analysts and tool developers to better characterize WMD facilities. There also is a need for improved cross-agency reporting of suspicious activity, in particular, technologies that would improve real-time awareness through alerting others to, and sharing information about, suspicious activities and persons.

⁷ Davis, Jay C., "The Attribution of WMD Events," *Journal of Homeland Security*, April 2003, <<http://www.homelandsecurity.org>>.

Recommendation 12: Develop, test, and deploy capabilities to understand and predict the motivations, actions, and reactions of an adversary seeking to acquire and employ WMD against the United States, its interests, friends and allies, whether the adversary is a state or non-state (e.g., terrorist cell—affiliated or non-affiliated) actor.

Applicable ACE(s): Intelligence

Many efforts to determine the threat from WMD are focused on discerning our adversaries' acquisition or attempted acquisition of WMD capabilities through various methods of observation or information-gathering. Following the signs that lead to WMD acquisition is only one part of the threat equation. Another important element of threat assessment is adversarial intent. Our knowledge and understanding of adversarial intent is still limited. Looking forward, the United States faces a different and varied set of actors who may attempt to use WMD, as compared to our recent past, which saw WMD acquisition carried out almost exclusively by state actors. Our way of thinking about adversarial intent should be adjusted commensurate with this new set of actors, some of whom bring difficult-to-comprehend political, social, economic, and religious motivations to the table. This more complex environment requires a new mode of analytical thinking, which in turn implies changes to our current approach for the acquisition, education, and training of our analytical personnel. It also requires analytical tools that more fully exploit technological advancements in the information sciences.

One potential area of capability improvement is automated adversarial modeling. Current methods of providing predictive adversary simulations are largely manual, thus time-consuming. The dynamic nature of adversary force behavior with respect to the changing capabilities, biases, beliefs, goals, intentions, and perceptions of friendly force actions must be addressed. Elements of a dynamic, automated adversary modeling capability must include operational patterns, behaviors, or doctrines of present-day non-traditional adversaries (e.g., terrorist cells, local insurgents, guerillas, and pirates), as well as more conventional force elements.⁸

Among the programs in this year's CPRC Report, the Defense Advanced Research Projects Agency's Persistent Operational Surface Surveillance Engagement (POSSE) program is being pursued with specific objectives to bridge these capability gaps. As described in Table C-4 in Appendix C, POSSE is designed to detect patterns of adversarial activities by receiving a wide variety of data from many different sensors, correlating these data in time and space, and interacting with human analysts to discover and track activities of interest—activities associated with the networks of insurgent, terrorist, and proliferation behavior. Applying a joint- or shared-funding approach, within DoD through the Joint Improvised Explosive Device Defeat Organization (JIEDDO) or the Director, Defense Research and Engineering's JCTD program, or through interagency technology groups, such as the Technical Support Working Group or the Nonproliferation and Arms Control Technology Working Group, may provide additional opportunities in this area.

⁸ Gilmour, Duane, et al, "Intent Driven Adversarial Modeling and Simulation," Paper presented at the *10th International Command and Control Research and Technology Symposium: The Future of C2*, June 2005.

CONCLUSION

CPRC member organizations continue to make improvements in capabilities to address the threat of weapons of mass destruction. The addition of the activities and programs of the Departments of State and Homeland Security in this report shows important contributions by those two new CPRC member organizations and illustrates the fact that the WMD threat can be addressed most effectively through a combination of U.S. Government organizations.

Improving integration and coordination for CWMD remains an important goal for the U.S. Government. Information sharing among participating CPRC organizations and achieving an efficient allocation of available resources are crucial to enhancing and improving the diverse portfolio of CWMD capabilities already available. Numerous Federal entities engage in CWMD research and development. The challenge is to coordinate all these activities in order to better “nationalize” this problem.

ABBREVIATIONS AND ACRONYMS

ACE	Area for Capability Enhancement
ACTD	Advanced Concept Technology Demonstration
AFRAT	Air Force Radiation Assessment Team
AFS	Alternative Footwear Solution
ALS	Analytical Laboratory System
AOR	area of responsibility
ANSI	American National Standards Institute
AP	Additional Protocol
ASD(GSA)	Assistant Secretary of Defense for Global Strategic Affairs
ATSD(NCB)	Assistant to the Secretary of Defense for Nuclear and Chemical and Biological Defense Programs
BKMS	Biodefense Knowledge Management System
BMDS	Ballistic Missile Defense System
BTR	Biological Threat Reduction
BW	biological warfare
BWIC	Biological Warning and Incident Characterization
C-CW	counter-chemical warfare (Air Force CONOP)
C-RW	counter-radiological warfare (Air Force CONOP)
C ²	command and control
C2BMC	command and control, battle management and communication
CB	chemical and biological
CBA	capabilities-based assessment
CBD	Chemical and Biological Division (DHS)
CBDP	Chemical and Biological Defense Program
CBIRF	Chemical Biological Incident Response Force
CBP	U.S. Customs and Border Protection (DHS)
CBR	chemical, biological, and radiological
CBRN	chemical, biological, radiological, and nuclear
CBRN IPP	Chemical, Biological, Radiological, and Nuclear Installation Protection Program
CBRNE	chemical, biological, radiological, nuclear, and high-yield explosives
CERFP	Chemical, Biological, Radiological, Nuclear, and High-yield Explosives Enhanced Force Package
CCMRF	CBRNE Consequence Management Response Forces
CM	consequence management
COI	community of interest
CONPLAN	concept plan
CONOP	concept of operations
CONUS	continental United States
CP	counterproliferation
CPRC	Counterproliferation Program Review Committee
CSI	Container Security Initiative
CST	Civil Support Team
CTM	Conventional Trident Modification
CTR	Cooperative Threat Reduction
CUGV	Chemical Unmanned Ground Vehicle
CW	chemical warfare, chemical weapon
CWA	chemical warfare agent
CWMD	combating weapons of mass destruction

DARPA	Defense Advanced Research Projects Agency
DHHS	Department of Health and Human Services
DHS	Department of Homeland Security
DHS S&T	DHS Science & Technology Directorate / Chemical Biological Division
DIA	Defense Intelligence Agency
DNDO	Domestic Nuclear Detection Office
DNI	Director of National Intelligence
DNN	Office of Defense Nuclear Nonproliferation (DOE/NNSA)
DoD	Department of Defense
DOE	Department of Energy
DOJ	Department of Justice
DOS	Department of State
DOTMLPF	doctrine, organization, training, materiel, leadership and education, personnel, and facilities
DTRA	Defense Threat Reduction Agency
ELM	Empirical Lethality Methodology
EMP	electromagnetic pulse
EPA	Environmental Protection Agency
EXORD	execute order
FBI	Federal Bureau of Investigation
FCM	foreign (WMD) consequence management
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency (DHS)
FY	fiscal year
GBI	Ground Based Interceptors
GEF	Guidance for Employment of the Forces
GND	Global Nuclear Detection Architecture
GTRI	Global Threat Reduction Initiative
HAZMAT	hazardous material
HDBT	hard and deeply buried target
HDBTD	hard and deeply buried target defeat
HSPD	Homeland Security Presidential Directive
IAEA	International Atomic Energy Agency
IBRD	Interagency Biological Restoration Demonstration
IC	Intelligence Community
ICBM	intercontinental ballistic missile
ICD	Initial Capabilities Document
IFS	Integrated Footwear Solution
IRTR	International Radiological Threat Reduction Program
ISN	Bureau of International Security and Nonproliferation (DOS)
ISR	intelligence, surveillance, and reconnaissance
J-8	Force Structure, Resources, and Assessment Directorate (Joint Staff)
JBAIDS	Joint Biological Agent Identification and Diagnostic System
JBPDS	Joint Biological Point Detection System
JCD	Joint Capabilities Document
JCTD	Joint Capability Technology Demonstration
JCIDS	Joint Capabilities Integration and Development System
JIEDDO	Joint Improvised Explosive Device Defeat Organization

JPACE	Joint Protective Aircrew Ensemble
JPEO-CBD	Joint Program Executive Office—Chemical and Biological Defense
JSCESM	Joint Service Chemical Environment Survivability Mask
JSCP	Joint Strategic Capabilities Plan
JSGPM	Joint-Service General-Purpose Mask
JSLIST	Joint Service Lightweight Integrated Suite Technology
JSTDSS	Joint Service Transportable Decontamination System—Small Scale
MAGTF	Marine Air Ground Task Force
MDA	Missile Defense Agency
MOA	memorandum of agreement
MOU	memorandum of understanding
MPC&A	material protection, control, and accounting
MTD	Material Threat Determination
NATO	North Atlantic Treaty Organization
NBC	nuclear, biological, and chemical
NCPC	National Counterproliferation Center
NDAA	National Defense Authorization Act
NFR	Non-Flame Resistant (glove)
NNSA	National Nuclear Security Administration (DOE)
NP	nonproliferation
NPAC TWG	Nonproliferation and Arms Control Technology Working Group
NPR	Nuclear Posture Review
NSPD	National Security Policy Directive
NTA	non-traditional [chemical] agent
NTNF	National Technical Nuclear Forensics
O&M	operation and maintenance
OCONUS	outside the continental United States
ODATSD(NM)	Office of the Deputy Assistant to the Secretary of Defense for Nuclear Matters
ODNI	Office of the Director of National Intelligence
OUSD(AT&L)	Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics
PHILIS	Portable High-throughput Integrated Laboratory Identification System
POSSE	Persistent Operational Surface Surveillance Engagement
PRND	Preventive Radiological and Nuclear Detection Pilot Project
QDR	Quadrennial Defense Review
R&D	research and development
RDT&E	research, development, test, and engineering
RDA	research, development, and acquisition
RDCDS	Rapidly Deployable Chemical Defense System
RN	radiological-nuclear
RSDL	Reactive Skin Decontamination Lotion
S/CT	Office of the Coordinator for Counter-Terrorism (DOS)
SBX	Sea-Based X-band (radar)
SC	Standing Committee
SCC-WMD	USSTRATCOM Center for Combating Weapons of Mass Destruction
SERPENT	Simulation Environment & Response Program Execution Nesting Tool
SLD	Second Line of Defense program

SM	Standard Missile
SOAE	Strategic Offensive Arms Elimination
SOF	special operations forces
SRF	Strategic Rocket Forces
TIC	toxic industrial chemical
TIM	toxic industrial material
TSWG	Technical Support Working Group
UAV	unmanned aerial vehicle
UCS	Unified Command System
UNSCR	United Nations Security Council Resolution
USAF	United States Air Force
USARPAC	United States Army Pacific
USEUCOM	United States European Command
USHS(S&T)	Under Secretary of Homeland Security for Science and Technology
USNORTHCOM	United States Northern Command
USPACOM	United States Pacific Command
USSTRATCOM	United States Strategic Command
V-Fund	Key Verification Assets Fund
VCI	Bureau of Verification, Compliance and Implementation (DOS)
WMD	weapons of mass destruction
WMD-CST	Weapons of Mass Destruction Civil Support Team

WORKS CONSULTED

- Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction. *Report to the President*, March 2005.
- Commission on the Prevention of WMD Proliferation and Terrorism. *World at Risk*, 2008.
- Commission on Terrorist Attacks Upon the United States. *The 9/11 Commission Report*, July 2004.
- Counterproliferation Program Review Committee. *Report on Activities and Programs for Countering Proliferation and NBC Terrorism*, May 2007.
- Department of Defense. *Department of Defense Research and Engineering (DoDR&E) Strategic Plan*, 2007.
- Department of Defense. Defense Science Board. *Defense Imperatives for the New Administration*, August 2008.
- Department of Defense. *Quadrennial Defense Review Report*, February 2006.
- Department of Defense. Secretary of Defense Task Force on DoD Nuclear Weapons Management. *Phase II: Review of the DoD Nuclear Mission*, December 2008.
- Government Accountability Office. *Mass Care in Disasters*, Publication No. GAO-08-1175T, September 23, 2008.
- Homeland Security Council. *Homeland Security Presidential Directive (HSPD) – 9*, “Defense of United States Agriculture and Food,” February 3, 2004.
- Homeland Security Council. *HSPD – 10*, “Biodefense for the 21st Century,” April 28, 2004.
- Homeland Security Council. *HSPD – 18*, “Medical Countermeasures against Weapons of Mass Destruction,” January 31, 2007.
- Homeland Security Council. *HSPD – 21*, “Public Health and Medical Preparedness,” October 18, 2007.
- National Academy of Sciences. National Research Council. *Report on Conventional Prompt Global Strike Capability: Issues for 2008 and Beyond*, 2008.
- National Security Council. *National Strategy to Combat Weapons of Mass Destruction*, December 2002.
- Office of Science and Technology Policy and the Office of Management and Budget. Memorandum for the Heads of Executive Departments and Agencies on “FY 2009 Administration Research and Development Budget Priorities,” August 14, 2007.