

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
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1. REPORT DATE (DD-MM-YYYY) 10 May 2007		2. REPORT TYPE FINAL		3. DATES COVERED (From - To)	
4. TITLE AND SUBTITLE Chemical, Biological, Radiological, and Nuclear Consequence Management: Ways to Improve Fixed-Site Decontamination Capability				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Alissa R. Ackley, MAJ USA Paper Advisor (if Any): N/A				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Joint Military Operations Department Naval War College 686 Cushing Road Newport, RI 02841-1207				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION / AVAILABILITY STATEMENT Distribution Statement A: Approved for public release; Distribution is unlimited.					
13. SUPPLEMENTARY NOTES A paper submitted to the faculty of the NWC in partial satisfaction of the requirements of the JMO Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.					
14. ABSTRACT Projection of an expeditionary force to an austere environment requires rapid force generation to secure bases of operation and the ability to sustain that force with logistical support. Ports of debarkation during initial entry can be centers of gravity and high value targets for adversaries because they are vital for generating, enhancing, and sustaining combat power. A possible course of action to deny access or degrade the building of a sustained force is through the employment of persistent CBRN contamination seaports of debarkation (SPOD), aerial ports of debarkation (APOD), marshalling areas, main supply routes, or supply depots. In order to maintain force momentum, rapid mitigation of the effects and restoration of logistics capabilities to full operational capacity is essential. This objective is achieved through consequence management and fixed-site decontamination operations. The effectiveness of CBRN consequence management and fixed-site decontamination executed in the Joint Security Area can be improved through the study of joint and multi-service doctrine, increased participation in joint CBRN consequence management training exercises, and timely fielding of joint fixed-site decontamination equipment.					
15. SUBJECT TERMS CBRNE Consequence Management, Fixed-Site Decontamination, WMD, Joint Security Operations					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES XX	19a. NAME OF RESPONSIBLE PERSON Chairman, JMO Dept
a. REPORT UNCLASSIFIED	b. ABSTRACT UNCLASSIFIED	c. THIS PAGE UNCLASSIFIED			19b. TELEPHONE NUMBER (include area code) 401-841-3556

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**CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR CONSEQUENCE
MANAGEMENT: WAYS TO IMPROVE FIXED-SITE
DECONTAMINATION CAPABILITY**

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: _____

10 MAY 2006

ABSTRACT

Projection of an expeditionary force to an austere environment requires rapid force generation to secure bases of operation and the ability to sustain that force with logistical support. Ports of debarkation during initial entry can be centers of gravity and high value targets for adversaries because they are vital for generating, enhancing, and sustaining combat power. A possible course of action to deny access or degrade the building of a sustained force is through the employment of persistent CBRN contamination seaports of debarkation (SPOD), aerial ports of debarkation (APOD), marshalling areas, main supply routes, or supply depots. In order to maintain force momentum, rapid mitigation of the effects and restoration of logistics capabilities to full operational capacity is essential. This objective is achieved through consequence management and fixed-site decontamination operations.

The effectiveness of CBRN consequence management and fixed-site decontamination executed in the Joint Security Area can be improved through the study of joint and multi-service doctrine, increased participation in joint CBRN consequence management training exercises, and timely fielding of joint fixed-site decontamination equipment.

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INTRODUCTION

U.S. Armed Forces must maintain strategic mobility and continue effective power projection operations when faced with Chemical, Biological, Radiological, or Nuclear (CBRN) contaminated ports of debarkation. The effectiveness of CBRN consequence management and fixed-site decontamination executed in the Joint Security Area can be improved through the study of joint and multi-service doctrine, increased participation in joint CBRN consequence management training exercises, and timely fielding of joint fixed-site decontamination equipment.

BACKGROUND

International evolutions from the industrial age to the information age and the effects of globalization on international security have necessitated the transformation of the U.S. Armed Forces. Vital to this transformation is developing and maintaining a combat force that is expeditionary, agile, and lethal.¹ Effective projection of an expeditionary force to an austere environment, where adversaries may seek to deny access, requires rapid force generation to secure bases of operation and the ability to sustain that force with logistical support. Reliance on logistics infrastructure, prepositioned supplies and equipment, and local allied forces may not be an option when commencing operations in an immature theater. Ports of debarkation during initial entry can be centers of gravity and high value targets for adversaries because they are vital for generating, enhancing, and sustaining combat power. A possible course of action to deny access or degrade the building of a sustained force is through the employment of persistent CBRN contamination on fixed-sites such as seaports of

¹ U.S. DoD, *Elements of Defense Transformation*, (Washington, D.C.: OSD, October 2004), 8.

debarkation (SPOD), aerial ports of debarkation (APOD), marshalling areas, main supply routes, or supply depots. In some cases it may be possible to continue operations in a degraded capacity but in order to maintain force momentum, rapid mitigation of the effects and restoration of logistics capabilities to full operational capacity is essential.² This objective is achieved through consequence management and fixed-site decontamination operations.

The need to address the threat of CBRN contamination is emphasized throughout U.S. strategic guidance from the Presidential level National Security Strategy to the combatant commander level in the form of contingency plans such as the U.S. Strategic Command's Concept Plan 8099 Combating Weapons of Mass Destruction (WMD).³ Another common theme throughout U.S. strategic military guidance is the need for an expeditionary force capable of power projection. "In the process of transforming the way we fight, we should emerge with a force that is more expeditionary, agile, and lethal than the present force and more capable of employing operational maneuver and precision effects capabilities to achieve victory."⁴ Combining these two themes, it is clear that the U.S. Armed Forces must be prepared to continue deployment and sustainment operations in non-permissive CBRN contaminated environments.

Current intelligence estimates that at least 25 nation states are in possession of or are actively seeking and developing CBRN weapons capability. Countries of note are China and North Korea who are able to threaten South Korea and Japan, and Libya, Iran, Syria, and Iraq

² U.S. Joint Chiefs of Staff, Joint Doctrine for Nuclear, Biological, and Chemical (NBC) Defense, Joint Publication 3-11, (Washington, D.C.: 11 July 2000), III-23 – III-31.

³ Chairman, U.S. Joint Chiefs of Staff (CJCS), National Military Strategy to Combat Weapons of Mass Destruction (Washington, D.C, CJCS, 13 February 2006), 12.

⁴ U.S. Department of Defense (DoD), *Elements of Defense Transformation*, (Washington, D.C.: Office of the Secretary of Defense (OSD), October 2004), 8.

who threaten the North African and Middle East regions. To stop these and other states from acquiring additional or initial CBRN weapon capability, the United States is combating proliferation of weapons technology from Russia, China, North Korea, and others who are suspected of supplying CBRN and ballistic missile technology. States often seek CBRN weapons to compensate for military inadequacies. Through asymmetric warfare directed towards critical logistics supply facilities, these lesser capable states are able to pose a greater threat to adversaries with conventional military dominance. Disrupting operations of an asymmetrical nature are likely to take place in the very early stages of conflict when they will have the greatest impact on combat force projection.⁵

Large fixed-sites required for reception, staging, onward-movement, and integration (RSOI) operations such as seaports of debarkation (SPOD), aerial ports of debarkation (APOD), staging and marshalling areas, initial assembly areas, and main supply routes leading to and from these sites are particularly vulnerable to CBRN disruption and denial attacks. In an immature theater of operation it is likely that these locations are not yet built up and have minimal infrastructure to protect critical assets from exposure to contamination. As an expeditionary military, commanders of the U.S. Armed Forces will continue RSOI and sustainment operations from contaminated fixed-sites using precautionary measures and controls to limit the spread of contamination. Decontamination of key pieces of equipment, structures, and operating surfaces may be required to sustain the appropriate level of operations until an alternate location is available. If relocating is not an option, a complete fixed-site decontamination operation is required to restore full operational capability.⁶

⁵ U.S. DoD, *Proliferation: Threat and Response* (Washington, D.C.: U.S. Government Printing Office (GPO), January 2001), 1-4.

⁶ U.S. Joint Chiefs of Staff, Joint Doctrine for Nuclear, Biological, and Chemical (NBC) Defense, Joint Publication 3-11, (Washington, D.C.: 11 July 2000), III-23 – III-31

The ability to conduct joint fixed-site decontamination operations is a key element in achieving the military strategic objective “*Protect, Respond, and Recover from Weapons of Mass Destruction (WMD) use*. The purpose of this objective is to respond to an adversary who has used WMD on the battlefield or against strategic U.S. interests. To protect and recover from WMD use, U.S. Armed Forces will execute passive defense measures and be prepared to conduct WMD consequence management activities.”⁷ Consequence management encompasses all operations conducted to mitigate the effects of CBRN contamination on essential operations and services.⁸

DISCUSSION

Doctrine

Military doctrine governing CBRN contamination avoidance, protection, and decontamination has improved significantly in recent years with the release of Joint Publication (JP) 3-11, Joint Doctrine for Operations in Nuclear, Biological, and Chemical (NBC) Environments, Field Manual (FM) 3-11, Multiservice Tactics, Techniques, and Procedures for NBC Defense Operations, FM 3-11.34, Multiservice Procedures for NBC Defense of Theater Fixed-Sites, Ports, and Airfields. To provide a doctrinal basis for interagency coordination and U.S. Armed Forces involvement in multinational operations designed to combat CBRN threat through nonproliferation, counterproliferation, and consequence management, the Chairman of the Joint Chiefs of Staff published JP 3-40, Joint Doctrine for Combating WMD, and JP 3-41, Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives (CBRNE) Consequence Management, in 2004 and 2006

⁷ CJCS, National Military Strategy to Combat Weapons of Mass Destruction (Washington, D.C., CJCS, 13 February 2006), 5.

⁸ Ibid., 8.

respectively. These publications cover command and control responsibilities across the various branches of service, required interactions with other federal agencies, and procedures for conducting CBRN defense operations. Unfortunately, written doctrine is not effective unless it is studied, learned, and practiced.

Training

The planning and execution of Joint Security Operations (JSO), including CBRN consequence management and fixed-site decontamination operations in areas outside of the United States is the responsibility of the designated Joint Force Commander (JFC). The JFC designates a Joint Security Coordinator (JSC), normally a service component commander, to provide a dedicated focus on the JSO within the area of operations. The JSC responsibilities may then be further delegated to a major U.S. Army logistics unit such as a Theater Support Command or a U.S. Marine Air-Ground Task Force Service Support Commander.⁹ The delegation of responsibility to various command levels across multiple services makes it difficult to determine exactly who is accountable for maintaining staff proficiency in CBRN consequence management on foreign ground. The responsibility ultimately falls on the service component commanders and geographical combatant commanders. Training exercises to address the full spectrum of CBRN consequence management; HAZMAT operations, reconnaissance and survey, decontamination, casualty handling, medical operations, and command and control, are not conducted often enough to ensure staffs are fully capable of planning and executing consequence management in the event of a CBRN event or attack. U.S. European Command was the only geographic combatant command to conduct an exercise stressing strategic and operational level foreign consequence

⁹ U.S. Joint Chiefs of Staff, Joint Security Operations in Theater, Joint Publication 3-10, (Washington, D.C.: 1 August 2006), II-4.

management operations in 2006. The Joint Requirements Office, CBRN Defense and the Joint CBRN Defense Capabilities Improvement Initiative Team were on hand to provide expertise and advice.¹⁰

There is assistance available for those geographical combatant commanders that have not had the opportunity to train and exercise a staff to handle CBRN consequence management. “The 20th Support Command, or when designated as Joint Task Force - Elimination, deploys and conducts operations in support of combatant commanders or other government agencies in order to counter chemical, biological, radiological, nuclear and high-yield explosive and weapons of mass destruction threats in support of National Combating WMD objectives.”¹¹ Activated in 2004 at Aberdeen Proving Grounds, Maryland as a major subordinate command under U.S. Forces Command, the 20th Support Command is a stand alone command and control headquarters for U.S. Army CBRNE technical assets. In addition to the headquarters and planning staff, the 20th Support Command is comprised of five explosive ordinance disposal battalions and two technical escort battalions. In September 2007 the command will expand with the activation of the 48th Chemical Brigade.¹² Geographic Combatant Commanders have a single point resource for requesting any assistance needed to conduct CBRN consequence management in their area of operations.

The U.S. Joint Forces Command, prior to the formation of U.S. Northern Command, designated Joint Task Force –Civil Support (JTF-CS) as the command and control element

¹⁰ U.S. DoD, *Chemical and Biological Defense Program Annual Report to Congress*, (Washington, D.C.: OSD, Special Assistant for Chemical and Biological Defense and Chemical Demilitarization Programs, March 2006), 151.

¹¹ U.S. Army 20th Support Command, Mission, <http://www.cbrne.army.mil/mission.html> (accessed 22 April 2007)

¹² U.S. Army 20th Support Command, About Us, <http://www.cbrne.army.mil/aboutus.html> (accessed 22 April 2007)

for all CBRN consequence management within the continental United States.¹³ “JTF-CS plans and integrates Department of Defense (DoD) support to the designated Lead Federal Agency for domestic Chemical, Biological, Radiological, Nuclear and high yield Explosive (CBRNE) consequence management operations. When directed by the Commander of U.S. Northern Command, JTF-CS will deploy to the incident site, establish command and control of designated DoD forces, and provide military assistance to civil authorities to save lives, prevent injury and provide temporary critical life support.”¹⁴

Tasked by the Secretary of Defense, the U.S. Army Reserve Command is responsible for domestic response missions providing casualty decontamination and dismounted CBRN reconnaissance in support of JTF-CS. Army Reserve units have put forth great efforts training chemical battalions on domestic CBRN consequence management since they received the disaster-response mission in 2003. U.S. Army Reserve EXERCISE RED DRAGON began in 2004, with the participation of four U.S. Army Reserve chemical companies. In 2005 the exercise grew to include eight chemical companies and increased in 2006 to 1,100 soldiers from medical, military police, chaplain, and chemical units. The training exercise focus is on hazardous material reconnaissance, mass-casualty decontamination, and integration of military responders with state and local response agencies.¹⁵ Domestic response and consequence management, as challenging as it is, does not compare to the level of difficulty the military faces when responding to a CBRN event or attack in a foreign country.

¹³ U.S. Army, Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Aspects Of Consequence Management, Field Manual (FM) 3-11.21 (Washington, DC: Headquarters Department of the Army, 12 December 2001), II-1.

¹⁴ JTF-CS, “Unit Fact Sheet,” <http://www.jtfcs.northcom.mil/pages/factsheet.html> (accessed 27 April 2007)

¹⁵ Haraburda, Scott S., “U.S. Army Reserve Support for Domestic Response to a Chemical Incident,” *Army Chemical Review*, (January – June 2007): 48.

The U.S. Army heavy division chemical companies are assigned the mission of fixed-site decontamination. Typically they do not exercise large scale operations like those required for CBRN consequence management because of inadequate equipment. The most common operation the unit conducts is thorough decontamination operations consisting of detailed equipment decontamination of military vehicles and detailed troop decontamination of military personnel. Terrain and small scale fixed-site decontamination are included in the National Training Center exercise scenario but typically the decontamination equipment available does not allow for superior execution.

The U.S. Navy's effort to address foreign CBRN consequence management for the last three years has been EXERCISE DESERT SAILOR conducted in Bahrain. The primary focus each year is the treatment of CBRN casualties; however, considering that the U.S. Navy has no responsibility for decontamination operations other than their own ships and personnel this is acceptable.¹⁶ The Marine Chemical Biological Incident Response Force (CBIRF) is a well trained CBRN consequence management staff capable of operating in any theater. They have organic assets capable of conducting all CBRN consequence management operations except for fixed-site decontamination.¹⁷

The most common element of CBRN consequence management exercised across the services is the decontamination and medical treatment of CBRN mass casualties. The percentages of the U.S. Army, U.S. Navy, and U.S. Air Force medical personnel that were

¹⁶ Thompson, Cassandra, "NSA Bahrain Sailors, Bahraini Nationals Train During Desert Sailor '06," *U.S. 5th Fleet Navy News Stand*, 14 March 2006, http://www.news.navy.mil/search/display.asp?story_id=22699 (accessed 22 April 2007)

¹⁷ U.S. Government Accountability Office (GAO), *Chemical and Biological Defense: Management Actions Are Needed to Close the Gap between Army Chemical Unit Preparedness and Stated National Priorities* (Washington D.C: GAO, January 2007), 2.

trained in consequence management of mass casualties in 2005 were 35%, 37%, and 78% respectively.¹⁸

Equipment

The U.S. Army is responsible for conducting fixed-site decontamination operations for all services. The U.S. Army has dedicated chemical and biological units as a part of its force structure where the other services assign CBRN defense as a collateral duty. This is aside from the Marine CBIRF that assists local, state, or federal agencies in consequence management, although they do not have a fixed-site decontamination capability.¹⁹

The existing heavy decontamination equipment and decontaminants available to the U.S. Army can be used for fixed-site decontamination but they are not the most reliable or effective available. The largest and most powerful decontamination equipment allocated is the M12A1 Power Driven Decontamination Apparatus, used primarily for large equipment decontamination. The apparatus is 35 years old and has gone through multiple rebuilds. It is difficult to maintain and deficient for large area decontamination operations. Fixed-site decontamination is likely to require that sprayed decontaminant solution fully cover multi-story buildings and large pieces of equipment. The M12A1 does not have the force needed to project decontaminants above one story or to the upper surfaces of large pieces of equipment such as aircraft.²⁰ The decontaminants used by the M12A1 are corrosive or bleach based aqueous solutions that are not suitable for use on delicate or electronic equipment. The equipment scheduled to replace the M12A1 is projected to meet the

¹⁸ U.S. DoD, *Chemical and Biological Defense Program Annual Report to Congress*, (Washington, D.C.: OSD, Special Assistant for Chemical and Biological Defense and Chemical Demilitarization Programs, March 2006), 159.

¹⁹ U.S. Government Accountability Office (GAO), *Chemical and Biological Defense: Management Actions Are Needed to Close the Gap between Army Chemical Unit Preparedness and Stated National Priorities* (Washington D.C: GAO, January 2007), 2.

²⁰ U.S. GAO, *Chemical and Biological Defense: Management Actions Are Needed to Close the Gap between Army Chemical Unit Preparedness and Stated National Priorities* (Washington D.C: GAO, January 2007), 24.

requirements for fixed-site decontamination and non-sensitive equipment decontamination. The Joint Service Transportable Decontamination System – Large Scale, and the Joint Service Sensitive Equipment Decontamination System are still in the research and development stage and scheduled for fielding in fiscal year 2012.²¹

During Operation Iraqi Freedom, U.S. Central Command determined they did not have the ability to conduct fixed-site decontamination of the numerous ports, staging bases, logistics nodes, and other fixed-sites throughout Iraq and Kuwait because of the non-mission capable M12A1 apparatus and the corrosive and toxic decontaminants available. The command assessed the situation and found that the systems available within the U.S. Army inventory would not be effective in executing a fixed-site decontamination mission in a timely manner and would disrupt sustainment operations to an unacceptable extent. To solve this problem, U.S. Central Command submitted an Operational Needs Statement requesting a commercially available system that did meet the required specifications. The request was approved and fielding of the Fixed-Site Decontamination System (FSDS) began. The FSDS is capable of dispersing foams or liquids through a hose up to a 100 foot stream projection or through a spray bar for uniform ground coverage. The compressed air foam, DF-200, that is used with the system is non-corrosive and environmentally safe.²²

RECOMMENDATIONS

Doctrine

²¹ U.S. DoD, *Chemical and Biological Defense Program Annual Report to Congress*, (Washington, D.C.: OSD, Special Assistant for Chemical and Biological Defense and Chemical Demilitarization Programs, March 2006), E-4 - E-6.

²² U.S. DoD, *Chemical and Biological Defense Program Annual Report to Congress*, (Washington, D.C.: OSD, Special Assistant for Chemical and Biological Defense and Chemical Demilitarization Programs, March 2006), 33.

Joint and multi-service doctrine that applies to CBRN consequence management is well structured and comprehensive. It is clearly derived from the guidance set forth in the National Security Strategy, the National Defense Strategy, the National Military Strategy, and the National Military Strategy to Combat WMD. An attempt to expand the scope of the publications or address the applications and responsibilities in greater detail will limit the flexibility of the geographical combatant commanders to structure JSO within their theater of operations. U.S. Armed Forces may find it difficult to exercise all of the policies and procedures laid out in the doctrine in the current operational environment due to other force commitments and a lack of adequate equipment but reducing the requirements to meet the current capabilities is not recommended.

The recommended action in the realm of CBRN consequence management doctrine is the promotion and dissemination of the published documents, emphasizing that achieving the standards and capabilities as laid out in the doctrine is the desired end state. It is also vital that the current limitations and shortfalls in capability are addressed so that incorrect assumptions are not made during the joint planning process. Improvements or alternate solutions that address the current shortfalls may be discovered through training and exercising published joint doctrine while keeping in mind the current equipment situation.

Training

The primary recommendation for improved CBRN consequence management training is for all Geographic Combatant Commands to develop and execute an exercise similar to the one conducted by U.S. European Command. Considering the current situation in U.S. Central Command, an exercise is not immediately necessary but should commence if actual CBRN consequence management planning and operations are no longer being conducted.

Lessons learned from the current operations in U.S. Central Command are an outstanding resource for other commands to use to develop a training exercise.

A tactical recommendation that will have operational level effects is that all U.S. Army chemical units conduct a full scale fixed-site decontamination operation semi-annually. Providing the non-standard FSDS to each unit for the exercise will prepare that unit to conduct the operation if deployed to a high threat area. In addition, the chemical soldiers themselves will take with them the operational knowledge should they be reassigned to an actual heavy decontamination unit or as an advisor on a commander's staff.

Equipment

The FSDS obtained through an Operational Needs Statement is not considered standard military equipment and is not supported by normal military logistics channels. Type classifying and standardizing the FSDS as official equipment, determining the number of systems required to address the current and future shortfalls in equipment capabilities prior to fielding of new equipment in fiscal year 2012, and providing the FSDS as an interim solution will greatly increase operational capability. This will also allow for additional unit training opportunity and increased fixed-site decontamination proficiency.

The final recommendation requires adjustments to doctrine, training, and equipment. U.S. Armed Forces have more than one source to draw from to build fixed-site decontamination capability. One asset that should be considered as an additional CBRN consequence management tool is the U.S. Air Force Prime Base Engineer Emergency Force.²³ This 400 man strong force is designed as a mobile asset available for deployment to air bases around the world. One of their many capabilities is combating fires caused by a

²³ Fleisch, David L, "Operational Concerns Regarding Chemical Biological Decontamination of Fixed Sites." (research paper, Newport, RI: U.S. Naval War College, Joint Military Operations Department, 1996), 14.

aircraft crash or within a structure.²⁴ The techniques and equipment used to conduct these fire fighting operations are very similar to those that are needed for fixed-site decontamination operations. Additional units within the U.S. Armed Forces may have skills that are easily transferred to CBRN consequence management and those options should be explored.

CONCLUSION

The ability of the U.S Armed Forces to conduct CBRN consequence management can be improved through the study of doctrine, regular participation in joint training exercises, and improved equipment availability and readiness. If these recommendations are unable to be implemented, there are other factors that will mitigate the negative results and U.S. Armed Forces will be successful in conducting full scale CBRN consequence management.

Quality doctrine exists and is available to all joint staffs. Referencing documents during crisis action planning is not the best course of action but it will still positively influence the commands ability to perform the mission.

Geographic combatant commands have begun to move towards full CBRN consequence management exercises but most remain in the table top exercise or preparation phase. To mitigate this risk, the U.S. Army has a stand alone command and control headquarters in the 20th Support Command that is specifically designed to deploy and conduct this mission. A delay can be expected during the deployment phase that would not be as apparent if the geographical combatant command was prepared to assume the mission,

²⁴ U.S. Air Force Civil Engineer Support Agency, "U.S. Air Force Prime BEEF Units", (Washington, D.C.: Office of the Civil Engineer of the Air Force, May 2006)
www.afcesa.af.mil/userdocuments/publications/factsheets/prime_BEEF_fact_sheet_2006.pdf (accessed 22 April 2007)

but the CBRN consequence management mission will be accomplished with a positive outcome.

CBRN consequence management equipment shortfalls have the greatest impact on the ability of the U.S. Armed Forces to fully accomplish the consequence management mission. The state of the equipment not only affects the mission directly, it also has an indirect impact through mission training. The inability exercise decontamination operations as the consequence management mission are planned leave U.S. Armed Forces less than fully trained. Even less than fully trained and equipped U.S. Armed Forces will accomplish the mission by implementing the lessons learned by the US Central Command and by requesting assistance from the 20th Support Command.