

GAO

Report to the Ranking Minority Member,
Subcommittee on National Security and
International Relations, Committee on
Oversight and Government Reform,
House of Representatives

January 2007

CHEMICAL AND BIOLOGICAL DEFENSE

Management Actions
Are Needed to Close
the Gap between Army
Chemical Unit
Preparedness and
Stated National
Priorities



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Highlights of [GAO-07-143](#), a report to the Ranking Minority Member, Subcommittee on National Security and International Relations, Committee on Oversight and Government Reform, House of Representatives

Why GAO Did This Study

The *2006 Quadrennial Defense Review Report* states that the Department of Defense (DOD) must be prepared to respond to and mitigate the effects of weapons of mass destruction (WMD) attacks at home or overseas. Moreover, the Secretary of Defense directed the U.S. military to define the nature and potential requests for military capabilities needed to respond to 15 National Planning Scenarios issued by the Homeland Security Council. The Army's chemical units are key players in this mission.

GAO was asked to evaluate the preparedness of the Army's chemical and biological units, including the extent to which (1) units tasked with providing chemical and biological defense support to combat units and commands are adequately staffed, equipped, and trained and (2) units also tasked with a homeland defense mission—especially National Guard and Reserve units—are adequately prepared for this mission. During this review, we analyzed readiness data and other preparedness indicators for 78 Army chemical units.

What GAO Recommends

GAO recommends actions to address long-standing chemical unit personnel and equipment shortages; and better enable Army chemical units to perform wartime and homeland defense missions. DOD generally agreed with two recommendations and disagreed with those to address unit personnel and equipment shortages. GAO continues to believe its recommendations have merit.

www.gao.gov/cgi-bin/getrpt?GAO-07-143.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Davi D'Agostino at (202) 512-5431 or dagostinod@gao.gov.

CHEMICAL AND BIOLOGICAL DEFENSE

Management Actions Are Needed to Close the Gap between Army Chemical Unit Preparedness and Stated National Priorities

What GAO Found

Most Army units tasked with providing chemical and biological defense support are not adequately staffed, equipped, or trained to perform their missions. Although the 2006 Quadrennial Defense Review and current operational plans highlight the need to mitigate WMD attacks at home and abroad and DOD has doubled its investment in chemical and biological defenses since 2001 and plans to increase funding for this program during fiscal years 2006 through 2011, there is a misalignment between the high priority DOD states that it places on chemical and biological defense and the current low level of chemical unit readiness. Most of the Army's chemical and biological units, particularly in the National Guard and Reserve, are reporting the lowest readiness ratings—meaning that they are not considered sufficiently qualified for deployment. This situation reflects critical personnel shortages, particularly in their key occupational specialty—chemical operations—and shortages of mission-critical equipment, such as decontamination equipment. Lacking key personnel and equipment, some units have not been able to train for their wartime chemical and biological defense missions. Army chemical unit readiness problems have historically been attributed to personnel and equipment shortages, and recently these have been greatly exacerbated by personnel and equipment transfers to other types of units in support of current operations. Moreover, the Army does not have a specific plan in place to resolve long-standing shortages in personnel and equipment. Until the Army develops a specific plan to address personnel and decontamination equipment shortfalls and the transfer of chemical operations specialists to deploying units, adequate chemical defense forces may not be available in the event of a WMD attack at home or abroad.

Even though 12 of the 15 National Planning Scenarios issued by the Homeland Security Council involve chemical, biological, radiological, nuclear, or high-yield explosive (CBRNE) response, the ability of Army chemical and biological units, especially National Guard and Reserve units, to concurrently perform both their original warfighting chemical and biological defense mission and their homeland defense mission is doubtful. While the Joint Task Force-Civil Support deployment data list contains a limited number of chemical and biological units that must be ready to perform homeland defense missions, the forces on this list, according to United States Northern Command planning documents, are intended only to be an initial response force. The Army is prohibiting the transfer of personnel and equipment from units on this deployment list to deploying units overseas. However, it is unclear whether this is an adequate number of units to support the homeland defense mission because no criteria have been established to determine how many and which chemical units are needed. In the event of multiple near-simultaneous WMD attacks in the United States, additional chemical units would be required—but most chemical and biological units are already at a low state of readiness and DOD has not updated doctrine for addressing the new homeland defense missions.

Contents

Letter		1
	Results in Brief	5
	Background	7
	Most Army Chemical Companies Are Inadequately Staffed, Equipped, and Trained to Perform Their Missions	16
	Army Chemical Units' Ability to Perform Both Homeland Defense and Warfighting Chemical and Biological Defense Missions Is Doubtful	31
	Conclusions	35
	Recommendations for Executive Action	36
	Agency Comments and Our Evaluation	37
Appendix I	Scope and Methodology	41
Appendix II	Comments from the Department of Defense	44
Appendix III	GAO Contact and Staff Acknowledgments	48
Figures		
	Figure 1: Composition of Army Chemical Companies, by Component	8
	Figure 2: Biological Integrated Detection System	9
	Figure 3: M12 Heavy Decontamination System	10
	Figure 4: M17 Light Decontamination System	11
	Figure 5: FOX M93A1 Nuclear, Biological, and Chemical Reconnaissance System	12
	Figure 6: M56 Coyote Smoke Generating System	13
	Figure 7: Army Chemical Companies by Type	14
	Figure 8: Fill Rates for Selected Army Chemical Company Military Occupational Specialties, as of February 2006	20
	Figure 9: Chemical Operations Specialist Fill Rates, by Army Component, 2000 through 2006	22
	Figure 10: Falcon Fixed Site Decontamination System	25
	Figure 11: Karcher Multipurpose Decontamination System	26
	Figure 12: M17 Light Decontamination Systems Authorized and Assigned to Army Units, as of July 2006	27

Abbreviations

BIDS	Biological Integrated Detection System
DOD	Department of Defense
CBRNE	Chemical, Biological, Radiological, Nuclear, or High-Yield Explosive
CERFP	CBRNE Enhanced Response Force Packages
COTS	commercial off-the-shelf
CST	Civil Support Teams
HMMWV	high-mobility, multipurpose wheeled vehicle
NBC	nuclear, biological, chemical
WMD	weapons of mass destruction

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United States Government Accountability Office
Washington, DC 20548

January 19, 2007

The Honorable Christopher Shays
Ranking Minority Member
Subcommittee on National Security and International Relations
Committee on Oversight and Government Reform
House of Representatives

Dear Mr. Shays:

The Department of Defense (DOD) believes that the United States is likely to be faced with adversaries abroad who possess a wide range of asymmetric capabilities, including chemical and biological weapons, which challenge our military forces' ability to fight and win conflicts overseas. Additionally, the United States continues to believe that nuclear, biological, and chemical weapons of mass destruction (WMD) in the possession of hostile states and terrorists represent one of the greatest security challenges facing our country.¹ The 2006 Quadrennial Defense Review report states that DOD must be prepared to respond to and mitigate the effects of WMD attacks at home or overseas. All of the military services—the Army, Air Force, Navy, and Marine Corps—plan and execute chemical, biological, radiological, and nuclear defense programs, ranging from basic research to procurement and sustainment.

¹ For the purposes of this report, the term weapons of mass destruction means any weapon or device that is intended, or has the capability, to cause death or serious bodily injury to a significant number of people through the release, dissemination, or impact of (1) toxic or poisonous chemicals or their precursors, (2) a disease organism, or (3) radiation or radioactivity. 50 U.S.C. § 2302 (1).

The Army, however, is the only service² that includes dedicated chemical and biological units³ as a standard part of its force structure. The Army's chemical units provide the following capabilities: chemical and biological detection, decontamination, reconnaissance, and smoke screening.⁴ Additionally, certain Reserve component chemical units have been given the mission of providing hazardous materials reconnaissance and mass casualty decontamination in the event of a WMD attack on the homeland. These designated units are rotated annually on the Joint Task Force-Civil Support's⁵ force deployment list. These units' personnel and equipment remain with the unit; they are not reassigned to deploying units in support of ongoing operations overseas.

The National Guard is creating a new regionally based force that would support the WMD-Civil Support Teams (CST) in the event of a WMD attack on the homeland. WMD-CSTs are federally funded, state-controlled National Guard units whose mission is to assist civil authorities in the United States in responding to incidents involving WMD, including chemical, biological, radiological, nuclear, or high-yield explosive (CBRNE) weapons and agents. Specifically, the WMD-CSTs are to identify CBRNE agents and substances, assess current or projected consequences, and advise civil authorities on response measures. They do not perform any decontamination functions. Unlike traditional National Guard units,

² One exception is that the Marine Corps has a Chemical Biological Incident Response Force that, when directed, is to deploy and/or respond to a credible threat of a chemical, biological, radiological, nuclear, or high-yield explosive (CBRNE) incident in order to assist local, state, or federal agencies and unified combatant commanders in the conduct of consequence management operations. This force accomplishes its mission by providing capabilities for agent detection and identification; casualty search, rescue, and personnel decontamination; and emergency medical care and stabilization of contaminated personnel. However, chemical and biological defense in the Marine Corps is generally considered an additional duty performed by regular marines rather than by specialized chemical or biological units. We recently reported that this force had some operational challenges. See GAO, *Chemical and Biological Defense: Marine Corps Response Force Has Developed Many Capabilities, but Critical Operational Challenges Remain*, [GAO-05-2C](#) (Washington, D.C.: Nov. 3, 2004).

³ Hereinafter referred to as "chemical units."

⁴ Smoke screening is the act of providing large-area obscurant screening intended to enhance a commander's ability to conceal and therefore deploy and maneuver forces.

⁵ The Joint Task Force-Civil Support, part of U.S. Northern Command, will provide dedicated domestic CBRNE command and control in support of the responsible lead federal agency for domestic CBRNE consequence management operations.

each team is composed of 22 members who are on full-time duty.⁶ The new National Guard regional forces, called CBRNE Enhanced Response Force Packages (CERFP), are composed of Army and Air National Guard units who will support local, state, and federal agencies in managing the consequences of a CBRNE event by providing capabilities to conduct personnel decontamination, emergency medical services, and casualty search and rescue.⁷ Existing Army National Guard chemical companies will perform the personnel decontamination function.

All of the services' chemical and biological defense training, except for medical courses, is located at the U.S. Army Chemical School at Fort Leonard Wood, Missouri. The U.S. Army Chemical School Doctrine Division is responsible for joint, multiservice, and Army doctrine development for operations related to nuclear/biological/chemical contamination avoidance, protection, decontamination, and smoke screening.

The 1997, 2001, and 2006 Quadrennial Defense Reviews, as well as other DOD publications, have emphasized the need to address the increasing threat posed by WMD, including chemical and biological weapons. Toward this end, DOD has doubled its investment in chemical and biological defenses since 2001, and it is increasing funding for its Chemical and Biological Defense Program by \$2.1 billion (approximately 20 percent) for the next 5 years beginning in fiscal year 2006. The department plans to use these funds primarily for improving its research, development, and testing infrastructure as well as expanding efforts to improve defenses against emerging chemical and biological threats. However, experiences during preparations for Operation Iraqi Freedom exposed continuing weaknesses in the preparedness of U.S. forces to defend against a chemical or biological attack that were identified during the Persian Gulf War. We and DOD's Inspector General have published multiple reports addressing continued problems in aspects of DOD's chemical and biological defense preparedness. While potential opponents have been assessed to be

⁶ We recently issued a report on these teams' mission and management: GAO, *Homeland Defense: National Guard Bureau Needs to Clarify Civil Support Teams' Mission and Address Management Challenges*, [GAO-06-498](#) (Washington, D.C.: May 31, 2006).

⁷ The National Guard has already placed 12 certified force packages on the ground. The National Defense Authorization Act for Fiscal Year 2006 increased the Army National Guard end strength and, in the conference report, the conferees recommended that this end strength include 5 additional certified force packages. H.R. Conf. Rep. No. 109-360, at 687 (2005).

technologically capable of sustaining certain levels of chemical and biological warfare, there is still disagreement on the specific extent to which this capability has actually been developed.

At your request, we evaluated the preparedness of Army chemical units. Specifically, we determined the extent to which (1) units tasked with providing chemical and biological defense support to combat units and commands are adequately staffed, equipped, and trained and (2) units also tasked with the homeland defense mission—especially Army National Guard and Army Reserve chemical units—are adequately prepared for this mission.

To determine the extent to which units tasked with providing chemical and biological defense support to combat units and commands are adequately staffed, equipped, and trained, we met with officials from the office of the U.S. Army Deputy Chief of Staff for Operations and Plans, U.S. Army Forces Command, U.S. Army Reserve Command, the National Guard Bureau, and officials from a nonprobability sample of Army chemical companies. We selected companies from each Army component and from each type of chemical company. Results from nonprobability samples cannot be used to make inferences about a population because some elements of the population have no chance of being selected. We obtained readiness data from the Army Readiness Management System and reviewed readiness reports for all 78 chemical companies from fiscal years 2000 through 2006. To assess whether Army chemical companies are adequately staffed to perform their missions, we obtained personnel data from the U.S. Army Deputy Chief of Staff for Personnel and compared personnel authorized with personnel on-hand for all of the chemical companies and Army-wide. We determined that the readiness and personnel data were sufficiently reliable for our purposes.

To assess the extent to which active, National Guard, and Reserve Army chemical companies have the equipment needed to perform their missions, we obtained chemical equipment requirements from the U.S. Army EQUIPFOR Database, and compared those requirements to what the data indicated that the chemical units had on-hand. We also obtained and analyzed data on other types of mission-essential items and compared authorizations to what the data indicated were on hand in chemical units and Army-wide. The data from the U.S. Army EQUIPFOR Database were of undetermined reliability because we received them close to our reporting deadline and, therefore, were not able to conduct a full reliability assessment. However, we corroborated the system data we used with officials from the Office of the Army Deputy Chief of Staff for Programs,

U.S. Army Reserve Command, the National Guard Bureau, and selected Army chemical units.

To assess the extent to which units also tasked with the homeland defense mission—especially Army National Guard and Reserve chemical units—are adequately prepared for this mission, we used the data obtained in the first objective, contacted officials from the U.S. Northern Command, and obtained planning documents that describe the use of Army chemical units to perform chemical and biological homeland defense missions. We also discussed this mission with some National Guard and Reserve chemical units who had been given this mission. We reviewed and analyzed current and planned chemical and biological defense doctrine and discussed the applicability of this doctrine to the newly emerging homeland defense missions with officials from the U.S. Army Chemical School and U.S. Army Reserve Command. We conducted our review from July 2005 through June 2006 in accordance with generally accepted government auditing standards. Our assessments of data reliability, other than that for the U.S. Army EQUIPFOR Database, showed that the data we used were sufficiently reliable for this report. A more detailed discussion of our scope and methodology is contained in appendix I.

This report is an unclassified version of a classified report dated September 29, 2006.⁸ That report provides additional details on the readiness of the Army's chemical units.

Results in Brief

Most Army units tasked with providing chemical and biological defense support are not adequately staffed, equipped, or trained to perform their missions. Although the 2006 Quadrennial Defense Review and current operational plans highlight the need to mitigate WMD attacks at home and abroad and DOD has doubled its investment in chemical and biological defenses since 2001, there is a misalignment between the high priority DOD places on chemical and biological defense and the current low level of preparedness characterizing Army chemical companies, particularly in the National Guard and Reserve. Problems occurring primarily as the result of personnel shortages related to current operations are now causing most of the Army chemical units expected to perform these

⁸ GAO, *Chemical and Biological Defense: Management Actions Are Needed to Close the Gap between Chemical Unit Preparedness and Stated National Priorities*, GAO-06-867C (Washington, D.C.: Sept. 29, 2006).

missions to report low readiness ratings—in other words, they are not considered sufficiently qualified for deployment. The low readiness ratings reflect critical personnel shortages, particularly in the key occupational specialty—chemical operations. Army chemical unit readiness is also being compromised by shortages of mission-critical equipment, such as decontamination equipment. For example, Army chemical units, particularly in the National Guard and Reserve, currently lack a substantial portion of their authorized light decontamination equipment. Because they lack key personnel and equipment, some units have not been able to train for their wartime chemical and biological defense missions. Army National Guard and Reserve chemical unit readiness problems have historically been attributed to personnel and equipment shortages, and recently these have been greatly exacerbated by personnel and equipment transfers to other types of units in support of current operations. Moreover, the Army does not have a specific plan in place to resolve long-standing shortages in chemical defense personnel and equipment. Until the Army develops a specific plan to address personnel and decontamination equipment shortfalls and the transfer of chemical operations specialists to deploying units, adequate chemical defense forces may not be available in the event of a WMD attack at home or abroad.

Even though 12 of the 15 National Planning Scenarios issued by the Homeland Security Council involve CBRNE response, the ability of Army chemical units, especially National Guard and Reserve units, to be concurrently prepared to perform either their original warfighting chemical and biological defense mission or their homeland defense mission is doubtful. According to Army Reserve Command officials, no criteria have thus far been established for determining how many and which units are needed to respond to multiple, near-simultaneous CBRNE attacks on the United States. While the Joint Task Force-Civil Support deployment data list contains a limited number of chemical units that must be ready to perform homeland defense missions, this list, according to U.S. Northern Command planning documents, is intended to provide only an initial response force. The Army is prohibiting the transfer of personnel and equipment from units on this deployment list to deploying units overseas. However, it is unclear whether this is an adequate number of units to support the homeland defense mission, because no criteria have been established to determine how many and which chemical units are needed. Since most chemical units are already at a low state of readiness, their ability to respond in the event of a mass casualty WMD attack on the United States is doubtful. Given DOD's emphasis on planning for WMD events at home and abroad, we believe that leaving chemical units in such a low state of readiness and dual tasking them will result in an increasing

operational risk to both the homeland defense and warfighting missions. Further, although some Army National Guard and Reserve chemical units are currently being trained and equipped to meet both new homeland defense and ongoing wartime chemical and biological defense missions, the Army has not updated doctrine for addressing these new missions, and Army Chemical School officials told us that this doctrine would not be completed until at least June 2007. However, it is unclear whether officials will meet this date, given the low priority updating the doctrine has received in the past.

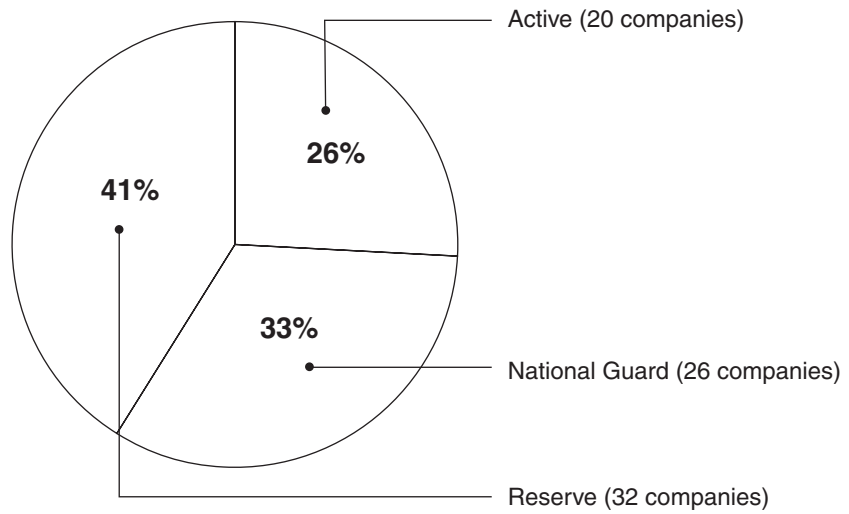
We are recommending several actions to align DOD's stated emphasis on responding to and mitigating effects from WMD incidents at home and abroad with the actual readiness of the Army's chemical units. However, in written comments on a draft of this report, DOD generally agreed with two recommendations but disagreed with our recommendations to address long-standing chemical unit personnel and equipment shortages. Specifically, DOD disagreed with our recommendation to develop a specific plan to address chemical unit personnel shortfalls. In general, the department stated that we did not fully consider the Army's current accession and recruitment plan as a solution to chemical unit personnel shortfalls and questioned our method for measuring unit readiness for homeland defense missions. As discussed in this report, we did consider the recruitment plan and found it has had a limited effect on personnel shortfalls, and we used the only available DOD metric because there is no other metric available to measure readiness of chemical units. The department also disagreed with our recommendation to develop a plan to address decontamination equipment shortages until new joint systems are fielded because the department believes these issues are addressed in its Fiscal Years 2008–2013 Program Objective Memorandum. In our view, that approach does not address many of the issues we highlight in our recommendation, such as training and logistics support. We continue to believe our recommendations have merit. DOD's comments and our evaluation of them are discussed in the agency comments section of this report.

Background

The Army Chemical Corps is comprised of brigades, battalions, companies, and detachments that perform a variety of chemical and biological defense missions. However, the chemical company is the primary operative unit that performs the majority of these missions. Of the Army's 78 chemical companies, about three-fourths (74 percent) are located in the Army National Guard or Army Reserve. Two of these companies are actually multicomponent—composed of both active and Reserve platoons—but are counted as Reserve companies because their

headquarters platoons are part of the Army Reserve. Figure 1 illustrates the division of the Army's chemical companies between the active, Reserve, and National Guard components.

Figure 1: Composition of Army Chemical Companies, by Component



Source: GAO analysis of U.S. Army data.

The Army's chemical companies provide the following capabilities:

1. *Biological detection*—Biological detection units provide monitoring, sampling, detection, and identification of biological agents through the use of a detector suite in a Lightweight Multipurpose Shelter mounted on a dedicated, high-mobility, multipurpose wheeled vehicle (HMMWV). The detector suite is called the Biological Integrated Detection System (BIDS), and hence these units are commonly referred to as BIDS units (see fig. 2).

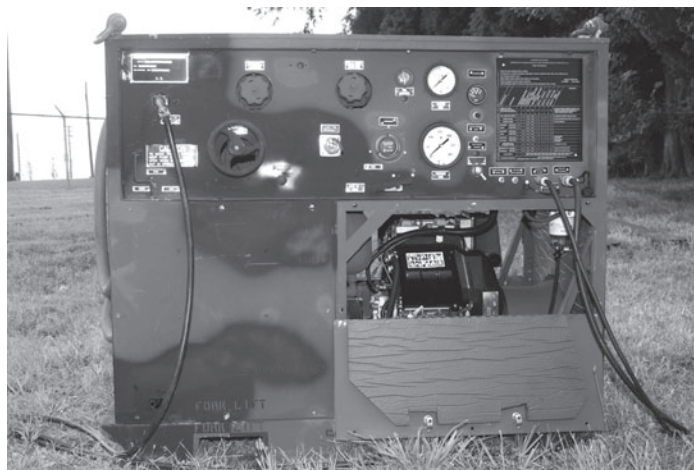
Figure 2: Biological Integrated Detection System



Source: Joint Program Executive Office for Chemical and Biological Defense.

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2. *Decontamination*—Decontamination units perform decontamination operations in direct support of either fighting forces or operations at fixed sites, such as strategic ports of embarkation and debarkation. The decontamination mission is performed using primarily either heavy or light decontamination equipment. The M12 Heavy Decontamination System consists of a pump, tank, and water heater mounted on a 5-ton truck, and it performs both equipment and terrain decontamination (see fig. 3).

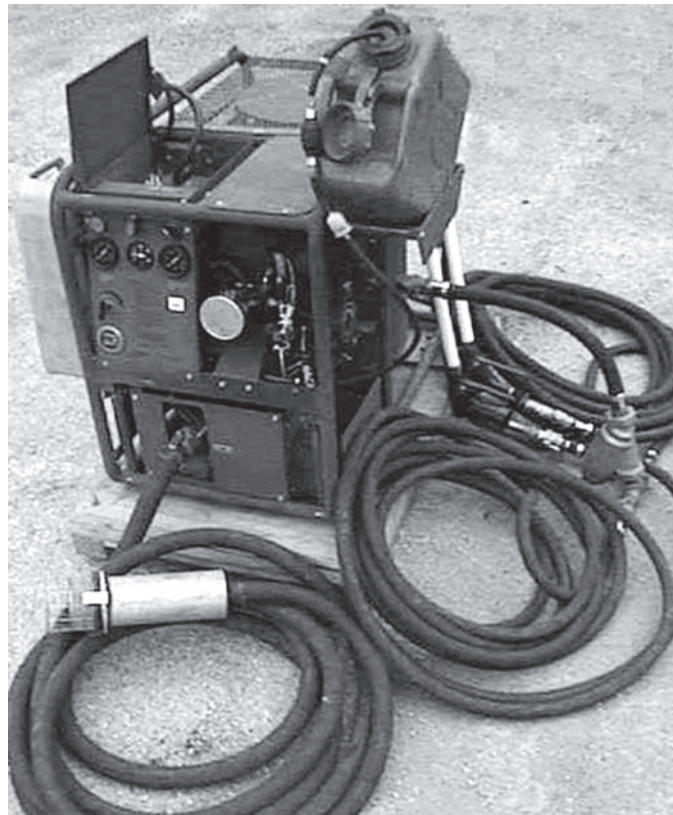
Figure 3: M12 Heavy Decontamination System



Source: Joint Program Executive Office for Chemical and Biological Defense.

The M17 Light Decontamination System is a portable, lightweight, compact, engine-driven pump and water heating system used to perform mostly personnel and equipment decontamination (see fig. 4).

Figure 4: M17 Light Decontamination System



Source: Joint Program Executive Office for Chemical and Biological Defense.

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3. *Reconnaissance*—Chemical reconnaissance companies perform reconnaissance—that is, they conduct surveillance, monitoring, and sampling in hostile territory—often using the lightly armored, wheeled FOX M93A1 Nuclear, Biological, and Chemical Reconnaissance System (see fig. 5) or a similar system mounted on other vehicles such as a HMMWV.

Figure 5: FOX M93A1 Nuclear, Biological, and Chemical Reconnaissance System



Source: Joint Program Executive Office for Chemical and Biological Defense.

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4. *Smoke screening*—Smoke companies use smoke-generating equipment (see fig. 6) to provide large-area obscurant screening intended to enhance the commander’s ability to conceal and thus deploy and maneuver forces.

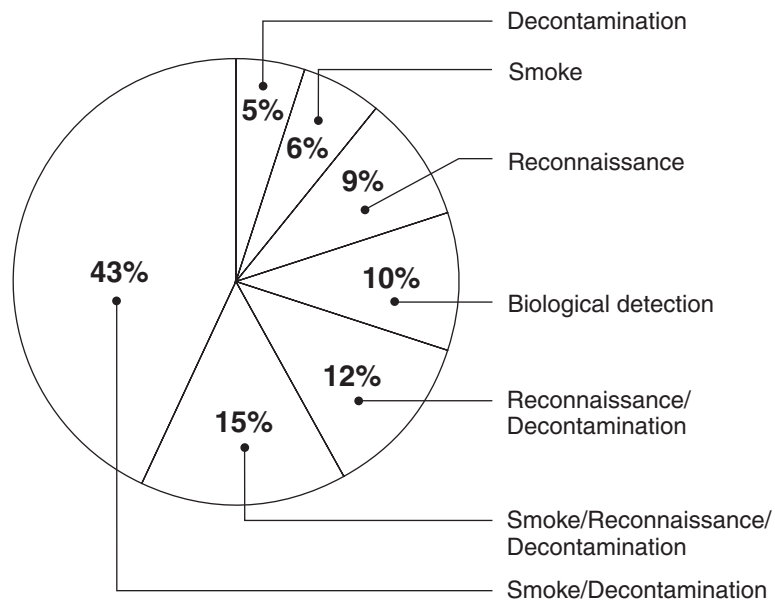
Figure 6: M56 Coyote Smoke Generating System



Source: Joint Program Executive Office for Chemical and Biological Defense.

Most of the Army's chemical companies are multifunctional—that is, the company may perform a combination of capabilities, such as reconnaissance and decontamination; smoke and decontamination; and smoke, decontamination, and reconnaissance. Most of the Army's chemical companies are smoke/decontamination companies, as shown in figure 7.

Figure 7: Army Chemical Companies by Type



Source: GAO analysis of U.S. Army data.

In addition to their wartime chemical and biological defense missions, certain Army National Guard and Army Reserve chemical units have also been given homeland defense missions. The Defense Against Weapons of Mass Destruction Act of 1996 mandated the enhancement of domestic preparedness and response capability for terrorist attacks involving nuclear, radiological, biological, and chemical weapons.⁹ In response to this mandate, the Deputy Secretary of Defense requested an assessment for integrating the National Guard and the Army Reserve into ongoing WMD domestic preparedness programs. This assessment, led by the Under Secretary of the Army, was completed in January 1998. The assessment recommended the training of Reserve component chemical companies for domestic nuclear, biological, and chemical (NBC) reconnaissance and decontamination and specified additional equipment lists to enable the needed capabilities. It also required the creation of Military Support Detachments, now known as WMD-CSTs. The Deputy Secretary of Defense approved this plan in January 1998 and directed its implementation.

According to an Army official, the fiscal year 1999 Army budget included funds for addressing the increased support requirements associated with terrorist use of WMD in the United States. Specifically, the support requirement included the establishment of 10 WMD-CSTs (later increased to 55 authorized) to perform identification of CBRNE agents and substances, assess current or projected consequences, and advise civil authorities on response measures; the establishment of WMD patient decontamination teams within existing standard National Guard and Reserve chemical companies; and the training and equipping of standard National Guard and Reserve units to conduct WMD reconnaissance. A March 1999 U.S. Army Forces Command message required the training and equipping of standard National Guard and Reserve chemical units to perform NBC reconnaissance and mass casualty decontamination. Additionally, in October 2001, the Army Deputy Chief of Staff for Operations and Plans directed that U.S. Army Forces Command, with support from Army Training and Doctrine Command and the Director of Military Support, refine the domestic reconnaissance and casualty decontamination mission for standard Army chemical units and develop operational requirements documents and training support packages. However, by 2005, the Army was still in the process of designing and implementing its response to these tasks, and the needed doctrine and

⁹ Public Law 104-201, § 1411 (1996).

training support packages had not been completed. This and other problems raised questions regarding the readiness of the Army's chemical units to perform their assigned missions and led to a 2005 congressional request that we perform this review.

In response to an initiative from the Chief of the National Guard Bureau, the National Guard is in the process of creating additional regional forces to support WMD-CSTs in the event of a WMD attack. According to the Chief of the National Guard Bureau, the mission of the 17 currently authorized CERFPs is to support local, state, and federal agencies managing the consequences of a CBRNE event by providing capabilities to conduct personnel decontamination, emergency medical services, and casualty search and rescue. Army National Guard chemical companies will perform the decontamination function of the CERFPs.

Both Army National Guard and Reserve chemical companies perform their homeland defense missions in support of civil authorities under the direction of the U.S. Northern Command. One of the U.S. Northern Command's missions is, when requested by civil authorities and directed by the President or the Secretary of Defense, to provide support to civil authorities for response and recovery from incidents such as CBRNE events.

Most Army Chemical Companies Are Inadequately Staffed, Equipped, and Trained to Perform Their Missions

The vast majority of the Army's chemical companies, particularly in the National Guard and Reserve, are currently reporting readiness levels so low that their ability to perform their mission is in doubt. Our analysis of Army active duty, National Guard, and Reserve chemical unit readiness and personnel data determined that most of these units' readiness is currently being affected by severe personnel shortages, especially in key chemical occupational specialties. They are also experiencing key equipment shortages, and both these factors are adversely affecting chemical unit training. Under these conditions it is questionable whether most of these units would be able to respond effectively to significant wartime or terrorist CBRNE events, and the Army appears to lack a specific plan for remedying this condition.

Army Chemical Company Readiness Is Low

As of March 2006, most of the Army's chemical companies, particularly in the National Guard and Reserve, were reporting the two lowest states of readiness measured by the Army's Unit Status Reporting System.¹⁰ In fact, the overall readiness of the Army's chemical companies began to decline precipitously from already low levels in early 2004. According to Army officials, this decline in readiness was primarily attributable to the transfer of resources from chemical units to other types of units deploying to support Operations Iraqi Freedom and Enduring Freedom. Army chemical companies reporting the lowest level of readiness doubled from March 2000 to March 2006. Specific details on the readiness ratings and readiness trends of the Army's chemical companies are included in the classified version of this report.¹¹

Personnel Shortages Are Driving Chemical Companies' Low Readiness Rates

Severe personnel shortages created primarily by the transfer of chemical unit personnel to other types of units deploying in support of Operations Iraqi Freedom and Enduring Freedom are the primary reason why Army chemical companies, particularly in the National Guard and Reserve, are reporting low readiness levels. Long-standing shortages in key occupational specialties are now becoming worse and further exacerbating chemical company personnel shortages.

Chemical companies are not staffed to authorized levels

The impact of these shortages on chemical companies is demonstrated by comparing the staffing levels authorized with the staffing levels actually filled. Army units are designed to perform certain defined missions and are authorized a specific number of personnel in order to be able to conduct their missions. Active Army chemical units are relatively well-staffed in relation to their authorized levels. However, about 74 percent of the

¹⁰ The *Unit Status Report* is the Army's primary mechanism for measuring and reporting a unit's readiness, i.e., the unit's ability to perform its wartime mission. The Unit Status Report provides a snapshot of the status of the unit's overall readiness (C rating). Unit Status reports are submitted monthly by active Army units, and quarterly by Army National Guard and Reserve units. The Army measures four areas of readiness: personnel, equipment-on-hand, equipment readiness, and training. There are five levels for rating readiness. The highest level, C1, indicates that the unit is prepared to undertake its full wartime mission. At C2 the unit is able to undertake most of its wartime mission and at C3 the unit is able to undertake many, but not all, portions of its wartime mission. C4 is the lowest level and, at this level, the unit is not prepared and requires additional resources or training to conduct its wartime mission. In addition, the C5 level indicates that the unit is undergoing an Army-directed resource action and is not prepared, at the time of the report, to perform its wartime mission.

¹¹ GAO-06-867C.

Army's chemical companies are located in the National Guard and Reserve, and these companies are presently staffed far below their authorized levels.

Current operational plans for Operations Iraqi Freedom and Enduring Freedom have little or no requirement for chemical companies. As a result, soldiers from chemical companies are being reassigned to address personnel shortages in deploying units. For example, in one state we contacted, three Army National Guard chemical companies are currently staffed at 22–45 percent of their authorized levels due to the transfer of 141 soldiers to other deploying Army National Guard units, such as military police units, from that state. These units were already suffering low fill rates before the transfer of soldiers to deploying units. The three companies together were authorized 401 soldiers, but only 275 soldiers had been assigned—a fill rate of 69 percent. Currently, the only soldiers in these three chemical companies who are not deployed are those ineligible for deployment because they either (1) have not received the training required for deployment or (2) do not meet deployment standards due to medical reasons.

Active Army chemical companies have significantly better personnel fill rates than Army National Guard and Reserve chemical companies. Overall, active Army chemical companies do not need to be supplemented with soldiers transferred from other units in order to deploy. However, our data show that Army National Guard and Reserve chemical companies will require extensive personnel increases in order to deploy. According to Army National Guard and Reserve officials, the overall fill rates for these companies will not improve until Army personnel requirements for Operation Iraqi Freedom are significantly reduced. As long as the Army National Guard and Reserve are tasked to provide a significant portion of the units deployed to Iraq, chemical companies as well as other low demand units will be used as a source of soldiers to fill deploying units. In addition, these officials stated that concrete plans to bring their chemical company fill rates back to pre-Operation Iraqi Freedom levels are not currently in place, or being developed, due to the Army's focus on supporting current operations.

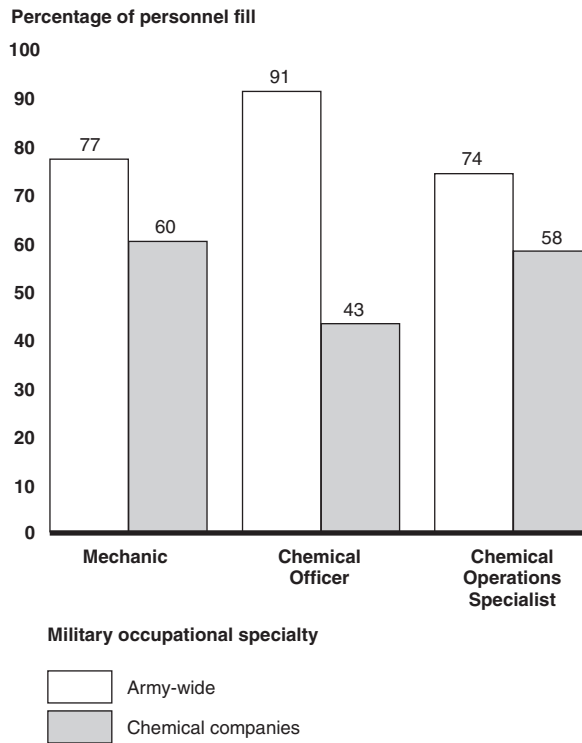
Army chemical companies have shortages in their key specialties

Chemical company personnel fill problems are being exacerbated by Army-wide shortages in occupational specialties that are key to chemical units. The Army classifies the jobs its soldiers perform as military occupational specialties. Army units are comprised of many occupational specialties, such as mechanics, supply personnel, and truck drivers. The primary specialty in chemical companies is the chemical operations

specialist. We determined, based on interviews with Army chemical officials, that three occupational specialty groups are critical to chemical companies in the performance of their missions: chemical operations specialists, chemical officers, and mechanics (that is, chemical equipment repairer, wheeled vehicle mechanic, tracked vehicle mechanic, and fuel and electrical repairer). These specialties are also found in other types of Army units. For example, most combat units have an assigned chemical officer or noncommissioned officer to advise their commander on chemical and biological defense matters.

Chemical companies are staffed significantly below their authorized levels for chemical operations specialists, chemical officers, and mechanics, and these shortages exist Army-wide. However, as shown in figure 8, these shortages are greater for the chemical companies than for the Army as a whole.

Figure 8: Fill Rates for Selected Army Chemical Company Military Occupational Specialties, as of February 2006



Source: GAO analysis of the Total Army Authorizations Document System and the Total Army Personnel Database.

Army officials told us that the primary reason for the greater shortage in chemical companies is that very few chemical companies are deployed; therefore, as the need for deployable personnel has arisen, many of these soldiers have been transferred to deploying units.

Chemical operations specialist shortages have worsened

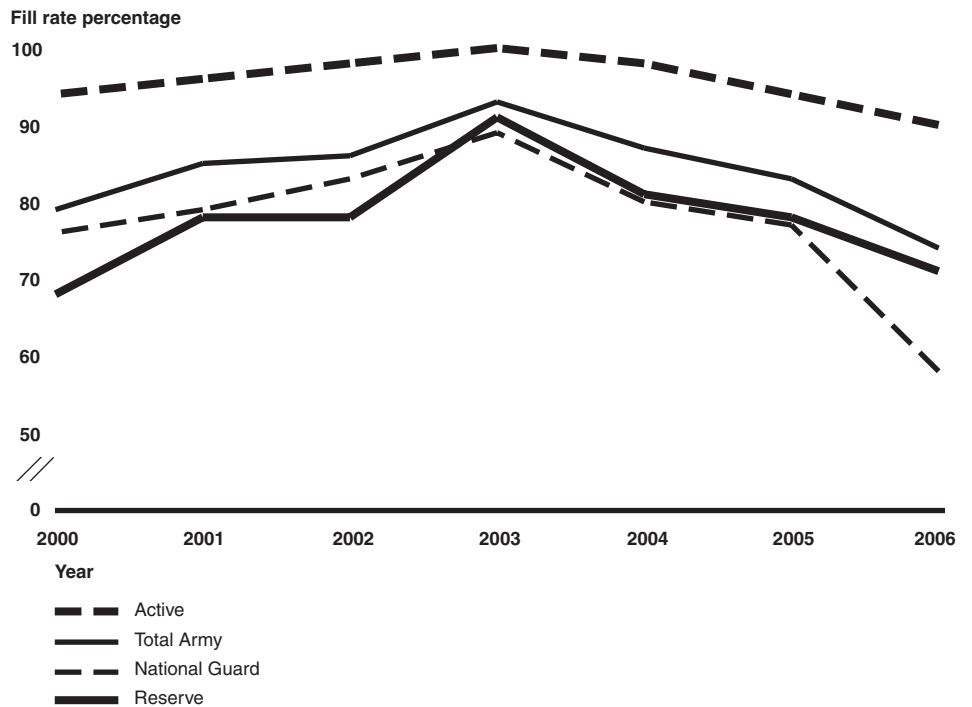
The Army has historically had difficulty recruiting and retaining the primary chemical company occupational specialty, the chemical operations specialist, but shortages of this occupational specialty are currently worsening despite Army efforts to reverse this trend. Army officials told us that staff for the chemical occupational specialty has always been difficult to recruit and retain because of the high aptitude scores required. In addition, they said that chemical unit training with real and simulated agents is limited, chemical unit personnel are often assigned nonchemical additional duties, and chemical unit equipment often is also used for more mundane tasks. For example, decontamination equipment such as the M17 and M12 can also be used for washing vehicles and

operating showers for troops in the field. Officials also told us that there are limited promotion opportunities in the chemical operations career field, making it difficult to retain personnel in this specialty.

The military services have offered enlistment or reenlistment bonuses to critical specialties in order to attract and retain personnel in these specialties. Although bonuses offered to chemical operations specialists led to some improvement in fill rates in the past, this has perpetually been one of the Army's underfilled military occupational specialties.¹² Fill rates for chemical operations specialists were on the increase between 2000 and 2003. According to Army officials, this increase was due to (1) enlistment and reenlistment bonuses for personnel who selected the chemical operations specialty as their primary military occupational specialty and (2) the efforts of Army recruiters. However, as shown in figure 9, the fill rates for this specialty began a steady decline in 2004, especially in the Army National Guard and Reserve.

¹² See GAO, *Military Personnel: DOD Needs Action Plan to Address Enlisted Personnel and Retention Challenges*, [GAO-06-134](#) (Washington, D.C.: Nov. 17, 2005).

Figure 9: Chemical Operations Specialist Fill Rates, by Army Component, 2000 through 2006



Source: GAO analysis of the Total Army Authorizations Document System and the Total Army Personnel Database.

According to Army National Guard and Reserve officials, the subsequent decline in chemical operations specialist fill rates is directly attributable to Operation Iraqi Freedom. First, as operations continued in Iraq, certain critical, nonchemical specialties were required due to the declining security situation. As a result, chemical operations specialists were often retrained, reclassified, and assigned to other units, such as military police units. Second, the fill rate for chemical operations specialists declined because, according to Army officials, this specialty is considered by recruits to be less attractive than other military occupational specialties. Recruits have historically been drawn to combat military occupational specialties, such as infantrymen, and to specialties, such as military police and mechanics, which more directly correspond to civilian jobs. Furthermore, many recruits want the opportunity to serve in Iraq, and they have a much better chance of doing so if they enlist as infantrymen or military police.

In addition, the shortage of chemical operations specialists has worsened in part because once transferred, retrained, or reclassified, these specialists often opt not to return to chemical units or specialties. For example, as discussed earlier, three Army National Guard chemical companies in one state lost a significant number of personnel to deploying units from that state. Of the 275 soldiers assigned to these three companies, 141 soldiers (51 percent) of those assigned were transferred to other deploying units. Of the 141 transferred, 129 went to military police companies, and most of these soldiers were retrained and reclassified as military police. The remaining 12 soldiers were transferred to a support battalion that deployed to Kuwait. National Guard officials from this state are not expecting many of these soldiers to return to their former chemical companies when their military police companies return because, according to these officials, these soldiers will have developed new camaraderies within their current units and as a result will not transfer back to their former chemical companies. Consequently, unless DOD requires soldiers in chemical occupational specialties to return to units requiring those specialties, National Guard officials will need to recruit additional soldiers into chemical operations specialties in order to address personnel shortfalls.

In one case, an entire Army National Guard chemical company from a different state was retrained and reclassified as military police and deployed to Germany as a military police company in order to assume the mission of an active duty military police company deploying to support the global war on terrorism. According to National Guard officials from that state, when this unit returns, it will remain a military police company. Other chemical companies from this state have lost personnel due to their transfer to other deploying units, including military police units. Army National Guard officials from this state also told us that increased recruitment of chemical operations specialists would be needed to refill these units with the required number of personnel.

Some Chemical Companies Lack Equipment Needed to Perform Their Missions

After personnel shortages, the second major reason for Army chemical companies' reporting low readiness rates is the shortage of key equipment, thus hampering their ability to perform their missions. Army chemical doctrine states that chemical units will perform both heavy and light decontamination functions. But the heavy and light decontamination equipment in use today by Army chemical companies is old and difficult or costly to maintain, previous attempts to replace it have failed, and the fielding of new replacement equipment is not scheduled to begin until at least fiscal year 2009.

The M12 Heavy Decontamination System and the M17 Light Decontamination System are the two primary types of decontamination equipment currently found in Army chemical units. The M12 is 35 years old and is scheduled to be replaced by a joint system beginning in fiscal year 2012. Army chemical company personnel told us that while recently refurbished and adequate to perform most functions, the M12 is inadequate to support all of the Army's heavy decontamination requirements. This has recently resulted in emergency purchases of alternate heavy decontamination equipment from commercial sources to meet standard operational requirements. For example, during Operation Iraqi Freedom, heavy chemical companies equipped with the M12 were tasked with performing fixed-site (such as seaport and airfield) decontamination, including spraying decontaminant on buildings or large pieces of equipment, if needed. However, according to a Corps chemical officer, the M12 cannot effectively reach higher than a one-story building or the upper surfaces of large aircraft. As a result, U.S. Central Command submitted an Operational Needs Statement requesting a different mobile decontamination system to provide the heavy decontamination support needed for terrain, large area, and fixed-site decontamination operations. Additionally, the Deputy Secretary of Defense requested the same new systems for U.S. Army forces in Korea in order to enhance the nuclear, biological, and chemical defense preparedness in this theater. These requests were approved, and DOD subsequently purchased new commercial heavy decontamination equipment—116 Falcon Fixed Site Decontamination Systems costing \$14.2 million—to meet these requirements (see fig. 10).

Figure 10: Falcon Fixed Site Decontamination System

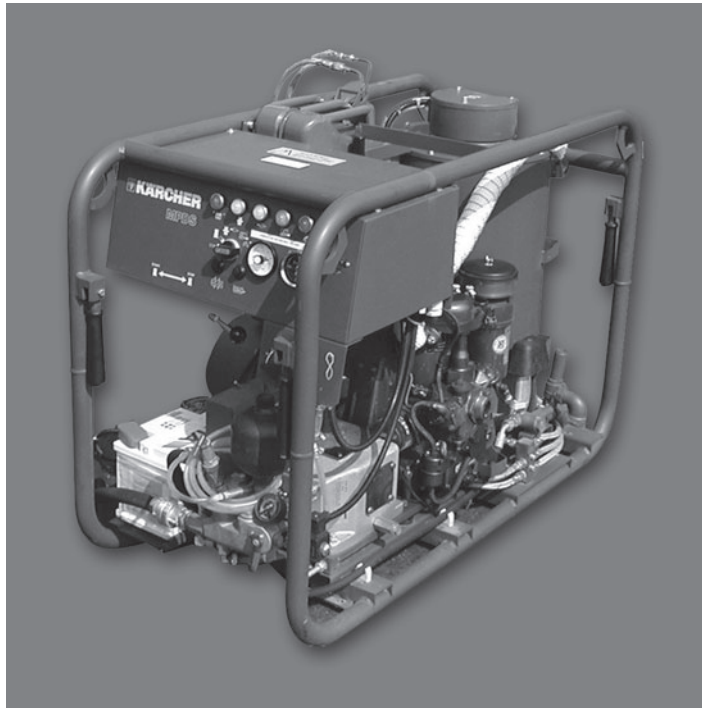


Source: Joint Program Executive Office for Chemical and Biological Defense.

Light decontamination companies are assigned the M17 Light Decontamination System to perform tactical personnel and equipment decontamination. This system is also typically fielded to Army combat units to enable them to decontaminate their own personnel and equipment (see fig. 4).

The M17 is also an old system (20 years old) that has reached the end of its service life. This system has been seriously affected by long-standing maintenance problems, and it has been difficult for the Army to obtain the needed repair parts. The Army consequently implemented a modernization program to replace the M17's engine and upgrade the system's hose/wand assembly. However, this effort was terminated because its costs were greater than those to purchase a new commercial off-the-shelf (COTS) replacement system, called the Karcher Multipurpose Decontamination System (see fig. 11).

Figure 11: Karcher Multipurpose Decontamination System



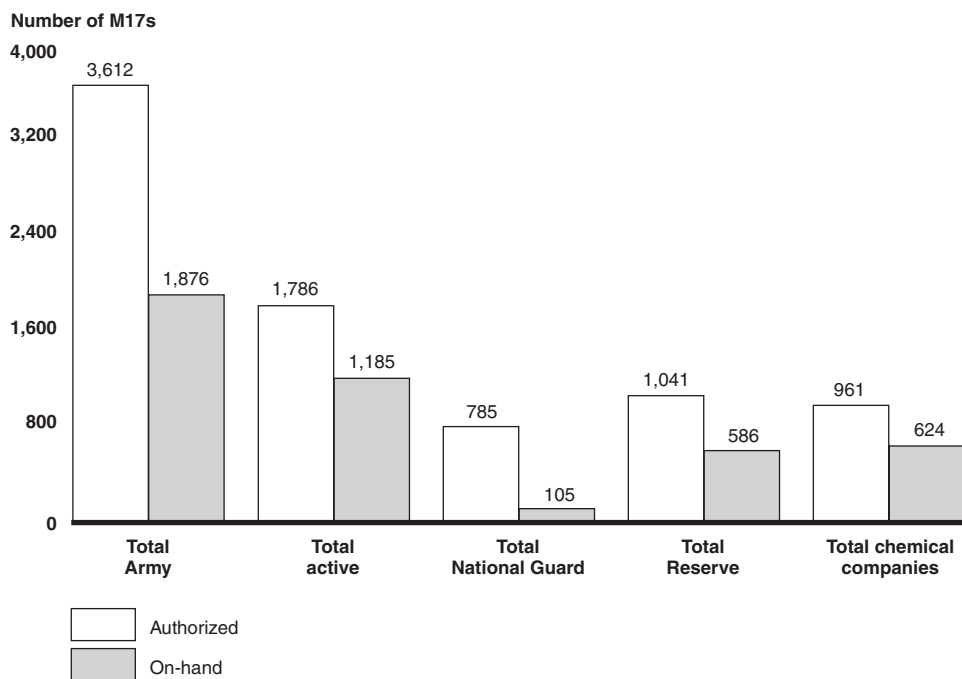
Source: Joint Program Executive Office for Chemical and Biological Defense.

With the termination of the M17 overhaul program, the decontamination system program manager determined that any future lightweight decontamination system requirements would be filled by the Karcher Multipurpose Decontamination System until the replacement system is fielded, currently scheduled to begin in fiscal year 2009. As with the M12, prior to Operation Iraqi Freedom, one Army Corps submitted an Operational Needs Statement requesting a new, improved light decontamination system, due to the mission capability problems of the M17. Subsequently, another Army corps, an Army organization in Korea, and the Marine Corps all submitted Operational Needs Statements requesting the procurement of an alternative to the M17. Consequently, DOD purchased 410 Karcher Multipurpose Decontamination Systems, costing approximately \$8.2 million, to provide the required light decontamination capability.

Furthermore, the Army—particularly the National Guard and Reserve—does not have sufficient M17s to meet the numbers currently authorized.

As shown in figure 12, the fill rate of M17s for the Army as a whole is less than 52 percent; the fill rates for the National Guard and Reserve are about 13 percent and 56 percent, respectively. For the chemical companies we reviewed, the fill rate for M17s is about 65 percent, since it is a mission-critical piece of equipment, but that is still well below required levels. Five Army National Guard chemical companies we visited had never received their authorized M17s or Karcher Multipurpose Decontamination System substitute equipment, even though these units had been activated in 2002 and this piece of equipment is a mission-critical item.

Figure 12: M17 Light Decontamination Systems Authorized and Assigned to Army Units, as of July 2006



Source: U.S. Army EQUIPFOR database.

Note: These data are of undetermined reliability.

DOD has long recognized the need to replace its aging decontamination systems. However, the Modular Decontamination System, an attempted replacement program for both the M12 and M17 begun in 1993, was unsuccessful and was officially terminated in 2003. According to an Army Chemical School memorandum, this system did not keep up with the emerging requirements of the Army's transformation, and the planned replacement system continued to be plagued with reliability deficiencies.

According to officials from the Joint Program Executive Office for Chemical and Biological Defense, the M17 and M12 will not be replaced by new, joint systems until at least fiscal years 2009 and 2012, respectively. In the meantime, the Army will resort to equipping units with commercial systems, in limited quantities, as an interim solution. However, the suitability of these commercial off-the-shelf systems for serving as interim replacements for the M12 and M17 has not been fully determined. For example, as commercial-off-the-shelf systems, they have not been ruggedized or tested for suitability in a tactical field environment. Since they have not been type-classified as standard military equipment, they are not recognized as standard issue items or included on chemical unit equipment lists. Furthermore, questions remain regarding logistical support issues, such as spare parts, maintenance, and training support. It is presently unclear how many commercial decontamination systems will be required in the interim, how these will be integrated with the new systems planned for delivery after fiscal year 2009, or how effectively the Army will be able to address its near-term decontamination mission requirements. At the time of our review, the Joint Program Executive Office for Chemical and Biological Defense had identified several options for addressing the replacement of M12s and M17s with interim commercial equipment, but no decision had yet been reached. After we completed our work on this assignment, the Joint Program Executive Office for Chemical and Biological Defense told us that they are now evaluating steps that would ensure that the commercial decontamination equipment and existing M12s and M17s will be integrated with the new, joint systems currently under development. A recommendation in this report on this subject remains, however, since these actions have not yet been completed.

Chemical companies are low on other pieces of key equipment

A further contributing factor to the chemical companies' readiness problem is the Army-wide shortage of other key equipment. The Army chemical companies we visited, especially in the National Guard and Reserve, reported shortages of other key pieces of equipment that hamper their ability to perform their mission. Military units cannot deploy without other mission-critical equipment, including chemical monitors, weapon night-vision sights, and radio sets. Since these items are in short supply across the Army, nondeploying units have transferred them to deploying units to support current operations. We previously reported on the extent of this problem in the National Guard and concluded that growing equipment shortages resulting from the need to fully equip deploying units

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- (1) make it unclear whether units will be able to maintain acceptable levels of equipment readiness for missions overseas or at home and (2) hamper the ability of nondeployed forces to train for future missions.¹³

Chemical Company Mission Training Is Suffering

Personnel and equipment shortages, as well as other priority requirements, have had an adverse impact on some chemical companies' ability to train collectively for their wartime chemical defense mission. Chemical companies are required to train for the tasks on their Mission Essential Task Lists¹⁴ as well as complete other priority training as designated by their headquarters. For example, due to the high pace of current operations, all Army soldiers are required to train on "warrior skills," the individual skills in which all soldiers need to be proficient if deployed.

Transferring soldiers from nondeploying units to deploying units to support current operations has had a negative impact on chemical companies' ability to train for their chemical mission-essential tasks. For example, two Army National Guard chemical companies that we visited have been unable to conduct unit-level training because of the requirement to transfer soldiers to other deploying National Guard units from that state. Further, another National Guard chemical company we visited told us they were unable to train for their mission-essential tasks due to the transfer of 44 soldiers to a deploying unit.

We visited four active-duty chemical companies at one Army installation that had not been able to train together as a unit for their chemical and biological defense mission because they were being used as trainers for other Army units that were deploying from that installation for Operation Iraqi Freedom. This training consisted of tasks such as convoy operations, individual readiness training, and live-fire training. One unit also operated the equipment movement site, where deploying units' equipment was located prior to being shipped to the port of debarkation. Performing these missions was a full-time responsibility, and as a result, these companies told us they had not trained for their mission-essential tasks since June

¹³ GAO, *Reserve Forces: Plans Needed to Improve Army National Guard Equipment Readiness and Better Integrate Guard into Army Force Transformation Initiatives*, [GAO-06-111](#) (Washington, D.C.: Oct. 4, 2005).

¹⁴ The Mission Essential Task List is a statement of the tasks a unit is required to accomplish in order to perform its wartime missions. For example, tasks on a biological detection company's task list include conducting mobilization and deployment operations, biological surveillance operations, and force protection/antiterrorism operations.

2005. However, as of April 2006, three of the four units had recently resumed unit-level training for their chemical and biological missions. The fourth unit still had not been able to train due to personnel shortages. This unit had only about 50 percent of its authorized personnel, and as a result the unit was unable to train for its mission-essential tasks. This unit's headquarters battalion transferred the company's soldiers to other active-duty chemical companies so that those units, which were also short of personnel due to the transfer of personnel to deploying units, were able to conduct their unit-level mission training.

Equipment shortages have similarly adversely affected chemical companies' ability to train for their mission-essential tasks. For example, three Army National Guard chemical companies we contacted from one state have a chemical decontamination mission, but only two of them had received any decontamination equipment; in this case, they received only 4 of the 54 decontamination systems authorized. As a result, these three companies, activated in September 2003, have never had the opportunity to conduct unit-level decontamination training. Additionally, five Army National Guard chemical companies we visited from another state have similar equipment shortages that impede their ability to train for their mission. All these chemical companies have a chemical decontamination mission, but none have been issued M17 light decontamination systems. To improvise, one company conducted annual training using M12 heavy decontamination systems and commercial sprayers. But since these substitute decontamination systems are markedly different from the authorized light decontamination system in performance and application, company personnel told us that the training experience was not nearly as effective as it would have been if conducted with the authorized decontamination systems.

Army Chemical Units' Ability to Perform Both Homeland Defense and Warfighting Chemical and Biological Defense Missions Is Doubtful

Army National Guard and Reserve chemical units' ability to perform not only their original warfighting chemical and biological defense mission but also their homeland defense mission is doubtful. DOD is currently tasked with planning how the U.S. military will support the response to the Homeland Security Council's National Planning Scenarios, 12 of which involve a CBRNE response. Selected National Guard and Reserve chemical units are being trained and equipped for homeland defense missions, and a limited number of active duty and Reserve units have been placed on the Joint Task Force-Civil Support's deployment list to be prepared to respond to a range of CBRNE incidents, including multiple, near-simultaneous mass casualty attacks on the United States. The Army is prohibiting the transfer of personnel and equipment from units on this deployment list to units that are deploying overseas. However, it is unclear whether this is an adequate number of units to support the homeland defense mission because no criteria have been established to determine how many and which chemical units are needed. Further, the poor readiness of these units, as described above, and inadequate doctrine to guide these units in the procedures needed for operating in the homeland defense environment, may compromise their ability to perform these missions.

Lack of Criteria and Poor Overall Readiness Will Likely Compromise Unit Preparedness for Homeland Defense Missions

DOD's strategy for homeland defense and civil support calls for its warfighting forces to be trained and equipped for domestic CBRNE consequence management to support its interagency partners in responding to a range of CBRNE incidents, including multiple, simultaneous mass casualty attacks within the United States, in addition to their warfighting chemical and biological defense missions.¹⁵ The standing consequence management execute order from the Chairman of the Joint Chiefs of Staff specifically directs the U.S. Northern Command to be prepared to execute multiple, near-simultaneous CBRNE consequence management operations for up to three incidents within the U.S. Northern Command area of responsibility. Moreover, in the spring of 2006, the Secretary of Defense directed the U.S. military to define the nature and potential requests for DOD capabilities needed to support its response to 15 National Planning Scenarios issued by the Homeland Security Council.¹⁶

¹⁵ Department of Defense, *Strategy for Homeland Defense and Civil Support* (Washington, D.C.: June 2005).

¹⁶ Department of Defense, *Strategic Planning Guidance Fiscal Years 2008-2013* (Washington, D.C.: Mar. 2006).

Twelve of these scenarios involve a CBRNE response, and 6 involve a specifically chemical or biological response. Army National Guard and Reserve chemical companies have been given the hazardous materials reconnaissance and mass casualty decontamination portions of the homeland defense mission. However, according to Army Reserve Command officials, no criteria have thus far been established for determining how many and which units are needed to perform this mission. Without such criteria, it is uncertain whether adequate chemical units will be available to respond to near-simultaneous mass casualty attacks on the United States.

In fiscal year 2000, the U.S. Army Reserve Command began training and equipping selected standard chemical units for domestic reconnaissance and mass casualty decontamination missions. As of April 2006, 12 platoons in 4 companies had been trained and equipped for hazardous materials reconnaissance. Additionally, 178 additional Army Reserve chemical soldiers have been trained for hazardous materials reconnaissance, for a total of 430 trained and certified hazardous materials technicians. Further, 75 platoons in 25 companies have been trained and equipped for mass casualty decontamination, and about 3,500 Army Reserve chemical and medical soldiers have been trained to perform mass casualty decontamination operations. The National Guard has designated certain standard chemical companies to provide the personnel decontamination function for the CBRNE Enhanced Response Force Packages (CERFP). These companies are also expected to continue to maintain the skills necessary to perform their wartime mission. Consequently, the Army must ensure that the chemical units tasked with performing homeland defense missions are ready to perform them, along with their warfighting missions. However, the *Unit Status Report* is designed only to address unit readiness for major combat operations. DOD currently does not have readiness measures designed to assess unit readiness to conduct domestic missions. We previously reported, though, that traditional readiness measures are likely adequate for some types of units to determine their preparedness to successfully conduct their domestic missions.¹⁷ As of July 2006, five National Guard decontamination companies, about 375 personnel, had been trained and equipped to provide personnel decontamination as part of their homeland defense mission. The National

¹⁷ GAO, *Homeland Defense: Progress Made in Organizing to Achieve Northern Command's Mission, but Challenges Remain*, [GAO-04-622C](#) (Washington, D.C.: Sept. 8, 2004).

Guard Bureau plans to train and equip an additional five decontamination companies during the remainder of fiscal year 2006.

The Joint Task Force-Civil Support deployment data list contains certain chemical units that must be ready to perform CBRNE consequence management operations in support of civil authorities. Specifically, one Reserve chemical company, two active duty platoons, and two Reserve platoons are currently on this deployment list. As such, the Army is not allowing the reassignment of personnel or equipment from these units to units deploying in support of current operations. To provide additional surge capacity, Army Reserve Command officials have unofficially designated two additional companies as exempt from the reassignment of personnel and equipment to support ongoing operations. The force structure identified is strictly an initial response capability; additional forces will be required and will have to be requested using established request-for-forces processes. However, other Reserve chemical companies with a homeland defense mission that are not currently on the deployment list have lost personnel due to transfers to deploying units. Unless DOD prohibits the transfers of personnel from all chemical units with homeland defense missions into units supporting other operations, there may not be sufficient Reserve chemical units available to provide surge capacity if needed.

Since many chemical units are already stressed due to their support of ongoing operations and are reporting low readiness levels, it is unclear whether they would be ready to support consequence management operations in the event of a catastrophic WMD attack in the United States. We have previously reported that although DOD has met the Northern Command requirements for forces to be made available should a CBRNE event occur, DOD acknowledges that it has become increasingly difficult to meet all expected requirements because of the high pace of operations, which may include the forces that would be requested or directed to support civil authorities for CBRNE events.¹⁸ Additionally, we reported that Northern Command officials are particularly concerned about a domestic CBRNE attack and have asked for forces to be dedicated to this mission. We also reported that DOD still plans to continue with its present practice of trying to balance the competing demands of the various combatant commanders and the use of dual-purpose units to accomplish CBRNE missions both at home and abroad. Further, the *Quadrennial*

¹⁸ [GAO-04-622C](#).

Defense Review states that military forces are also to be prepared for conducting a “long war” in the future. Given DOD’s emphasis on planning for WMD events at home and abroad, we continue to believe there is operational risk to both the homeland defense and the warfighting missions in not only leaving chemical units in such a low state of readiness but also dual tasking them.

Current Chemical and Biological Defense Doctrine Does Not Adequately Reflect Homeland Defense Missions

The Army published doctrine in December 2001¹⁹ on nuclear, biological, and chemical consequence management that mentions the reconnaissance and mass casualty decontamination capabilities of the National Guard and Army Reserve. According to an Army Reserve Command senior official, however, this doctrine was published in the early stages of developing the Army Reserve’s CBRNE domestic response capabilities, and consequently this doctrine is now out of date. In the past 3 years, the Army Reserve has made progress in this area, having completely revised and improved the tactics, techniques, and procedures for these missions. For example, in 2001, it took approximately 1-½ hours for a single mass casualty decontamination line to be set up and become operational. By the summer of 2005, Army Reserve soldiers were able to perform the same operation with the latest procedures and equipment in an average of 20 minutes.

However, the Army Chemical School has not updated the doctrine needed for addressing these homeland defense missions. A 2001 memorandum from the Army Deputy Chief of Staff for Operations and Plans specifically states that Army chemical units have a mission to provide nuclear, biological, and chemical reconnaissance and mass casualty decontamination in support of domestic emergencies involving WMD. The memorandum goes on to list several other defense directives and publications that identify this mission. Further, it specifically directs Army Forces Command, along with Training and Doctrine Command and the Director of Military Support, to refine the homeland defense mission and develop operational requirements documents and training support packages. However, according to an official from the Army Chemical School’s homeland security office and documents provided by the school, DOD has not been told what military capabilities are required to support civil authorities in the event of a terrorist attack involving WMD, making it

¹⁹ U.S. Army, *Field Manual 3-11.21: Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Aspects of Consequence Management* (Ft. Leonard Wood, Mo: Dec. 2001).

more difficult to write doctrine. In addition, the Army did not provide funding for the school to update its doctrine or provide training for the Reserve component homeland defense missions until fiscal year 2006. Since the Army did not consider these missions to be warfighting missions, it gave them a low priority for funding, even though DOD considers defending against a chemical and biological attack to be a national priority. Once the funding was received, the Army Chemical School began exploring options to revise current doctrine to include comprehensive tactics, techniques, and procedures on the hazardous materials reconnaissance and mass casualty decontamination homeland defense missions. The school finalized its plan to update its doctrine in March 2006.

Army Chemical School officials told us that it typically takes 24-36 months to update doctrine to incorporate a new mission, but they are accelerating this process and plan to complete revised doctrine, to include the homeland defense missions, by June 2007. The chemical companies we visited with homeland defense missions told us that they need updated doctrine to provide guidance on how to operate effectively in the unique homeland defense environment because of differences between homeland defense and tactical wartime missions. Further, the new equipment that has been fielded to these units is nonstandard equipment and, therefore, the chemical companies lack guidance on how to properly integrate it with their standard wartime military equipment. As a result, without doctrine to guide their efforts, Army National Guard and Reserve chemical companies cannot ensure that they are meeting DOD needs, prioritizing their training requirements appropriately, and properly integrating new equipment with existing items.

Conclusions

The readiness of Army chemical units—particularly in the National Guard and Reserve—is so low that it is doubtful whether most of these units can now perform their missions. The absence of a plan to address the personnel and equipment shortfalls that are primarily responsible for these readiness problems makes it unclear whether and when these problems will be corrected. Consequently, we believe there is a misalignment between DOD’s stated national priorities, especially the Secretary of Defense’s requirement for military forces to be able to respond to the Homeland Security Council’s 12 National Planning Scenarios requiring a CBRNE response, and the current readiness of Army chemical units. Moreover, it is unclear whether Army chemical units affected by low readiness, but tasked with both wartime and homeland defense chemical and biological missions, can perform both effectively, especially given the

lack of criteria to determine how many and which units are needed to support civil authorities in the event of multiple, near-simultaneous attacks on the United States. Even though DOD considers responding to and mitigating the effects of WMD attacks on the United States to be a national priority, the Army did not consider funding the completion of doctrine for the Reserve component homeland defense mission to be a priority. Consequently, the U.S. Army Chemical School has not yet updated the doctrine needed for performing homeland defense missions, leaving chemical units assigned these missions with only limited guidance on how to accomplish them. Unless DOD takes the steps needed to address long-standing gaps in chemical unit readiness and doctrine, we question whether these units will be able to perform either their warfighting or homeland defense missions effectively.

Recommendations for Executive Action

To align DOD's stated emphasis on responding to and mitigating the effects from WMD incidents at home and abroad with the readiness of Army chemical units, we recommend that the Secretary of Defense direct the Secretary of the Army to take the following actions:

- Develop a specific plan to address the long-standing chemical unit personnel shortages that have been exacerbated by ongoing operations, particularly for chemical operations specialists.
- This plan should specifically address and discuss options such as
 - the need for temporarily prohibiting the transfer of personnel from chemical units with homeland defense missions into units supporting other operations;
 - requiring soldiers in chemical occupational specialties to return to assignments requiring that specialty after deployments, as long as shortages continue in that specialty;
 - other steps designed to mitigate the loss of these personnel; and
 - the risks associated with not taking such steps.
- Determine how many and which active, National Guard, and Army Reserve chemical units will be needed to perform homeland defense missions, including responding to multiple, near-simultaneous CBRNE attacks on the United States, and set forth a plan to ensure that for these units, the homeland defense mission is given priority over other missions.

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- Develop and approve a plan for addressing DOD's decontamination equipment shortages until new joint systems are fielded beginning in fiscal year 2009. This plan should determine
 - the total number of systems needed during the interim period, by type of system (M12, M17, Karcher, or Falcon) to maintain the needed decontamination capability;
 - how the interim systems will be integrated with retained M12 and M17 systems;
 - how training and logistical support for the interim systems will be addressed; and
 - whether the interim systems should be type-classified and standardized as official military equipment with a national stock number, and added to units' official equipment lists.
 - Set a definitive deadline for completing chemical and biological defense doctrine to reflect new homeland defense missions.

Agency Comments and Our Evaluation

In written comments on a draft of this report, DOD disagreed with our recommendation to direct the Secretary of the Army to develop a specific plan to address the long-standing chemical unit personnel shortages that have been exacerbated by ongoing operations, particularly for chemical operations specialists, and cited several reasons as a basis for their position. First, DOD stated that we are discounting the Army's accession and recruitment plan, which strives for 100 percent fill of all units. We acknowledge that the Army does have an agencywide accession and recruitment plan, and the goal is 100 percent fill of all units. However, as we discuss in this report, that plan by itself has not been fully successful and has had little positive long-term impact on chemical unit personnel shortages. Specifically, while the recruitment and retention bonuses—which are a part of the Army's plan—were helping to alleviate chemical operations specialist shortages to some extent, the transfer of chemical unit personnel to other deploying units for Operation Iraqi Freedom negated those gains. Second, DOD disagreed with our use of the Unit Status Report to gauge the readiness of the chemical forces to support a homeland defense mission. In their comments, the department points out that the Unit Status Report is designed to evaluate an organization's ability to support wartime missions, not a homeland defense mission, and that the Army is developing improved readiness metrics in support of evolving DOD and Joint Staff reporting requirements, which will include the readiness for contingency operations such as homeland defense missions. We agree that the Unit Status Report is designed to address readiness for

major combat operations. However, DOD also acknowledges there is no other metric currently available to measure readiness for homeland defense missions. DOD also stated that some unit personnel who are not available for a major combat operations deployment are available for a homeland defense mission. Our analysis shows that chemical unit personnel shortages are severe and primarily a result of personnel transfers to deploying units; therefore, DOD's statement that unit personnel could be available for a homeland defense mission is in our opinion, invalid. Because of the severe personnel shortages in most chemical units, we continue to believe our recommendation has merit and is an important step that should be taken by the Army.

DOD partially agreed with our recommendation to direct the Secretary of the Army to determine how many and which active, National Guard, and Army Reserve chemical units will be needed to perform homeland defense missions, including responding to multiple, near-simultaneous CBRNE attacks on the United States, and set forth a plan to ensure that for these units, the homeland defense mission is given priority over other missions. DOD agreed that the capability requirements for homeland defense, including the number and type of chemical units, must be identified in the context of an interagency, DOD, and Army assessment process. DOD further states that the Chief of Staff of the Army has identified improvement of homeland defense as a focus area with the intent of identifying Army contributions to homeland defense as well as gaps and shortfalls where Army capabilities could be improved to support the joint force. However, DOD then stated that, with some exceptions, the Army generally does not develop force structure to identify specific units for specific missions beyond those supporting the Joint Task Force-Civil Support because such designation limits the pool of units that can be deployed for overseas requirements, greatly increasing the burden on the deployable units. While we believe the above DOD actions are good first steps, we do not believe DOD's comments address the overall intent of our recommendation, which was to ensure DOD identified all forces needed to respond to homeland defense missions and develop a plan to ensure that these forces are available and ready for those missions. Specifically, as we highlight in this report, the units designated to support the Joint Task Force-Civil Support are only intended to be an initial response capability, and additional forces would be required to support multiple, near-simultaneous attacks on the homeland. The low readiness levels of units not associated with the Joint Task Force, combined with the potential deployment of personnel from other units in support of overseas operations, could inhibit DOD's ability to provide the planned surge capacity needed for supporting DOD's execute order on multiple, near-

simultaneous homeland defense missions. DOD's response does not indicate how, or to what extent, this homeland defense requirement will be prioritized compared with other missions, and our recommendation to do this is both valid and important to accomplish. Without a clear set of priorities for chemical unit response capabilities, DOD increases the risk that it may not be able to provide the forces required to respond to its own stated homeland defense requirements.

DOD disagreed with our recommendation to direct the Secretary of the Army to develop and approve a plan for addressing DOD's decontamination equipment shortages until new joint systems are fielded. DOD stated that while the equipment information contained in the report is generally correct as of the time the information was collected, our recommendation does not accurately depict the current situation. Since a draft of this report was provided to DOD for comment, the Joint Program Executive Office for Chemical and Biological Defense developed a plan that addresses replacement and future fielding of decontamination equipment and this plan was funded in the Fiscal Years 2008-2013 Program Objective Memorandum. Although we have not analyzed this plan in-depth, it appears to be a good first step in meeting the Army's decontamination needs as long as the procurement and fielding of replacement systems stays on track. However, in its comments, DOD did not discuss whether its plan will address the specifics of our recommendation, including how training and logistics support for the interim systems will be addressed and whether the interim systems should be type-classified and standardized as official military equipment with a national stock number and added to units' official equipment lists. We maintain that these steps are necessary so that appropriate training and logistical support will be available and accountability over these interim systems can be maintained.

DOD agreed with our recommendation to set a definitive deadline for completing chemical and biological defense doctrine to reflect new homeland defense missions. Although DOD agreed that updated chemical and biological defense doctrine to reflect homeland defense missions is a high priority, they did not set a deadline because they believe any deadline must account for the impact on other high-priority doctrine development projects, particularly those supporting ongoing combat operations. We continue to believe that without a deadline, development of this doctrine will be uncertain, leaving chemical units without much-needed doctrine to address the unique requirements associated with their homeland defense missions.

DOD's comments are included in appendix II. DOD also provided technical comments, which we incorporated into the report, as appropriate.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from its issue date. At that time, we will send copies to the Secretaries of Defense and the Army. If you have any questions about this report, please contact me at (202) 512-5431 or dagostinod@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix III.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Davi M. D'Agostino". The signature is fluid and cursive, with a large initial "D" and "A".

Davi M. D'Agostino, Director
Defense Capabilities and Management

Appendix I: Scope and Methodology

To determine the extent to which units tasked with providing chemical and biological defense support to combat units and commands are adequately staffed, equipped, and trained, we met with officials from the office of the U.S Army Deputy Chief of Staff for Operations and Plans, U.S. Army Forces Command, National Guard Bureau, and U.S. Army Reserve Command to define the population of Army chemical units. Using the information provided, we determined that in fiscal year 2006, the Army had 78 chemical companies tasked with providing chemical and biological defense support to combat units and commands. We did not include command and control units (brigades and battalions) and units smaller than companies, such as detachments, in our population since the actual chemical and biological defense mission is largely performed at the company level.

To determine the overall readiness levels of Army chemical companies in our population and reasons why units were reporting low readiness rates, we obtained and analyzed data from the Army Readiness Management System for fiscal years 2000 through 2006. We determined that these data were sufficiently reliable for our purposes by comparing the system data with the readiness data reports submitted by the companies we visited (see below). We also reviewed reliability assessments conducted by other GAO teams. To further assess the preparedness of Army chemical companies to perform their missions, we visited five active duty Army chemical companies located at Fort Hood, Texas; five Army National Guard chemical companies in Alabama and Texas; and five Army Reserve chemical companies in Alabama, Arkansas, and Texas. We selected units to visit from each Army component—active, National Guard, and Reserve—and from each type of chemical unit—biological detection, decontamination, reconnaissance, and smoke screening. We discussed personnel fill rates, the adequacy of decontamination equipment, fill rates for mission-essential equipment items, and training issues with officials from each of these companies. We also discussed chemical company mission preparedness with officials from the Kentucky Army National Guard, and the Army Reserve’s 81st and 90th Regional Readiness Commands.

To assess whether Army chemical companies are adequately staffed to perform their missions, we obtained and analyzed data provided by officials from the U.S Army Deputy Chief of Staff for Personnel. This office provided us with personnel data for the entire Army, which includes our universe of 78 chemical companies. It included authorized and assigned soldiers segregated by grade and military occupational specialty as of February 2006. To assess the reliability of the personnel data, we reviewed

data reliability assessments prepared on the same data system by another GAO team and performed electronic testing of the data. We also corroborated system data with officials at selected sites and interviewed officials knowledgeable about the data. We determined that the personnel data we used were sufficiently reliable for our reporting purposes.

To determine the extent to which the Army chemical companies have the equipment needed to perform their mission, we obtained and analyzed data as of July 2006 from the U.S. Army EQUIPFOR Database. We determined the equipment fill rates by comparing the equipment authorized to the equipment on-hand of selected chemical and other mission-essential equipment for the 78 chemical companies and compared this with overall Army equipment fill rates. Because we received the Army EQUIPFOR Database data close to our reporting deadline, we were not able to conduct a full reliability assessment. Consequently, these data are of undetermined reliability. However, as noted above, we used the Army EQUIPFOR Database as only one source of information for findings about equipment readiness. In addition, we corroborated system data with officials at the Office of the Army Deputy Chief of Staff for Programs, U.S. Army Reserve Command, National Guard Bureau, and selected Army chemical units. We also discussed decontamination equipment issues with officials at the chemical units we visited and with officials from the office of the Army Deputy Chief of Staff for Programs; the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology; and the Joint Program Executive Office for Chemical and Biological Defense.

To determine the extent to which units with the additional homeland defense mission—especially National Guard and Reserve chemical units—are adequately prepared for this mission, we used the data collected in the first objective, contacted officials from U.S. Northern Command, and obtained planning documents that describe the use of Army chemical units to perform chemical and biological decontamination and reconnaissance functions for homeland defense. We discussed these missions with officials from the Army Reserve Command and National Guard Bureau. We also reviewed and analyzed current chemical and biological defense doctrine and discussed the applicability of this doctrine to the newly emerging homeland defense missions with officials from the Army Chemical School and Army Reserve Command. We also discussed the chemical and biological homeland defense doctrine that is being developed with Army Chemical School officials and discussed homeland defense doctrine needs with officials from the chemical companies we visited that had been assigned homeland defense missions.

We performed our work from July 2005 through June 2006 in accordance with generally accepted government auditing standards.

Appendix II: Comments from the Department of Defense



NUCLEAR AND CHEMICAL
AND BIOLOGICAL DEFENSE
PROGRAMS

ASSISTANT TO THE SECRETARY OF DEFENSE
3050 DEFENSE PENTAGON
WASHINGTON, DC 20301-3050

SEP 13 2006

Ms. Davi D'Agostino
Director, Defense Capabilities and Management
U. S. Government Accountability Office
441 G Street, N.W.
Washington, DC 20548

Dear Ms. D'Agostino:

This is the Department of Defense (DoD) response to the GAO draft report, "CHEMICAL AND BIOLOGICAL DEFENSE: Management Actions Are Needed To Close The Gap Between Chemical Unit Preparedness And Stated National Priorities," dated August 1, 2006 (GAO Code 350714/GAO-06-867C).

The report recommends that the Secretary of Defense direct the Secretary of the Army to:

1. develop a specific plan to address the long-standing chemical unit personnel shortages that have been exacerbated by ongoing operations,
2. determine how many and which Active, National Guard (NG), and Army Reserve chemical units will be needed to perform homeland defense missions, including responding to multiple, near-simultaneous attacks on the homeland, and set forth a plan to ensure that for these units, and the homeland defense mission is given priority over other missions,
3. develop and approve a plan for addressing DoD's decontamination equipment shortages until new joint systems are fielded beginning in fiscal year 2009, and
4. set a definitive deadline for completing chemical and biological defense doctrine to reflect new homeland defense missions.

The Department non-concurs with recommendations 1 and 3, partially concurs with recommendation 2, and concurs with recommendation 4. Detailed comments on the report are enclosed.

Jean D. Reed
Special Assistant
Chemical and Biological Defense and
Chemical Demilitarization Programs

Enclosure:
As stated

GAO DRAFT REPORT – DATED August 1, 2006
GAO CODE 350714/GAO-06-867C

"CHEMICAL AND BIOLOGICAL DEFENSE: Management Actions Are Needed to
Close the Gap between Chemical Unit Preparedness and Stated National Priorities"

DEPARTMENT OF DEFENSE (DOD) COMMENTS
TO THE RECOMMENDATIONS

RECOMMENDATION 1: The GAO recommended that the Secretary of Defense direct the Secretary of the Army to develop a specific plan to address the long-standing chemical unit personnel shortages that have been exacerbated by ongoing operations, particularly for chemical operations specialists. This plan should specifically address and discuss options such as: (1) the need for temporarily prohibiting the transfer of personnel from chemical units with homeland defense missions into units supporting other operations; (2) requiring soldiers in chemical occupational specialties to return to assignments requiring that specialty after deployments, as long as shortages continue in that specialty; (3) other steps designed to mitigate the loss of these personnel; and (4) the risks associated with not taking such steps.

DOD RESPONSE: DoD non-concurs. The report states that the Army does not have a plan to fix personnel readiness; this statement discounts the Army's accession and recruitment plan which strives for 100% fill of all units. Promotion, reclassification and incentive programs are constantly adjusted to react to the changing needs of the Army. The language of the report also treats the active and reserve components as the same, when in fact they are very different when it comes to personnel lifecycle management.

The Army is engaged in active combat operations in overseas environments where demand for CBRNE capabilities is low and demand for other, more basic ground combat capabilities is much higher. While operating within fixed fiscal and end strength topline, the Army is internally transforming to meet current and anticipated challenges. This has resulted in the tradeoffs noted in the GAO report.

Overall the report only uses one metric (Unit Status Reports) to gauge the readiness of the Chemical Forces to support a Homeland Defense (HLD) mission. The Unit Status Report is a metric that evaluates an organization's ability to support a wartime mission. Many areas reflected in a USR report do not crosswalk from Major Combat Operation (MCO) to a HLD mission. For example, some equipment needed for an MCO would not be needed for a HLD mission; likewise some unit personnel who would not be available for a MCO deployment are available for employment during a Homeland Defense Mission. The Army is developing improved readiness metrics in support of evolving DoD and Joint Staff reporting requirements. The metrics will include readiness for contingency operations such as HLD missions.

RECOMMENDATION 2: The GAO recommended that the Secretary of Defense direct the Secretary of the Army to determine how many and which Active, National Guard, and Army Reserve chemical units will be needed to perform homeland defense missions, including responding to multiple, near-simultaneous Chemical, Biological, Radiological, Nuclear, or High-Yield Explosive (CBRNE) attacks on the homeland, and set forth a plan to ensure that for these units, the homeland defense mission is given priority over other missions.

DOD RESPONSE: DoD partially concurs. The DoD agrees that the capability requirements for homeland defense, including the number and type of chemical units, must be identified in the context of an Interagency, DoD, and Army assessment process. The Army is participating in ongoing DoD assessments of support to civil authorities including CBRNE response. An example is the ongoing Multi-Service Force Deployment assessments and a Consequence Management Capabilities-Based Assessment.

The Chief of Staff of the Army has identified "Improvement of Homeland Defense" as one of twenty focus Areas (Focus Area #18). The intent is currently to identify Army contributions to Homeland Defense (HLD), as well as gaps and shortfalls where Army capabilities could be improved to support the Joint force in HLD.

With some exceptions, the Army does not develop force structure to identify specific units for specific missions. As part of the Total Army Analysis (TAA) process, the Army uses a model with scenario vignettes to determine requirements for the number and type of various units (including Chemical units). The Army does not assign forces by name beyond those supporting Joint Task Force-Civil Support because such designation limits the pool of units that can be deployed for overseas requirements, greatly increasing the burden on the deployable units. The Army maintains flexibility to rotate units to support the Army Force Generation (ARFORGEN) process.

RECOMMENDATION 3: The GAO recommended that the Secretary of Defense direct the Secretary of the Army to develop and approve a plan for addressing DOD's decontamination equipment shortages until new joint systems are fielded beginning in FY 2009. This plan should determine: (1) the total number of systems needed during the interim period, by type of system (M12, M17, Karcher, or Falcon), to maintain the needed decontamination capability; (2) how the interim systems will be integrated with retained M12 and M17 systems; (3) how training and logistical support for the interim systems will be addressed; and (4) whether the interim systems should be type-classified and standardized as official military equipment with a national stock number, and added to units' official equipment lists.

DOD RESPONSE: The DoD non-concurs. While the equipment information contained in this report is generally correct as of the time the information was collected, the

recommendation does not accurately depict the current situation. The Chemical and Biological Defense Program, in coordination with the Services, including the Army, has developed a plan from validated requirements that addresses replacement and future fielding of Department of Defense's decontamination equipment, including joint systems scheduled to begin fielding prior to FY 2009 (FY09). This plan is contained in the FY 2008-2013 Program Objectives Memorandum (FY 08-13 POM). This comprehensive plan includes next-generation replacement systems meeting joint small scale and large scale decontamination requirements to replace the M17 Light Decontamination System and the M12 Heavy Decontamination System, respectively. These two systems are the primary types of decontamination equipment currently used to solve the small and large scale requirements, respectively, in Army chemical units. As an interim measure until these new systems are fielded, the small scale requirement will be covered by the existing M17 systems, augmented by 410 already fielded Multi-Purpose Decontamination Systems and 115 Lightweight Multipurpose Decontamination Systems that will start fielding in October 2006. The Joint Service Transportable Decontamination System (JSTDS-SS) will start fielding in 2nd Quarter FY08.

To cover the large scale requirement until the Joint Service Transportable Decontamination System – Large Scale (JSTDS-LS) system starts fielding in FY12, the recently completely refurbished and fully mission capable M12 systems will continue service. Of the entire M12 fleet, 505 have been completely over-hauled and converted to diesel fuel. An additional 13 more will be completed before the end of FY06 and an additional 32 will be converted in FY07. Furthermore, 103 recently fielded FALCON systems augment this large scale capability.

The FY08-13 plan also funds future decontamination systems to round out Service decontamination capabilities. These new capabilities include a man-portable (back-packed) decontamination system, human remains decontamination, and sensitive equipment (e.g., avionics and night vision devices) and platform interior (aircraft, ship, and vehicle) decontamination. There is also funding in the FY08-13 POM for continued fielding of skin decontamination kits.

RECOMMENDATION 4: Set a definitive deadline for completing chemical and biological defense doctrine to reflect new homeland defense missions.

DOD RESPONSE: The DoD concurs with Recommendation 4. The publication of updated chemical and biological defense doctrine to reflect homeland defense missions is a high priority. However, any deadline must account for the impact on other high priority doctrine development projects, particularly those supporting ongoing combat operations.

Appendix III: GAO Contact and Staff Acknowledgments

GAO Contact

Davi M. D'Agostino, (202) 512-5431

Staff Acknowledgments

In addition to the contact named above, William W. Cawood, Assistant Director; Hamid Ali; Jane Ervin; Robert Malpass; Enemencio Sanchez; Kimberly Seay; and Cheryl Weissman made key contributions to this report.

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