THE DEPARTMENT OF DEFENSE CHEMICAL, BIOLOGICAL, NUCLEAR AND HIGH YIELD EXPLOSIVE RESPONSE ENTERPRISE: HAVE WE LEARNED THE LESSONS TO ENSURE AN EFFECTIVE RESPONSE?

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Since September 11, 2001, the Department of Defense began reorganizing the CBRNE response model. The enhanced structure formed based on the guidance from the National Response Framework. Response to domestic incidents has come under scrutiny because of lack of effectiveness. Considering the new CBRNE response enterprise has never been fully utilized in a domestic incident, the question arises if the new enterprise provides the most effective response model. Consequently, what improvements can be made to improve upon the model to ensure enhanced effectiveness?

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

THE DEPARTMENT OF DEFENSE CHEMICAL, BIOLOGICAL, NUCLEAR AND HIGH YIELD EXPLOSIVE RESPONSE ENTERPRISE: HAVE WE LEARNED THE LESSONS TO ENSURE AN EFFECTIVE RESPONSE? By Major Nicholas K. Dall, 102 pages.

Since September 11, 2001, the Department of Defense began reorganizing the CBRNE response model. The enhanced structure formed based on the guidance from the National Response Framework. Response to domestic incidents has come under scrutiny because of lack of effectiveness. Considering the new CBRNE response enterprise has never been fully utilized in a domestic incident, the question arises if the new enterprise provides the most effective response model. Consequently, what improvements can be made to improve upon the model to ensure enhanced effectiveness?

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ACRONYMS

CAE	Command Assessment Element
CBIRF	Chemical Biological Incident Response Force
CBRNE	Chemical, Biological, Radiological, Nuclear, and High-Yield Explosive
CERFP	CBRNE Emergency Response Force Package
CM	Consequence Management
CrM	Crisis Management
C2	Command and Control
C2CRE	Command and Control CBRN Consequence Response Element
CCMRF	CBRNE Consequence Management Response Force
DCRF	Defense CBRNE Response Force
DHS	Department of Homeland Security
DoD	Department of Defense
DoJ	Department of Justice
DoS	Department of State
EPA	Environmental Protection Agency
FBI	Federal Bureau of Investigation
FDNY	Fire Department – New York
FEMA	Federal Emergency Management Agency
GSA	General Services Administration
HRF	Homeland Response Force
HSPD	Homeland Security Presidential Directive
JTF	Joint Task Force
JTF-CS	Joint Task Force – Civil Support

LOE	Line of Effort
MEB	Maneuver Enhancement Brigade
MACDIS	Military Assistance for Civil Disturbances
MOE	Measure of Effectiveness
NG	National Guard
NGB	National Guard Bureau
NGRF	National Guard Response Force
NIMS	National Incident Management System
NRF	National Response Framework
NSHS	National Strategy for Homeland Security
NSS	National Security Strategy
NYPD	New York Police Department
PDC	Processing and Distribution Center
QDR	Quadrennial Defense Review
TIM	Toxic Industrial Material
WMD-CST	Weapon of Mass Destruction – Civil Support Team

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CHAPTER 1

INTRODUCTION

> New priorities also need to be set for the U.S. armed forces in light of the threat to the homeland. We urge, in particular, that the National Guard be given homeland security as a primary mission, as the U.S. Constitution itself ordains. The National Guard should be reorganized, trained, and equipped to undertake that mission
>
> — Road Map for National Security: Imperative for Change, The Phase III Report

9/11 and the History of the Department of Homeland Security

Unbeknownst to the writers of the *Road Map to National Security*, the U.S., less than seven months later, would face the largest terrorist attack on its soil. The devastation of the World Trade Center Towers and attacks on the Pentagon rapidly overwhelmed the civilian authorities' ability to provide crisis management and consequence management. Multiple units from the Department of Defense (DoD) were mobilized in response to the attacks. The National Guard responded with a small contingent to the incident at the World Trade Center collapse within twenty-four hours after the initial attacks. Approximately two thousand more Soldiers arrived within the next few days. Although the National Guard was not the lead in the disaster recovery, they assisted the New York Fire and Police Department (NYPD) in search and rescue efforts in the rubble of the World Trade Center Towers mostly by hand sifting through the debris. The National Guard took on a more traditional role following the attacks by providing security around key infrastructure sites as a result of the elevated threat across the nation, panic across New York City and the thinly stretched NYPD. During and after the attacks on the

Pentagon and the World Trade Center, multiple sorties of U.S. Air Force aircraft patrolled the skies over key infrastructure sites and airspace over the nation's capitol.

To exacerbate problems, one month after the attacks on the World Trade Center and the Pentagon, government offices and several news agencies received letters containing anthrax spores. Though unrelated to the September 11, 2001 attacks, the anthrax scare highlighted the need for preparedness by local, state and federal assets to handle Chemical, Biological, Radiological, Nuclear, and High-Yield Explosive (CBRNE) incidents. The Marine Corps' Chemical Biological Incident Response Force (CBIRF), in addition to the Environmental Protection Agency, conducted collection and testing of the anthrax spores found in federal buildings (Cabellon 2001). The CBIRF is nearly identical to the U.S. Army National Guard CBRNE Emergency Response Force Package (CERFP) in terms of capabilities. However, only one CBIRF exists within the Marine Corps.

In February 2001, a report from the Hart-Rudman Commission on National Security recommended procedural and institutional changes to meet the growing challenges to National Security, and one of these changes was the implementation of a Department of Homeland Security (DHS) (Department of Homeland Security History Office 2008, 3). In response to the large scale attacks on September 11th, 2001, the United States began the process to rapidly implement the DHS. On January 24, 2003, the DHS became operational. Charged with leading the unified national effort in securing the United States, the DHS mission is to prevent and deter terrorist attacks and protect against and respond to threats to the Nation (Department of Homeland Security 2008, 3). The DHS was organized to meet the security challenges of the 21st Century and included organizations such as the United States Coast Guard, the Federal Emergency

Management Agency (FEMA), and the Transportation Security Agency. The FEMA Response Division plays a pivotal role in consequence management as the lead organization to respond to and coordinate federal operational and logistical support to incidents of national significance (FEMA 2010).

The Department of Defense, NORTHCOM and the CBRNE Response Model

In addition to the establishment of the DHS, a shift of policy began from the National Security Strategy (NSS) and the National Strategy for Homeland Security. With these key documents, other federal departments refocused policy to meet the increasing threat to the homeland. The DoD directed U.S Northern Command (NORTHCOM) with the mission to be the lead DoD agency in Homeland Defense and Security. Due to the increased focus on the homeland threats through CBRNE means, DoD and NORTHCOM established the CBRNE response model linked to the National Strategy policies. Doctrinally, the DoD plays a supporting role in CBRNE consequence management to domestic events (Department of Defense 2006a, ix).

The DoD CBRNE Response model predominantly falls onto the active components of the U.S. Army and the Army and Air National Guard. Depending on the level of severity and the requests made by the state where the incident occurs, these units can be tasked by NORTHCOM and subsequently Joint Task Force-Civil Support for the purpose of CBRNE consequence and crisis management. Both Title 10 and Title 32 forces of all service branches make up the response framework. The response framework adopted by the DoD has tiers scalable to incident size. Typical response begins at the lowest level with the Weapon of Mass Destruction-Civil Support Teams (WMD-CST).

These twenty-two person teams arrive at an incident scene within three hours and are comprised of Title 32 forces working directly for their respective state governor. Though limited in capability, the WMD-CSTs augment local authorities in identification of hazards and facilitate follow on military forces if applicable. Concurrent with the WMD-CST, NORTHCOM often provides a Command Assessment Element (CAE) which identifies potential CBRNE hazards and prepares for possible federal response. If local authorities are overwhelmed, the National Guard can mobilize the CBRNE Enhanced Response Force Package (CERFP), the National Guard Reaction Force (NGRF) and the Homeland Response Force (HRF) at the request of a state governor. These forces are made up specifically of National Guard Soldiers and Airmen working under Title 32 U.S. Code directly for their respective state governors or, if across state boundaries, for the state lead agency. The top level response occurs in the event the HRF and CERFP forces are overwhelmed. The CBRNE Consequence Management Response Force (CCMRF) now known as the Defense CBRNE Response Force (DCRF) and attached enablers are Title 10 forces underneath Joint Task Force-Civil Support (JTF-CS). JTF-CS would assume the lead support coordinator for CBRNE consequence and crisis management. In these circumstances, the federal government also mobilizes other governmental organizations. For disaster response, the Federal Emergency Management Agency normally becomes the on-site federal coordination element with the DHS as lead federal agency. Doctrinally, the DoD supports the lead federal agency in all domestic incidents.

Thesis Question

The DoD is required by policy to support CBRNE consequence management and crisis management. Since 9/11, the federal government's responses to natural and man-

made disasters have come under a great deal of scrutiny. According to congressional reports of the response to Hurricane Katrina and post-training studies and reports of Operation Vibrant Response, a majority of this scrutiny is focused towards the DoD, FEMA, and the DHS, specifically targeting the unification of command and control during disaster response. During most incidents of national significance, the lead federal agency often requests DoD assistance due to manpower, transportation, and special equipment requirements. This holds especially true during CBRNE incidents. According to the Federal Preparedness Report of 2009, capability gaps exist between the DoD and other local, state, and federal organizations response capabilities as CBRNE is an area resourced and trained by the DoD. The thesis question is: Can the DoDs current CBRNE response model provide effective response to CBRNE incidents of national significance? Research will determine if the DoDs current CBRNE response model provides the most effective response to CBRNE incidents of national significance through analysis of goal attainment, response, and preparedness through historical examples and training events using the rubric of the National Response Framework.

The secondary questions are the following: What are the measures of effectiveness during a CBRNE incident? What functions must DoD be prepared to perform in a CBRNE incident? What are the capability differences between the DoD response model and other local, state and federal response models, and how have they been utilized?

This research is significant because post-incident studies of responses such as DoD response to the Los Angeles Riots and Hurricane Katrina demonstrate the lack of effectiveness of past incidents. Additionally, there are limited reviews of CBRNE

incident responses within the U.S. The research will measure the effectiveness of the current DoD model in responses to CBRNE incidents as a function of goal attainment, response, and preparedness through historical examples and training events using the rubric of the National Response Framework. These measures will determine the effectiveness to respond to CBRNE threats or incidents within the U.S., the limitations of the current response model, and potential changes the current model needs to ensure positive measures of effectiveness.

Assumptions

The first assumption is that during implementation of a CBRNE response force, CBRNE consequence management and crisis management will not be the only missions assigned. This becomes an issue because it increases the manpower and capability requirements of the response force, leading to a mobilization of other DoD assets. The second assumption is the DoD response force size and structure is entirely dependent on the nature, location, and severity of the CBRNE incident. Under the National Response Framework, incident response begins at the local level with the smallest element growing only when its capabilities are overwhelmed. The third assumption is that the public may not show a favorable opinion to crisis management efforts by DoD forces during a CBRNE incident. This becomes a problem in instances where the local population will not evacuate or remain outside quarantined areas. This issue becomes important due to restrictions imposed under Posse Comitatus on DoD forces under Title 10 U.S. Code. The fourth assumption is that most local, state, and other federal agencies lack the capabilities to properly respond to CBRNE incidents and in most cases, the DoD will be utilized.

Limitations

The research on this subject is limited to the actions and plans DoD has taken during and after the events of 9/11. Exceptions to this limitation will be historical examples used for case study as few CBRNE events have occurred post-9/11. The thesis will cover the response model and framework in place on September 11, 2001. The thesis will analyze the response model currently in place by the DoD and framework available through September 2010. The research will be limited to incidents and training events that fall within the realm of CBRNE.

Significance of Study

The DoD is required by presidential directive and through DoD Instruction 2000.18 to support CBRNE Consequence and crisis management and recently altered the mid-tiered response model from three CCMRF elements to ten HRFs and one DCRF. If this paper shows that the changed response model does not adequately address the current threats or cannot react efficiently, it may cause organizational and structural change in the response model. This study has the potential to refine the current CBRNE response model for future planning.

Summary and Conclusion

The purpose of this study is to determine if the DoDs current CBRNE response model provides the most effective response to CBRNE incidents of significance. Through analysis of goal attainment, response, and preparedness through historical examples and training events, the thesis will determine the effectiveness using the rubric of the National Response Framework. The research will begin reviewing works defining the legal

limitations and role the DoD has during CBRNE response. Once the current response model is defined, review of documents and texts will address secondary questions identifying measures of effectiveness, capabilities and responsibilities. According to Creswell, the case study research involves the study of the issue which is the effectiveness of the CBRNE response model in the thesis within a bounded system (Creswell 2007, 73). When the current response model is defined by responsibilities and capabilities, the paper will apply this model against historical CBRNE events.

CHAPTER 2

LITERATURE REVIEW

Introduction

The purpose of this thesis is to examine the current Department of Defense (DoD) Chemical, Biological, Radiological, Nuclear, and High-Yield Explosive (CBRNE) response model and determine if the current model can effectively respond to a CBRNE incident. There is no current study of the new CBRNE response model partially due to the fact the model has not been fully implemented. Additionally, the DoD utilized the current CBRNE response model only in training operations. Like the local, state and federal level responses, the CBRNE response is also tiered to meet the size and duration of the incident. The majority of significant work focuses on civil support and homeland defense, but does not specifically address CBRNE incidents. The intent of chapter 2 is to familiarize the reader with the current response model, the framework and limitations in which it operates.

Areas of Review

The literature review for this thesis is divided into three major areas. The first area is concerned with government documents and manuals related to and defining the response framework, limitations, and response models. The second area is significant previous work related to capabilities of the CBRNE response model, measures of effectiveness, and functions of the model pertaining to incident response. The final area is a review of organizations during response to incidents. These areas will be discussed in the context of post-9/11 as the current response model and framework changed

dramatically following the events of September 11, 2001. The historical examples will be discussed from 1980 until the present since there is very limited recent information on incident response to CBRNE events.

Response Framework

The requirement of the DoD to be able to respond to a CBRNE incident begins with the National Security Strategy (NSS). The strategy outlined within the NSS states that the United States must be capable to meet the full range of threats and hazards to our communities (The White House 2010, 18). There are two major security goals that set the framework for CBRNE response. The first goal is to strengthen security and resiliency at home, while the second goal is to reverse the spread of nuclear and biological weapons and secure nuclear materials (The White House 2010, 18-23).

Strengthening security and resiliency contains four sub-categories to increase or enhance resiliency and security. Only two of these categories apply specifically to CBRNE response. The first, enhancing security at home, identifies critical areas that the United States must focus on to include infrastructure and lines of cooperation between federal, inter-agency, local and state organizations. The NSS also acknowledges that defensibility can not deter every threat. The second category specifies management of a crisis and identifies the need to effectively manage emergencies post-incident. Since 9/11, this has been one of the major criticisms of the government, especially after the aftermath of Hurricane Katrina.

The National Strategy for Homeland Security (NSHS) is an additional federal document that supports the NSS by expounding on defense and mitigation of incidents of national significance. These critical infrastructure and key resources are particularly

vulnerable to the effects of CBRNE type incidents. Both the NSS and NSHS provide guidance for CBRNE response and detail a general outline of what is critical to the United States. The NSHS further provides guidance through the National Incident Management System (NIMS) and the National Response Framework (NRF).

On February 28, 2003, the President issued Homeland Security Presidential Directive 5 (HSPD–5), *Management of Domestic Incidents*, which directed the Secretary of Homeland Security to develop and administer a National Incident Management System (Department of Homeland Security 2008b, 3). HSPD-5 also directs other federal agencies, including DoD, to support the Department of Homeland Security (DHS) during incident response according to the NIMS. The DoD is specifically tasked to provide CBRNE response in support of the DHS from Title 50 U.S. Code § 2313. The NIMS is a standardized system that outlines the federal government's doctrinal roles during incident management. In conjunction with the National Response Framework, they provide the guidelines from which local, state and federal response to incidents occurs. These are the most important documents detailing the DoDs role in CBRNE crisis and consequence management. Furthermore, in conjunction with the NIMS, HPSD-8 directed the DHS to develop national planning scenarios (see figure 4) to illustrate the scope and magnitude of incidents which the nation should prepare for to reduce uncertainty in planning (Department of Homeland Security, 2008b, 11). The national scenarios are focused on the critical infrastructure and key resources. All the scenarios except one, Cyber Attack, have the potential requirement for CBRNE response.

Legal Guidelines

In order to understand the CBRNE response model set forth by the DoD, the legal guidelines requiring the CBRNE model must be defined. Several U.S. Codes and acts provide legal guidelines for the DoD to operate in the United States. Organizations under federal control of the DoD fall under Title 10 U.S. Code. Title 10 is the list of regulations, rules, laws and guidelines for use of the Armed Forces including federalized National Guard forces. For purposes of this thesis, the major area within Title 10 that needs attention is the restriction of the use of Armed Forces for purposes of enforcement of State and Federal Laws. The restriction can be lifted during specific times when approved by Congress during rebellions or specific states of emergency in accordance with the National Emergencies Act, Posse Comitatus Act or Insurrection Act. This restriction has historically been a subject of debate with the major restriction on the DoD being the Posse Comitatus Act.

The Posse Comitatus Act of 1878 essentially limits the use of federal military forces from conducting conventional law enforcement activities within the United States. Some of the activities restricted by Posse Comitatus include arrest, and search and seizure, There is disagreement over whether this applies in an advisory, support, disaster response, or other homeland defense role, as opposed to conventional law enforcement (Felicetti 2003, 79). According to Commander Felicetti's review of the Posse Comitatus Act, the law is clearly misunderstood, and the majority of limitations of use of federal forces are not from the law but from self-imposed limitations from the DoD on itself. John Brinkerhoff, a former associate director for FEMA, agrees with the misunderstanding of Posse Comitatus. The Posse Comitatus Act is not specific in

describing the role of Title 10 forces and application of Posse Comitatus. However, there are several exceptions that allow DoD forces to be used in law enforcement roles that are very specific. Title 18 U.S. Code specifies that anyone that uses the Army or Air force as Posse Comitatus without Constitutional authorization or congressional act are subject to fines and imprisonment. Furthermore, Title 10 U.S. Code specifies that the Secretary of Defense shall prescribe regulations that restrict DoD forces from conducting law enforcement or similar activities unless expressly authorized by law. Whether by the Posse Comitatus Act or self-imposed limitations, exceptions to Posse Comitatus are the National Guard, which falls under Title 32 U.S. Code when in State Active Duty Roles, the US Coast Guard under Title 14 U.S. Code and the U.S. Navy when conducting counter-drug operations in conjunction with the U.S. Coast Guard. Title 18 U.S. Code also addresses exceptions to Posse Comitatus in certain emergencies. Specifically, these emergency exceptions to Posse Comitatus arise in CBRNE incidents. The major exception to the limitation of use of federal forces is the Insurrection Act.

The Insurrection Act is within Title 10 U.S. Code under sections 331 through 334. These sections of Title 10 clearly delineate the applicable circumstances when the President is able to employ Federal U.S. forces to enforce the law by authority of Congress. Depending on the declared state of emergency by the President in accordance with the National Emergency Act, use of federal forces under the Insurrection Act can be as little as sending military police to assist local law enforcement to full Martial Law. In conjunction with the Posse Comitatus Act, the National Emergency Act provides a set of checks and balances to limit Presidential power when utilizing federal forces. In 2005, after the wake of Hurricane Katrina, the Insurrection Act was amended to apply to natural

or man-made disasters. This was repealed less than two years later because certain Senators believed it took away some of the checks and balances that the National Emergency and Posse Comitatus Act invoked.

Like the Insurrection Act, the DoD itself has similar exceptions when it allows Federal forces to act. Department of Defense Directives (DoDDs) give specific guidance to federal forces for actions. In cases such as a CBRNE incident, local law enforcement agencies may request immediate assistance from local military forces. DoDD 5535.05 *DoD Cooperation with Civilian Law Enforcement*, Section E4.1.2.3.1 states that the emergency authority authorizes Federal action including military forces to prevent loss of life or destruction and to restore public order only if local authorities are unable to do so. DoDD 3025.12 *Military Assistance for Civil Disturbances (MACDIS)*, Section 4.2.2 and 4.2.2.1 states that military forces shall not be used for MACDIS unless authorized by the President under emergency circumstances, and the acting commander must have exhausted all resources to obtain prior authorization from the President. These exceptions to Posse Comitatus allow local commanders to act on their own authority to provide assistance to local law enforcement during incident management. While restrictive, there are many cases where Posse Comitatus can be bypassed. The National Guard is perhaps the largest resource available during a CBRNE incident that does not have the disadvantage of being restricted through Posse Comitatus since it falls under Title 32 U.S. Code.

One of the most important caveats to the Posse Comitatus act that is specific to the thesis argument is specified in Title 10 section 382. Section 382 allows the DoD to conduct very specific law enforcement activities during nuclear, chemical, or biological

incidents that exceed the capabilities of local agencies and would impair the enforcement of laws by enforcement agencies. Section 382 of Title 10 U.S. Code allows limited use DoD as law enforcement, but does not lift restrictions on intelligence collecting, search and seizure, or arrest. While this specific portion of Title 10 allows law enforcement under certain circumstances, it is generally accepted that Title 10 forces will not conduct law enforcement activities.

CBRNE Response Model, Capabilities and Functions

Before the response model can be applied with the methodology of this thesis, it must be defined in terms of structure, capabilities, and functions. This will articulate the role it must take part in during CBRNE consequence management. The Quadrennial Defense Review (QDR) available in 2010 changed the model under which the DoD would conduct CBRNE Consequence Management. Prior to 2010, the typical CBRNE response model consisted of the WMD-CSTs, the CBRNE Emergency Response Force Package (CERFP) and the three CCMRF elements, two National Guard CCMRFs and the Active Duty CCMRF. The new model does away with the three CCMRF elements, the largest and most capable portion of the CBRNE response models. Instead, it replaces the two National Guard CCMRFs with ten Homeland Response Forces (HRF) aligned with the ten FEMA regions (see figure 5). The development of the regional model working closely with FEMA increases the unity of effort between these organizations.

The restructuring also takes the Active Component CCMRF and reorganizes it into a Defense CBRNE Response Force (DCRF). According to BG Johnathan Treacy, Deputy Director for Antiterrorism and Homeland Defense, as quoted in the CBRNE World magazine, "In reorganizing to a Defense CBRNE Response Force (DCRF), we

have increased to somewhere in the region of 5,200 to 5,400 personnel, and that increase of 800 to 1,000 personnel will be in the life-saving arena such as medical response capabilities." With the National Guard CCMRFs being shelved, and replaced by the HRF, it adds another tier of response with the intent that the response is quicker and more agile (Winfield 2010, 14). This move also allows the DoD to achieve more unity of effort between the lead agencies during CBRNE Consequence Management, generally FEMA, by aligning itself with the FEMA regions.

The overall structure within the DoD response force remains similar to the past response model. The difference is a regional based command and control element working in its own regional area providing a more rapid response time to incidents of national significance. The HRF model is designed to provide a regional command and control element for up to five CERFPs and nine CST elements (National Guard Bureau 2010, 14). The end state is the HRFs become fully operational with planning cells coordinating state and regional plans with the National Guard Bureau, FEMA, and NORTHCOM to provide a coherent response to a CBRNE event (National Guard Bureau 2010, 14).

The HRF is a brigade sized element closely resembling the CERFP with additional security elements and a robust command and control element (see figure 7). It will have a response time similar to the CERFP of six to twelve hours. Because it is a regional asset, the majority of equipment and personnel will be moved by ground transport to CBRNE incident areas (see figure 6).

The CERFPs make up the bulk of the NG Rapid Response Force capabilities. The CERFP is comprised of four elements staffed by personnel from already established

National Guard units (National Guard Bureau 2007a). They include a search and extraction team, a medical team, a decontamination team, and a command and control element. The command and control team directs the overall activities of the CERFP, and coordinates with the Joint Task Force–State (JTF-State) and the incident commander (National Guard Bureau 2007a). The search and extraction element is assigned to an Army National Guard Engineering Company, the decontamination element is assigned to an Army National Guard Chemical Company, and the medical element is assigned to an Air National Guard Medical Group (National Guard Bureau 2007a). Security duties for the incident site and the four CERFP elements are performed by the state National Guard Response Force (National Guard Bureau 2007a). The mission of the CERFP is to provide immediate response capability to the governor of each state including: incident site search capability of damaged buildings, rescuing trapped casualties, providing decontamination, and performing medical triage and initial treatment to stabilize patients for transport to medical facilities (National Guard Bureau 2007a). The concept of the CERFP is to augment other regional response in the event that they become overwhelmed. Initially, the WMD-CSTs would be deployed to the incident areas to make initial assessments.

The WMD-CST (see figure 12) is comprised of twenty-two full-time, Title 32 Active Guard and Reserve Army and Air National Guard personnel and is divided into six sections: command, operations, communications, administration/logistics, medical/analytical, and survey (National Guard Bureau 2007e). At the request of a state governor, a WMD-CST deploys to an incident site using organic transportation assets which includes a command vehicle, operations trailer, a communications platform providing multiple communications capabilities, a mobile laboratory capable of

identifying and detecting types of CBRNE hazards, and several general purpose vehicles (National Guard Bureau 2007e). The initial response standard is within three hours of notification by their respective state governor.

Depending on the severity of the incident, the tiered response may include other enabling assets. The National Guard Response Force (NGRF) is a security element normally assigned to the HRF when required to respond to an incident. The NGRF force package contains approximately 75 to 125 personnel designed to respond to an incident ahead of federal assets within four to eight hours (National Guard Bureau 2007d). An additional force of up to 375 can arrive within another 24 to 36 hours. The mission of the NGRF is to respond and assist in the protection of critical infrastructure, other state or national assets, and any other missions as directed to promote stability and security (National Guard Bureau 2007d). The NGRF is formed from local, state and regional National Guard units organized as a task force under Title 32. Predominantly, these units are focused on security and stability. While not a unit directly responding to a CBRNE incident, the NGRF retains capabilities to manage secondary incidents such crowd dispersal or protection of CBRNE response forces. Unlike federal forces, the NGRF is not restricted by Posse Comitatus legalities.

Like the NGRF, other attached enablers are required to complete missions during CBRNE incidents. Aeromedical Evacuation from fixed wing and rotary wing aircraft is not always available during incidents to state National Guard organizations. In addition, medical facilities, and mortuary affairs units are not always available to a deployed Rapid Response Force. During a non-deployed status, the Rapid Response Force has access to the States complement of enablers (see figure 8). However, depending on the location of

the CBRNE incident and the memorandums of agreement and understanding between states, this may change (see figure 9).

In addition to the response model located solely within the National Guard, the Active Duty forces contain the Marine Corps Chemical and Biological Incident Response Force (CBIRF), the two Command and Control CBRN Consequence Response Elements (C2CREs) and the DCRF. The CBIRF is the Marine Corps equivalent to an HRF with associated enablers but on a smaller scale. The CBIRF is organized into five separate functions which include reconnaissance, decontamination, medical, security and service support. The CBIRF is composed of approximately three hundred personnel total. The capabilities of the CBIRF are similar to a deployed HRF on a smaller scale; it retains the detection, decontamination, medical treatment, and security capabilities. The distinguishing characteristic of the CBIRF is that it is self-sustainable for up to fourteen days unlike the Active Army and National Guard counterparts (Globalsecurity.org 2010).

The Active Army response model contains the DCRF and the two C2CREs. This is the highest tiered response force to a CBRNE incident by the DoD. The DCRF was formerly the CCMRF-1 element complementing the National Guard CCMRF-2 and 3 organizations. The DCRF closely resembles the CCMRF in structure with the addition of approximately 1,000 more personnel in the medical specialties for a total of approximately 6,000 personnel. The DCRF mission remains the same as the CCMRF however. The DCRF mission falls under Title 10 and is made up of Active, Reserve Components, and Federalized National Guard assets. The DCRFs, primary role when responding to a CBRNE event is to augment the CBRNE consequence management efforts of civil responders by providing complementary and reinforcing capabilities when

the effects of the event exceed state civilian and NG capabilities (Anderson 2009, 6). The DCRF is employed by U.S. Northern Command (NORTHCOM) and works in conjunction with the lead federal agency responding to the CBRNE incident. The DCRF does have internal security but does not react to civil disturbances associated with incidents because it is a Title 10 U.S. Code element. All the restrictions of Title 10 U.S. Code apply to the element when activated. The typical structure of the DCRF includes three task forces assigned under the DCRF headquarters (see figure 10). These include Task Force Operations, Task Force Medical and Task Force Aviation. The strength of the DCRF is that by rapidly establishing a substantial JTF command structure on the ground, the DCRF can respond to requests for follow-on forces which will be effectively integrated into the response (Anderson 2009, 7). This allows the DCRF to effectively request and integrate other forces deemed necessary to provide CBRNE consequence and incident management during a CBRNE response.

The Army's Maneuver Enhancement Brigade (MEB) typically will be the unit assigned the DCRF mission as the MEB contains the majority of forces necessary to complete the CBRNE consequence and incident management. The MEB has the most complete multifunctional staff of any Army brigade with the staff skills needed to C2 consequence management operations and is designed to integrate many of the types of units that have the greatest applicability in support to consequence management (Department of the Army 2009, 7-1) The principle mission of the DCRF is directly related to doctrinal responsibilities of the MEB. The MEB would be augmented with the Medical Task Force and Aviation Task Force personnel and equipment, but would make the bulk of the Operations Task force. While a brigade combat team or other brigade

level command and control element could effectively serve as the Task Force Operations headquarters element, the MEB is uniquely suited for the command of engineer, military police, and CBRNE units (Anderson 2009, 7). The MEB command structure and operational employment concept, which includes consequence management as a part of the core mission set, provides an optimized capability for this requirement (Anderson 2009, 7). The typical MEB also has the key task of CBRNE Consequence Management with key response tasks including: assessing CBRNE hazard, conducting risk management, responding to chemical/biological explosive ordnance disposal incidents, responding to WMD incident, planning/preparing for CBRNE CM support, responding to a CBRNE CM incident, and providing mass casualty decontamination support. The typical Maneuver Enhancement Brigade consists of a headquarters company, a network support signal company, and a brigade support battalion. As required, the MEB could also have augmentation of an engineer battalion, a military police battalion, a chemical reconnaissance/decontamination battalion, and an explosive ordnance disposal team that would further enable it to conduct CBRNE consequence management (see figure 11).

The C2CRE is the most recent addition to DoD CBRNE consequence management. There is limited literature regarding this entity primarily because it is currently not tasked to a military unit nor has it been finalized in structure. Currently, the C2CRE stands at approximately 1,500 personnel and has redundant capabilities of the DCRF (Department of the Army 2010b). In the event that the C2CRE is required for disaster response, the planning factor of ninety-six hours is required (Department of the Army 2010b). The C2CRE remains a Title 10 response force and was designed to complement the DCRF (RAND 2010, 30). This structure was put into place due to the

two National Guard CCMRFs becoming smaller and regionally focused HRFs. The C2CRE can be followed into a response with general and special purpose personnel as required by DoD.

The current DoD response model has robust capabilities at multiple levels. The current model is built in response to federal disaster response since 2001, and as of 2010 it became regionally focused providing a more agile response across a wider geographical area. The morphing of the CCMRF into the active component DCRF and C2CREs and the implementation of the HRF in the National Guard provide greater flexibility for a measured response nationwide. The paradigm change has increased the capabilities of the DoD response model to more closely react to anticipated threats.

Capability Gap

There exist multiple capability gaps between DoD CBRNE response and those of other federal, state and local organizations. The capability gap lies with numbers of personnel, equipment, and sustainability. A portion of the capability gap is due to the requirement of CBRNE capabilities in order to fulfill wartime requirements. Another portion is due to the lack of resources of local and state agencies. The DoD has a considerable budget and is required by directive to be able to respond to CBRNE incidents. The organizations in the DoD model are self-deployable with assistance from other DoD assets. With the multiple tiered structure of the DoD response model, a large number of trained personnel are available to deploy nationwide with specialized equipment. The transport capability of the DoD also lends itself to be the most sustainable in an isolated environment. The DoD model is based on the regional concept that allows for operational flexibility.

Multiple federal agencies have CBRNE specializations that will be utilized in the event of a federal response to a CBRNE type disaster. The Department of Energy has the National Nuclear Security Administration which can provide specialists in nuclear disasters. However, the numbers are nowhere near what can be provided by DoD. At state and local levels, the capability gap widens due to these specializations. An average mid-sized American city has only a local police, fire, and ambulance force which would be rapidly limited in the event of a medium scale CBRNE event. Like other governmental agencies, the DoD has additional organizations that are capable of providing support to CBRNE incidents that are not within the normal structure of the response structure. These include the operational forces assigned to military divisions that have the ability to provide transportation and manpower, one of the most critical requirements during incident response. There are multiple special organizations within the DoD such as the CBRNE command that have capabilities to support CBRNE incidents. The largest of these is the 20th Support Command. While the subordinate units are generally used for tactical missions, they have capabilities that can be critical during a domestic response.

The 20th Support command has a subordinate organization, the Consequence Management Unit that has the mission to support domestic CBRNE incidents. The 20th Support Command has analytical and forensic capabilities. However, there are limited decontamination capabilities as the unit is only equipped and resourced to decontaminate its organic personnel and equipment. In addition to the Consequence Management Unit, the DoD has other organizations such as the Army Medical Research Institute of Infectious Diseases, the Defense Threat Reduction Agency, the U.S. Army Technical Escort Unit, and the Chemical Biological Rapid Response Team. In addition to the

specific CBRNE organizations, DoD also has the ability to forward deploy hospital and medical assets, mortuary affairs, and religious support.

The capabilities of organizations must be tailored to meet the incident and be able to have a positive effect on the incident. In order to define positive effect, Measures of Effectiveness (MOEs) must be defined for the specific incident. This is especially true in CBRNE incidents where, often times, the incident exceeds the capability of local means. In events where incident exceeds local and state capability, one major issue arises. Ongoing missions in support of operations globally can and do limit resource availability. This is especially true to operational DoD assets. Tailoring the organization enhances response capabilities and limits excessive operational costs especially when the requested assets are limited in availability.

Incident Management and Measures of Effectiveness

Measures of effectiveness for response to CBRNE consequence management are difficult to define (Brown n.d., 2). They differ depending on the severity of the incident, where the incident occurs, and also the length of time required to stabilize the area where the incident occurred. As poorly defined as they might be going into a CBRNE situation, the measures of effectiveness will need to be clarified to determine what is needed for successful incident management. In order to calibrate measures of effectiveness, the problem or disaster must first be defined. According to Dr. Donald Brown, disasters are spatial-temporal events which impact social units which then invoke responses to the event or events (Brown n.d., 6). Understanding that a disaster and disaster response causes both physical and social concerns will assist clarifying measures of effectiveness. The disaster response is simply a means to return wholly or partially to the ~~–s~~tatus quo"

(Brown n.d., 6). Measures of effectiveness can be developed once the disaster is defined. Historical data provides information that may assist with developing relevant measures of effectiveness. Relying on historical data from past disasters is necessary and is the basis of any model which might be created. However, historical data has many pitfalls because it is reactive and there are inconsistencies due to non-standard methodologies used during a disaster response (Brown n.d., 4). As dissimilar as all disasters are, the measures of effectiveness must be tailored to meet the differences. Historical data will be able to provide the similarities to expound upon.

The most effective measure for disaster response is through goal attainment according to research by Brown. Through stated goals, the organization can develop objective and subjective metrics to determine how effective the disaster response framework is. Measures of performance are not as necessary on the macro scale during disaster response using the goal attainment method. According to Brown, ~~"~~It does not necessarily matter *how* the mission was accomplished, rather *how well* it was accomplished." Clearly defined objective and subjective goals with identifiable metrics will enhance disaster response as these will facilitate a return to the status quo.

Once the disaster is defined and measured in scope, the response must be scaled to meet the goals. Metrics must be developed in order to ascertain attainment of the goals and must be related to the disaster's physical and social impacts. Physical impacts could be destruction of infrastructure or degradation of capabilities; social impacts may be deaths, injuries or an evoked attitude towards the responders. Goals such as saving lives or rebuilding infrastructure are easily defined and measured objectively, but readiness or capabilities are more difficult and require subjective metrics. While important, subjective

metrics are not easily quantifiable and effort should be made to change the metric to one of objectivity (Brown n.d., 22). For example, whether someone is classified as a mild or severe casualty might be a subjective determination; the fact that the person is a casualty and is injured to some level is objective (Brown n.d., 22). Measures of effectiveness should fall under the general goals of protecting life and property, stabilization, mitigation, rescue, and safety (Brown n.d., 22).

Measures of effectiveness enhance unity of effort in disaster response. MOEs allow participants in the management process to know what others are doing and why (Burkel 2004, 259). They additionally serve to bring together organizations and agencies that need to support each other, serve as a tool for coordination and communication, and minimize needless confusion and risk (Burkel 2004, 259). Measures of effectiveness establish a common language during incident management facilitating unity of effort. MOEs serve as an integrative performance tool that allows for the crossing of sector and professional boundaries while influencing both policy decisions and the operationalizing of policy (Burkel 2004, 259). This is important as post-incident studies of disaster responses to incidents recognize unity of effort as one of the critical factors limiting effectiveness.

DoD Response to Incidents and Issues

There is limited documentation of federal DoD responses to CBRNE incidents within the United States. This is partially due to the very limited existence of incidents that have exceeded the capabilities of local and state resources. In addition to this, the new response framework has not been utilized in a CBRNE incident. NORTHCOM has conducted multiple training events in the past to test the response system, but these are

also limited in number. One exercise called Operation Vibrant Response tested the DoD capability to respond to a radiological device in support of FEMA and local and state agencies. Vibrant Response is a culminating exercise for Defense Support to Civil Authority operations conducted by U.S. Army NORTHCOM (Winnefeld 2010). NORTHCOM conducts the exercise yearly in multiple locations. Vibrant Response 11.1 recently took place with a simulated nuclear detonation in Louisville, Kentucky (Manuszewski 2011). In addition to the Vibrant Response exercises, DoD organizations have been employed in other Defense Support to Civil Authorities roles. One of the most fundamental issues that have been brought to light is the need for coordinated response.

Coordinated response being the most fundamental issue is one of the key points in all post-incident reports associated with DSCA incidents. Post-incident reports of the response to the Los Angeles Riots in 1992 as well as the response to Hurricane Katrina show multiple instances where coordinated effort limits response effectiveness. While this has not necessarily been the fault of DoD, it shows that there was an issue between the supporting organizations and the lead organizations. Some of the additional findings through subsequent post-incident reports show that the other issues are lack of accountability through unclear chains of command, poor communication, no systematic planning processes, and undefined integration requirements for interagency structures (FEMA 2011). These lessons learned and issues were fundamental to the changes of the DoD shift in structure and framework. To better meet the threat of CBRNE incidents, the structure changed.

Current Threats

In order to justify the need to have or change the response model, the threats must be analyzed. Terrorist organizations have stated that it is their intent to pursue weapons of mass destruction and use them against Americans. Aside from this threat, there are multiple instances where toxic industrial chemicals or materials could be released inadvertently, pathogens could mutate and spread rapidly throughout the population, or a nuclear meltdown could take place. There could also be instances where more than one CBRNE incident may arise due to natural disaster as witnessed in Hurricane Katrina or most recently the tsunami in Japan and the Fukushima Dai Ichi Nuclear Reactor. On March 11, 2011, an earthquake of 8.9 magnitude caused a tsunami to impact the coastline of northern Japan (*New York Times* 2011). The resulting tsunami caused destruction of large quantities of farmland and urban structures. Furthermore, the tsunami caused disruption of the cooling system for the Fukashima Dai Ichi Nuclear reactor. The resulting loss of the cooling supply caused a breach in the reactor which began leaking radioactive elements into the surrounding area (*New York Times* 2011). At the conclusion of this research, the reactor still continues to leak and efforts are still underway to restore the reactor system.

Chemical incidents pose perhaps the largest threat. Of all the weapons of mass destruction, chemical weapons have been the most widely prolific and utilized (Drell 1999, 6). Industrial chemicals and materials are widely utilized in factories, and most households contain chemicals that improperly utilized can affect plant or animal life.

Biological incidents differ from chemical incidents in that their scope of destruction could be far larger. The most dangerous part of biological incidents is that

they pose extraordinary challenges for detection, mitigation, and remediation (Drell 1999, 41). Biological weapons are difficult to manufacture, but natural diseases pose a threat equal to man-made incident. Dire social, medical, and economic consequences possibly arise in the event of a natural spread of a disease such as avian flu among the human population or a foot and mouth outbreak among the cattle population.

Nuclear incidents are the least likely to occur considering that fissile material is extremely difficult to obtain in sufficient quantity to pose a major threat and requires special handling and knowledge. Since September 11, 2001, security of fissile material and nuclear facilities has increased dramatically (Nuclear Regulatory Commission 2011). However, nuclear incidents can pose the most destructive effects. If an organization were to acquire sufficient materiel and the knowledge, they would have a pure terror device. Aside from terrorist action, an accidental nuclear reactor meltdown has consequences that last years. High yield explosives, while not new, do not necessarily have the same lasting effects of chemical, biological or nuclear incidents.

Historically, CBRNE incidents have occurred, and they continue to occur. Toxic chemicals were inadvertently released due to faulty storage techniques in Niagara Falls, New York. The Three Mile Island nuclear power plant nearly melted down in 1979. In 1918, the Spanish Flu pandemic killed millions globally. Natural, accidental, or intentional CBRNE incidents pose serious threats and preparedness must occur in order to rapidly respond and negate the effects. Preparedness must occur not only with DoD but at local, state and federal levels.

Local, State, and Federal Preparedness

The most vital piece to incident response is preparedness at the lowest level. Ultimate success in the effort to react to CBRNE incidents will in large part depend on how government is reorganized (Daalder 2001, 1). Preparedness at all levels is essential to having the capability to respond to CBRNE incidents

The National Response Framework, National Incident Management System, and the Incident Command System are key components to instituting preparedness at local, state, and federal level. These documents are the concepts adopted by organizations to form a cohesive preparedness doctrine. Essentially, local, state, and federal agencies adopted the National Response Framework.

Most states and local communities have a response coordinator. In fact, many churches and businesses have followed the plan and have their own response coordinator as well. DoD is no different than these organizations. The establishment of NORTHCOM as well as the shift into a regionally focused response model has demonstrated the preparedness within the CBRNE response framework.

Summary

This chapter presented a familiarization of the DoD CBRNE response model and the framework in which it operates. The DoD CBRNE response model is limited to an extent legally in actions it is forbidden to take through Posse Comitatus and some of the delimitations offered through additional information in Title 18 and DoD policies. Familiarizing with the capability gaps between the DoD and other organizations coupled with CBRNE threats demonstrate that there is a sustained requirement for a response

model. However, the limited information in regards to DoD responses to CBRNE incidents demonstrates the limited responses DoD has conducted in CBRNE incidents.

Chapter 3 will present the methodology used to determine if the current response model can effectively respond to a CBRNE incident. It will be the basis for identifying shortfalls within the current response model and methods of improvement.

CHAPTER 3

RESEARCH METHODOLOGY

> First, no commander working for me will ever come into your state to operate independently of what you and your governor believe needs to be done. And I've told your TAGs, if one tries to, then we'll have a very short and exciting conversation. Second, when a disaster strikes your state, I don't want to be one second too early…nor do I want to be one second too late, if you need our support. We're simply not as good at this as I believe we need to be. I want to be limited only by physics, not by bureaucracy…and we're working on improvements to the latter. We've got a lot of work to do.
>
> — Admiral James A. Winnefeld, Jr.,
> Commander, NORAD and USNORTHCOM,
> 132nd General Conference of the National
> Guard Association of the United States

Introduction

The research methodology used for this thesis is a case study with qualitative and quantitative analysis of data. The advantage of the case study is that it builds upon already established theory (Creswell 2007, 73). Historically, the case study method is used in social sciences (Creswell 2007, 73). The benefits that the case study allows for this thesis is that it examines multiple sources and offers lessons learned from the cases (Creswell 2007, 75). It allows for interpretation of historical facts in regards to the thesis. The disadvantage to the case study is that it is non-specific and results found in the case study are not always applicable to current theories. In order to mitigate the disadvantages, multiple cases will be utilized to show different perspectives on the same problem. The cases presented will demonstrate an in depth analysis of the Chemical, Biological, Radiological, Nuclear, and High-Yield Explosive (CBRNE) response model against different incidents both in size and scope. Through cross case-analysis, the study will

show generalizations and a holistic view of the CBRNE response model as well as issues that are common among the cases (Creswell 2007, 75).

The purpose of this case study is to examine the current Department of Defense (DoD) CBRNE response model and determine its effectiveness. Chapter 1 provided a brief historical vignette of the purpose of the DoDs response model. The literature review examined documents defining the framework and response model identified by the DoD for CBRNE response. It also examined and described how measures of effectiveness will be used in incident management and discussed past DoD responses to incidents of national significance, issues arising from those responses, and current threats.

To adequately assess the thesis question, the secondary questions must be answered. The secondary questions are the following: What are the measures of effectiveness during a CBRNE incident? What functions must the DoD be prepared to perform in a CBRNE incident? What are the capability differences between the past and current response models within the DoD, the capability differences between the DoD response model and other local, state and federal response models, and how have they been utilized?

In order to determine the effectiveness of the CBRNE response model, the model will be applied in specific cases. Using the rubric of the Federal Emergency Management Agency (FEMA) definition of disasters (see figure 13), the current DoD CBRNE response enterprise never responded to a large scale CBRNE incident within the United States. The current response model has only been exercised in limited training events and during small scale CBRNE incidents. Certain events occurred within the United States

such as the Exxon Valdez oil spill which subjectively are defined as large scale. However, the current DoD response model did not participate in the response efforts.

Analysis Criteria

Based on the limited information in regards to CBRNE incidents within the United States, an analysis of CBRNE events worldwide will be the only method feasible to determine the effectiveness of the CBRNE response model. Using the framework of the DoD response model applied to the incident, findings and recommendations can be made. Criteria are to be objective in that they meet the requirements of disaster response. To determine objectivity, the rubric used for analysis is the National Response Framework (NRF). The DoD is required by presidential directive to utilize the National Response Framework as the system in place for disaster response. The method to answer the research question is utilization of the NRF essential activities for preparing to respond to an incident: plan, organize, train, equip, exercise, and evaluate. This will be coupled with the NRF response tasks: gain and maintain situational awareness, activate and deploy resources, coordinate response actions, and demobilize. This method of evaluation provides a response structure and provides insight into effectiveness. Attainment of goals will be measured by the capabilities of the CBRNE response model. In order to remain objective and eliminate research bias, each essential activity will be weighed using the rubric of the Military Decision Making Process course of action rubric of suitability, feasibility, acceptability, distinguishability, and completeness to the actions required in the case studies (Department of the Army 2010, B-14).

The author will utilize three distinct case studies of CBRNE incidents. The major issue with the cases in the study is only one case has a DoD response historically

associated with the efforts. The second and third cases occurred outside the United States and had no historical response by DoD elements. In order to justify the application of the DoD response model, the cases outline a framework in which the DoD response model is applied to. By accepting the capabilities determined in chapter 2, it can be ascertained that the cases outside the United States are relevant when applied to the incident. One of the key principles of the National Response Framework is the requirement of scalable, flexible, and adaptable operational capabilities. Utilizing cases outside the scope of historical DoD responses demonstrate the holistic analysis approach according to Creswell.

Research Method

The research began with a comprehensive view into the National Response Framework as well as the legal guidelines in which the CBRNE response model falls. Answers to the primary and secondary research question became apparent through analysis of the threat, incidents, and response model. Because CBRNE incidents are a function of risk, the composite risk management steps were used as an analytical rubric. Composite risk management is a process used to mitigate risks associated with all hazards that have the potential to injure or kill personnel, damage or destroy equipment, or otherwise impact mission effectiveness (Department of the Army 2004, 1-1). Using the composite risk management steps to assess risks, the threats and incidents were assessed for areas requiring DoD response. The response model was assessed for areas of decreased effectiveness in reviews of the literature. In chapter 4, the response model is applied without controls being implemented and an evaluation is completed through

chapters 4 and 5. Chapter 5 shows developed controls or lessons that can be implemented into the system in order to enhance effectiveness.

Once the literature review was completed, the methodology for analysis was finalized and cases for study were identified. Evaluation criteria were developed to analyze the cases in depth to determine efficiency of the CBRNE response model. In order to determine objectivity, the military decision making process course of action screening rubric was applied to actions the DoD response model would doctrinally take within the NRF preparedness and response tasks. This method determines the validity of DoD actions within the NRF preparedness and response tasks (Department of the Army 2010c, B-14). The screening rubric determined how well the CBRNE response model meets the evaluation when applied to the cases within the study. The two evaluation criteria answered the thesis question.

The NRF indicates that in order to be effective, the CBRNE response model must be prepared to respond to a set of incidents. Under the umbrella of preparedness evaluation criteria will be the NRF essential activities. First, an organization must have a plan in place. The second factor is that the CBRNE response element must be organized to properly respond to a specific incident. Third, members of the response model must be trained in the management of that incident. Fourth, the response model must be equipped to handle a variety of missions associated with incident response. Finally, the response model must be able to exercise operations and be able to evaluate itself and put best practices to use. This evaluation criterion will determine if the CBRNE response model is prepared to respond to an incident. The majority of this information was determined from the analysis during chapter 2 of the study. In order to evaluate response, four factors will

be utilized with the CBRNE response model applied to the cases. These are the NRF respond tasks: gain and maintain situational awareness, activate and deploy resources, coordinate response actions, and demobilize.

Preparedness

Plans should have clearly defined leadership roles and responsibilities, and they should clearly articulate the decisions that need to be made, who will make them, and when (Department of Homeland Security 2011, 28). Table 1 describes the evaluation criteria for determining preparedness of the CBRNE Response Model.

Table 1. Evaluation Criteria: Preparedness

Preparedness: Preparedness is absolutely essential if an organization is to efficiently respond to a CBRNE Incident. Organizations cannot prepare for all types of incidents, but must best plan, organize, train, equip, and practice for the most likely incident to occur.	
Plan:	The plan is based on readily available resources. Plan should include both hazard specific and all-hazards response operations.
Organize:	Organization is structured for rapid deployability, tiered, and easily put into action. Resources should conform to NIMS organizational and management principles.
Train:	The organization is trained to operate and manage CBRNE incidents. Relevant training should comply with standards and measure proficiency.
Equip:	Organization contains all necessary equipment to manage CBRNE incidents of significance. Equipment should be interoperable between agencies.
Exercise:	Unit has conducted training or responded to incidents. Regular training and operations should occur.
Evaluate:	Training and response has been reviewed for lessons learned and better practices have been implemented.

Source: Department of Homeland Security, *National Response Framework* (Washington, DC: Government Printing Office, 2008), 27.

Respond

Once an incident occurs, priorities shift – from building capabilities to employing resources to save lives, protect property and the environment, and preserve the social, economic, and political structure of the jurisdiction (Department of Homeland Security 2011, 32). The key point in establishing the CBRNE response model is for it to respond to incidents both rapidly and efficiently. The second evaluation criteria will further answer the thesis question and define if the model is efficient.

Table 2. Evaluation Criteria: Respond

Respond: An organized, rapid response is necessary during a CBRNE incident. Organizations must be able to gain situational awareness, activate, and, most importantly, have a structured response. The organization must be able to then move out of the environment when no longer necessary for operations.	
Gain and Maintain Situational Awareness:	Situational Awareness is essential to defining the characteristics of a CBRNE incident. Measures of effectiveness are developed from awareness of all aspects of the incident. According to the NRF, the priorities are providing the right information at the right time, improving and integrating national reporting, and linking operations centers and using subject matter experts (Department of Homeland Security 2008a, 33).
Activate and Deploy Resources and Capabilities:	The NRF states that the fundamental activities are the following: activating key resources, requesting additional resources, and identifying needs (Department of Homeland Security 2011 35,). A tiered deployment of key resources that match the mission is instrumental in a rapid recovery.
Coordinate Response Action:	The model must manage emergency functions, coordinate actions, coordinate additional support, identify and integrate resources and capabilities, and coordinate information. This is the overall function of the response model.
Demobilize:	The model should be able to conduct an orderly return to normal staging areas. DoD doctrine states that military forces should transition operations to civilian agencies when military forces are no longer needed.

Source: Deparment of Homeland Security, *National Response Framework* (Washington, DC: Government Printing Office, 2008), 32.

Comparison of Incidents

Using the composite risk management model to analyze the response model, the literature review in chapter 2 shows how the response model is prepared to react to CBRNE incidents. Chapter 4 will analyze whether the CBRNE response model would be prepared for and efficiently respond to a small, medium, and large scale CBRNE incident. In order to apply the evaluation criteria against the response model, several assumptions will be made because two of the events occurred outside the United States. The incidents will be described in detail and facts about the incident will be shown. Each incident contains a subject assessment of the CBRNE response model within the scope of the CBRNE event. A comparison of the evaluation criteria with respect to each incident shows how well the CBRNE response model reacts to CBRNE incidents. This comparison outlines possible shortcomings or strengths in the model.

Table 3. Evaluation Criteria: Comparison

	Small Scale	Medium Scale	Large Scale
Preparedness	Exceeds, meets, or fails to prepare for incident	Exceeds, meets, or fails to prepare for incident	Exceeds, meets, or fails to prepare for incident
Response	Exceeds, meets, or fails to respond to incident	Exceeds, meets, or fails to respond to incident	Exceeds, meets, or fails to respond to incident

Source: Deparment of Homeland Security, *National Response Framework* (Washington, DC: Government Printing Office, 2008), 25-45.

Capitol Hill Anthrax Incident

The first incident in the case study occurred in 2001 in the Capitol Hill Region of the United States. Seven anthrax laden letters were sent from a Trenton, New Jersey post office. The letters were sent through the U. S. Postal system. Five of the letters were sent on September 18 with one going to American Media in Boca Raton, Florida, a second to the *New York Post,* a third to Tom Brokaw of NBC News, a fourth to ABC News, and a fifth to Dan Rather of CBS News (Frerichs 2002). On October 9, two more letters were sent from Trenton, N.J. via Brentwood mail processing facility, one to Senator Tom Daschle and the other to Senator Patrick Leahy (Frerichs 2002).

Due to cross contamination, a total of twenty-two cases of anthrax developed. A total of five deaths were the result of both cutaneous and pulmonary anthrax (Frerichs 2002). There is no estimation of how many total persons were exposed to the anthrax spores, but cross contamination through the mail routes led to multiple sites being contaminated. The contaminated sites included the following: Hart Senate Office Building on the Capitol Hill, the Brentwood Processing and Distribution Center (PDC), the Hamilton PDC, the Department of Justice (DOJ) postal facility, the General Services Administration (GSA) Building 410, and the Department of State (DOS) Annex-32 (Canter 2003, 2). The contaminated space totaled over 23 million cubic feet in those locations (Canter 2003, 3).

The incident caused alarm throughout the United States. Very few illnesses resulted from the attack. However, the attack had a large psychological effect on the population. Over ten-thousand people in the United States were put on antibiotics due to possible exposure (Burke 2007, 50). The form of delivery of the anthrax essentially

limited its efficacy. The largest impacts to infrastructure would be closing of multiple buildings, identification of contaminated areas, and cleanup. The U.S. Postal Service also began to irradiate processed mail in order to prevent other infections (Burke 2007, 51). The cleanup efforts were the largest requirement, finally being completed in the mail processing centers in 2003 (Burke 2007, 51). The Environmental Protection Agency led the cleanup efforts. In addition to the Environmental Protection Agency, the Federal Bureau of Investigation, FEMA, the Center for Disease Control and Prevention, U.S. Army assets, and the Marine Corps Chemical and Biological Incident Response Force (CBIRF) played a role in identification and clean-up of the incident sites.

This is the first case study to be analyzed in chapter 4. This case was chosen because it contained a biological incident within the United States. In addition, the response included assets from the DoD. The analysis in chapter 4 does not detail the historical actions of the DoD responses during this incident. The case frames a small scale biological incident with application of the DoD CBRNE response model.

Tokyo Subway Sarin Incident

The second case study occurred on 20 March 1995. In a coordinated attack, five members of the Aum Shinrikyo cult released sarin gas in five areas of the Tokyo subway system. The attacks began at approximately 0830 with subway passengers complaining of strange smells and odors encountered in one of the train stations (Brackett 1996, 1). The cult members released sarin on three separate lines of the Tokyo subway system in five different subways. Within a few hours, it was estimated that over five thousand people were exposed to the sarin gas.

The delivery method used in the attacks was the placement of liquid sarin in eleven bags which were then pierced with umbrellas (Tucker 2000, 218). The delivery system lacked proper means for dispersal, and the low purity of the liquid sarin evaporating from puddles on the subway trains floors prevented large scale casualties (Tucker 2000, 219). Had the delivery means been more effective, it is assumed the casualties would have been much greater.

The majority of victims of the attacks became ill from low level exposure to sarin gas with typical effects of nausea, vomiting, loss of vision, falling unconscious, and muscle spasms (Burke 2007, 126). There were a total of eleven deaths, fifty-four seriously injured, and over three-thousand with limited exposure (Burke 2007, 125). Most of the seriously injured and deaths were onboard the subway. Many, however, fell victim to secondary spreading of the chemical both at the subway stations and at the hospitals where the affected were taken (Burke 2007, 126). Secondary victims included hospital staff and emergency response workers due to their lack of situational awareness of the use of a chemical weapon (Burke 2007, 125).

Sarin is normally atomized for release as a chemical weapon. The Aum Shinrikyo cult, however, sealed the liquid sarin in plastic bags which were left on the floors of the subway cars and punctured. Like the delivery method for the anthrax in the first case study, this method limited its efficacy. The release in sealed subway cars did concentrate the sarin vapors in a confined area which caused the large numbers of sickened people. The effects on infrastructure included multiple hospitals being overrun with affected people. Public transportation services shut down on the subway system, and streets crowded with emergency services. Difficulties lie in measuring the psychological effects

of the attack. It frightened the citizens of Japan in ways that they had not experienced since World War II (Brackett 1996, 7).

This is the second case study to be analyzed in chapter 4. This case was chosen because it contained a chemical incident and is considered a medium sized incident. The analysis in chapter 4r does not detail the historical actions of responders during this incident. The case frames a medium scale chemical incident that the new CBRNE response model will be applied to.

Chernobyl Nuclear Reactor Incident

The final case study occurred on 26 April 1986. The Chernobyl nuclear power station in the former Soviet Union experienced an explosion in the number 4 reactor (Gale 1988, 26). The incident began on 25 April 1986 with a series of tests being performed on the number 4 reactor. In order to fully understand the situation at Chernobyl, the difference in structure between standard U.S. reactors and the Soviet type reactors needs to be examined. In a standard U.S. reactor, nuclear fission is controlled with a type of control rod using cadmium, boron, or graphite to slow or stop nuclear fission (Gale 1988, 26). In between the fuel rods is a moderator substance such as water or graphite that essentially controls the rate of nuclear fission. The water or graphite also acts as a coolant. In addition to this, the nuclear reactors in the U.S. are generally housed inside stainless steel containment vessels which are again housed within reinforced concrete structures (Gale 1988, 26).

Chernobyl differed dramatically in the structural design which led to exacerbation of the meltdown. The Chernobyl reactor was moderated or cooled with graphite as opposed to water which leads to uncontrolled fission in the event of loss of coolant (Gale

1988, 26). The reactors in Chernobyl were also not housed in protective concrete structures but in buildings (Gale 1988, 26).

The events that led up to the reactor meltdown included a series of tests to determine how long the generators would produce electricity to run the water cooling pumps after an interruption in the normal electrical supply (Gale 1988, 26). Over the next twenty-four hours, the power regulation system and emergency cooling systems were brought off line in preparation for the test (Gale 1988, 26). Once the power systems were brought off line, the reactor immediately began to overheat as the automatic shutdown system was disconnected. Seconds later, a massive heat buildup caused two explosions in the reactor building due to steam and hydrogen buildup (Gale 1988, 26). The reactor explosion launched a radioactive cloud which spread to neighboring countries. Molten fissile material was spread over the Chernobyl nuclear plant. On top of this, the graphite coolant caught fire and continued to spread radioactive smoke over the course of the next several days.

In the wake of the Chernobyl meltdown, nearly two hundred towns and villages were vacated (Gale 1988, 23). As a result, 130,000 people resettled permanently to other locations (Medvedev 1990, 75). The radioactive cloud spread as far as the Danish coast. In the aftermath, the Soviets erected a thirty kilometer exclusion zone around the Chernobyl plant. It is estimated that over five-thousand square kilometers were at levels exceeding safety levels for humans (Medvedev 1990, 82). There is no official statement with accurate measures of how much land area was contaminated above levels acceptable for human settlement. However, over 100,000 square kilometers of Soviet marshland and agricultural areas were contaminated with efforts by the Soviets to decontaminate them

(Medvedev 1990, 91). In addition, over six hundred villages added to the nearly two-hundred evacuated villages became restricted areas (Medvedev 1990, 91). The impacts of the nuclear meltdown were immense and to a degree immeasurable.

This is the final case study to be analyzed in chapter 4. This case was chosen because it contained a nuclear incident and is considered a large sized incident. The analysis in chapter 4 does not detail the historical actions of responders during this incident. The case frames a large scale nuclear incident that the new CBRNE response model will be applied to.

Conclusion

Chapter 3 identifies and explains the rubrics used to determine the answer to the thesis question. Using the NRF as the rubric for determining effectiveness and by screening actions taken by the DoD using the rubric of the military decision making process screening criteria, the thesis question is answered objectively. According to Creswell, this process gives a holistic analysis of the cases and interpretations emerge to answer the thesis question (Creswell 2007, 75). The chapter outlines the evaluation criteria used to analyze the CBRNE response model adopted by the DoD. Chapter 3 also identifies in limited detail the case studies the CBRNE response model is applied. The cases will be used to determine the answer to the thesis question.

Chapter 4 analyzes the CBRNE response model in response to the cases presented in chapter 3. It defines effectiveness based on the criteria of preparedness and response according to the NRF. Actions taken by the CBRNE response model are founded in doctrinal tasks that are validated using a screening rubric. Chapter 4 frames the cases' lines of operations that the CBRNE response model could respond to.

CHAPTER 4

ANALYSIS

> USNORTHCOM's homeland defense and civil support plans are vital to the nation's ability to deter, prevent, and defeat threats to our security, and support civil authorities when called upon by the President or Secretary of Defense. They provide a template for USNORTHCOM responses and are continuously updated to reflect evolving national security requirements.
>
> — General Gene Renuart
> Commander, NORAD and USNORTHCOM
> Statement before The House Armed Services Committee

Introduction

The fourth chapter contains the analysis of the Chemical, Biological, Radiological, Nuclear, and High-Yield Explosive (CBRNE) response model in respect to the cases outlined in chapter 3. The analysis consists of applying the CBRNE response model against the incidents and applying the evaluation criteria of preparedness and response. The two major evaluation criteria are further broken down into sub-criteria. Chapter 3 outlined the methodology of the thesis study, the evaluation criteria, and the cases for study. These provide the framework for the analysis in chapter 4.

The research in chapter 2 outlined the legal framework and presented a familiarization of the current Department of Defense (DoD) CBRNE response model. Chapter 2 included a brief glimpse of the capability gaps between DoD and local, state, and other federal organizations. It also demonstrated a requirement for a DoD CBRNE response organization.

In order to fully analyze the cases and the CBRNE response model, lines of efforts needed to be applied to each case. Disaster response operations are similar to

stability operations performed by the DoD. During disaster management, the focus is to lay the foundation not only for a strong recovery over the short term but also for the rebuilding and revitalization of affected communities and regions over the long term (Department of Homeland Security 2008, 12). Stability operations aim to establish conditions that support the transition to legitimate host-nation governance, a functioning civil society, and a viable market economy (Department of the Army 2008b, 3-2). Both instances suggest that the key is returning the situation to functioning society. Lines of effort prove particularly valuable where unity of command is elusive, if not impractical, and when used to achieve unity of effort in operations civilian agencies and organizations (Department of the Army 2008b, 4-9). Lines of effort frame the start point in operations and end state. The line of effort also contains the tasks and applicable measures of effectiveness linking the start and ends. According to Burkell, measures of effectiveness serve to bring together organizations and agencies that need to support each other, serve as a tool for coordination and communication, and minimize needless confusion and risk (Burkel 2004, 259). Using lines of effort, this ensured that the problem was framed and response efforts were able to be applied. In addition, the CBRNE response force needed to be defined in its doctrine in order to be applied to the lines of effort. Chapter 4 evaluates these responses based on the criteria outlined in chapter 3. Following the analysis of each case, a cross-case comparison determined the effectiveness of the organization in a holistic viewpoint (Creswell 2007, 75).

Preparedness

Table 4. Evaluation Criteria: Preparedness	
Preparedness: Preparedness is absolutely essential if an organization is to efficiently respond to a CBRNE Incident. Organizations cannot prepare for all types of incidents, but must best plan, organize, train, equip, and practice for the most likely incident to occur.	
Plan:	The DoD CBRNE response model utilizes an all hazards approach. Operational Plans are in place. The Chairman of the Joint Chiefs Standing Execution Order provides immediate guidance for response support.
Organize:	The organization is built in accordance with the National Response Framework. The model is organized in a tiered level. Smallest organizations are self-deployable and moderately sustainable. Coordination lines are developed through the Incident Commander, National Guard Bureau, and Defense Coordinating Officer.
Train:	Core doctrinal tasks and missions are structured similar to those experienced in combat situations. The focus is on reaction to attacks by a CBRNE means.
Equip:	Units such as the WMD-CST, CERFP, and CBIRF are equipped with equipment focused on CBRNE domestic response. The HRF operates as a coordination element predominantly. The DCRF is composed of active Army organizations that do not have specific equipment tailored to domestic response unless purchased.
Exercise:	Multiple training culminating exercises are completed annually such as VIBRANT RESPONSE. Individual training and collective training occurs.
Evaluate:	Multiple after-action reviews exist for larger exercises. Units regularly take best practices and implement them into current doctrine.

Source: Department of Homeland Security, *National Response Framework* (Washington, DC: Government Printing Office, 2008), 27.

It was noted during the analysis that no specific planning is in place to react to domestic CBRNE incidents. Instead, the response model focuses on training, organizing, and exercising to respond to CBRNE incidents. Due to the changing characteristics of incidents, effectively preparing for every known or unknown incident is impossible. For the Nation to be prepared for any and all hazards, its leaders must have a baseline

familiarity with the concepts and mechanics of the NRF (Department of Homeland Security 2008a, 1).

The CBRNE response model is organized in accordance with the National Response Framework. The DoD response model utilizes a ground up approach to CBRNE incidents. There are currently fifty seven WMD-CST units with one in every State, territory, and the District of Columbia and two in California, Florida, and New York (Department of the Army 2011).. This allows them to rapidly move to and begin incident response locally. Along with the WMD-CSTs, there are seventeen CBRNE Emergency Response Force Package (CERFP) units operating more regionally. Alongside the CERFPs, the Homeland Response Forces (HRFs) are aligned with the ten FEMA regions. This provides a means for improved unity of command and unity of effort. The research indicated that this was one of the major concerns during past incidents.

The organizations in the CBRNE response model conducted multiple training events. The focus of these training exercises included individual and collective training. Most importantly, these events include non-governmental and other-governmental organizations. Exercises such as these increase the preparedness of the response model because of enhanced unity of effort. Actual preparedness is difficult to ascertain. Even in Unit Status Reporting, most indicators of readiness are subjectively measured. In order to fully determine preparedness, the model must have a measure of response.

Small Scale Biological Incident Preparedness and Response

The first portion of the analysis included an in depth look at the CBRNE response model in terms of preparedness. The metrics defined in chapter 3 were utilized to make

an assessment of preparedness based on the evaluation criteria. In order to determine the response efforts, the incident was defined through lines of effort. A line of effort (LOE) chart depicts the current state. From the current state, analysis was done on the doctrinal tasks performed by all organizations within the DoD CBRNE response model and tasks were applied to the incident. The end state of the lines of effort did not include return to the previous status of the incident because this portion would have included the recovery phase of disaster management which was not measured.

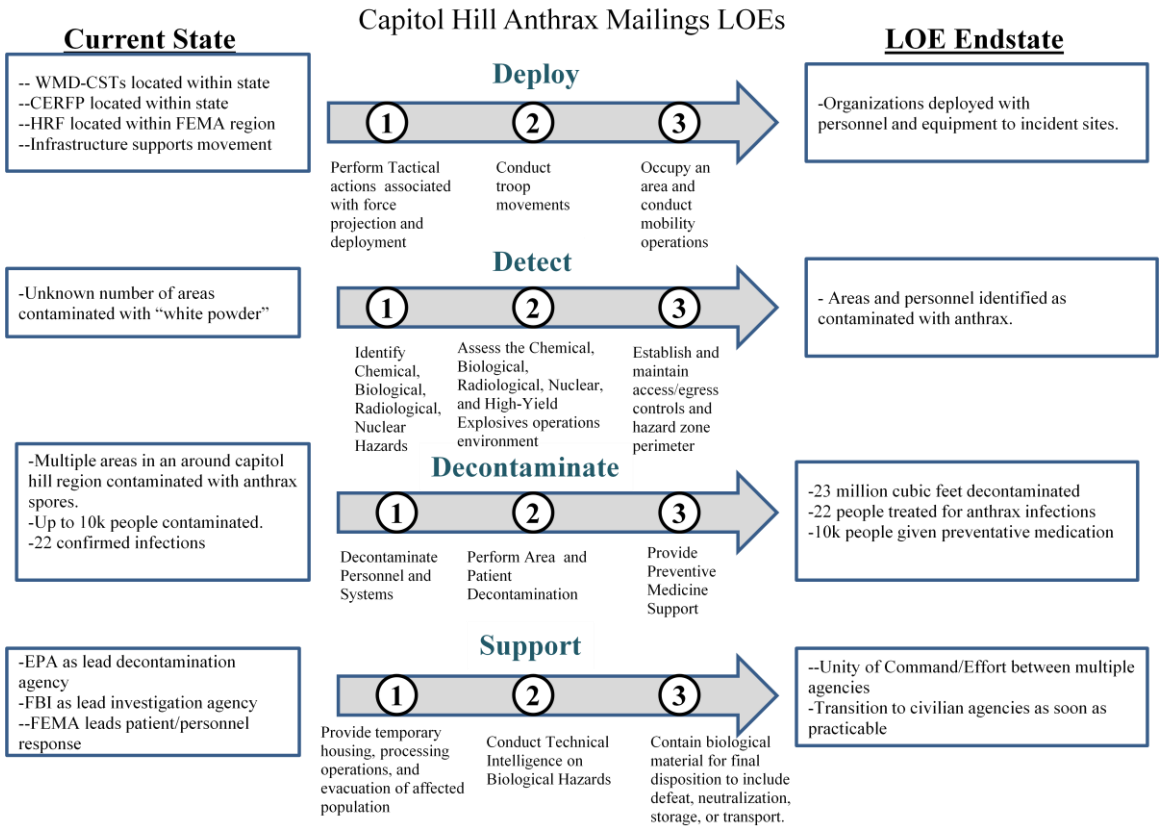

Figure 1. Capitol Hill Anthrax Mailings LOEs
Source: Department of the Army, Field Manual 3-07 *Stability Operations* (Washington, DC: Headquarters, Department of the Army, 2008), 4-10.

The incident such as the anthrax mailings in the Capitol Hill region is considered a small scale CBRNE incident. The anthrax contamination, though spread through multiple areas, was limited in effect due to the means of dispersal. The WMD-CST and elements from the Chemical and Biological Incident Response Force (CBIRF) and CERFP are the most likely organizations to respond to this level of incident. The predominant actions that must be taken during this incident include identifying the contaminated sites, decontaminating the sites, and providing limited medical care to exposed civilians. These were considered the primary goals during this incident. In order to support these, the lines of effort included measures of effectiveness (MOE).

Table 5. Capitol Hill Anthrax Mailings Measures of Effectiveness

OBJECTIVE	MOE #1	MOE #2	MOE #3
Deploy	Notification time before movement <3 hours according to doctrine	Number of personnel and equipment deployed = Full WMD-CST and full CBIRF unit	Response time< 72 hours
Detect	Correctly identified agent as anthrax	Positively identified all contaminated locations and personnel with no further cross-contamination	No unauthorized access to contaminated areas
Decontaminate	No cross contamination from areas	Further incidents of anthrax infection decreased Structures re-opened for operations	No further anthrax infections
Support	Contaminated civilians receive proper medical care All incidents of contamination documented	Bio-agent identified and traced to source	No cross contamination of areas

Source: Department of the Army, Field Manual 3-28 *Civil Support Operations* (Washington, DC: Headquarters, Department of the Army, 2010), annex J.

Using suitability, feasibility, acceptability, distinguishability, and completeness of all the actions the CBRNE response model can take during this incident, the response is deemed to be effective according to the response evaluation criteria.

Table 6. Evaluation Criteria: Respond	
Respond: An organized, rapid response is necessary during a CBRNE incident. Organizations must be able to gain situational awareness, activate, and, most importantly, have a structured response. The organization must be able to then move out of the environment when no longer necessary for operations.	
Gain and Maintain Situational Awareness:	Situational Awareness is rapidly gained with the capability of the CBIRF and WMD-CST. Biological threat is determined and immediate response is conducted.
Activate and Deploy Resources and Capabilities:	The WMD-CST being a state based unit, organized and equipped for rapid deployment, meets necessary requirements for incident. The WMD-CST and CBIRF are limited in capability for sustainment; coordination through state National Guard and Marine Corps must be made to enhance capabilities. Redundant capabilities are located in FEMA, FBI, and EPA.
Coordinate Response Action:	Effectively manages emergency functions. Effectively works with elements of EPA, FEMA, and FBI. Unity of Effort is gained through coordination lines between DCO, NORTHCOM, and National Guard Bureau. Maintains capabilities to complete all necessary support functions.
Demobilize:	Due to small scale incident and self-deployability, WMD-CST and CBIRF can rapidly transition operations to civilian agencies. Redundancy in capabilities with other governmental organizations hastens demobilization.

Source: Department of the Army, Field Manual 3-07 *Stability Operations* (Washington, DC: Headquarters, Department of the Army, 2008),32.

Medium Scale Chemical Incident Preparedness and Response

The incident response for the sarin gas attack on the Tokyo subway is similar to the response for the anthrax letter mailings. Based on the required response, this incident is classified as medium scale. The line of effort chart used in this incident in similar to the

previous, and the assessment of response efforts was based on doctrine in Field Manual 3-28 *Civil Support Operations*.

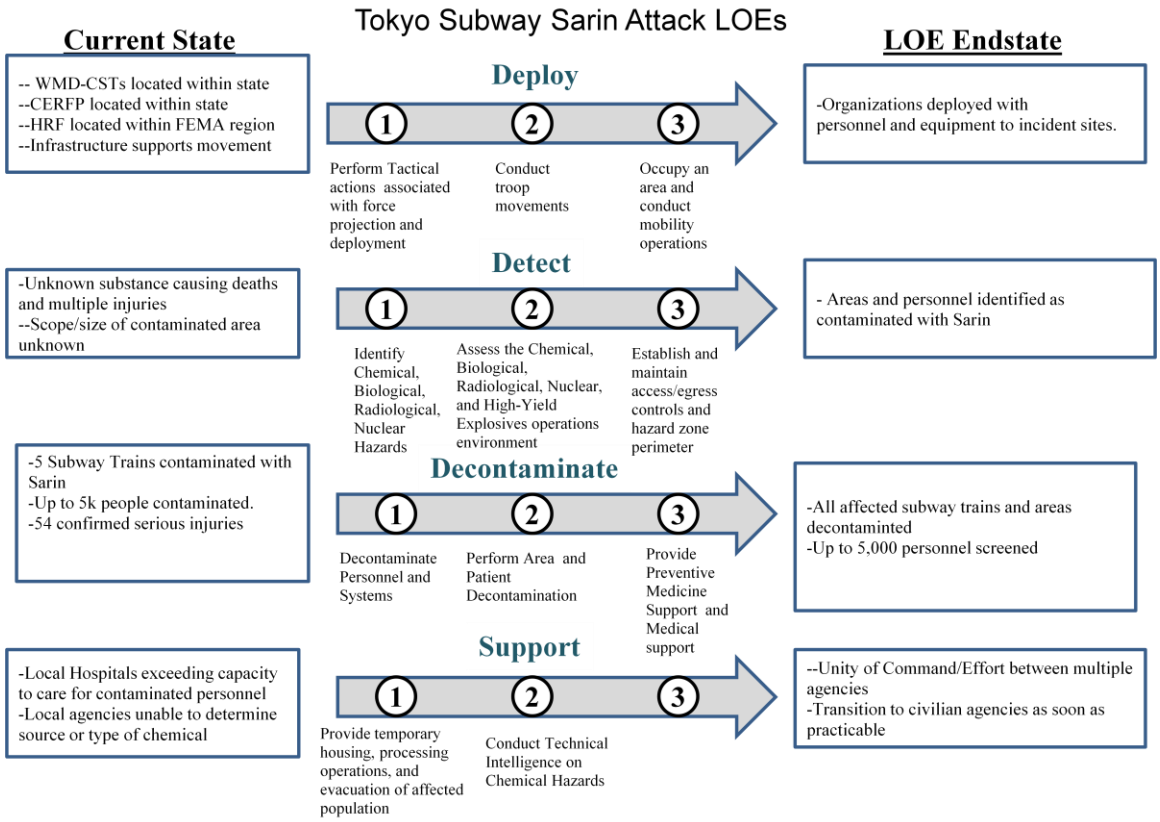

Figure 2. Tokyo Subway Sarin Attack LOEs
Source: Department of the Army, Field Manual 3-07 *Stability Operations* (Washington, DC: Headquarters, Department of the Army, 2008), 4-10.

The sarin gas attack on the Tokyo subway was determined to be a medium scale CBRNE incident. Like the anthrax contamination, the effects of the sarin were limited to the subway system due to the method of dispersal. The WMD-CST, CERFP, and HRF elements are the most likely organizations to respond to this type of incident. The difference between the Tokyo incident and the anthrax mailings lies in the predominant actions that must be taken by the CBRNE response model. Actions by the CBRNE

Response Model include identifying contaminated sites, decontamination, and providing medical care to injured civilians. Due to hospitals exceeding capabilities and specialized medicines, patient care becomes a major requirement.

Table 7. Tokyo Sarin Gas Attack Measures of Effectiveness

OBJECTIVE	MOE #1	MOE #2	MOE #3
Deploy	Notification time before movement <3 hours according to doctrine	Number of personnel and equipment deployed = Full WMD-CST and full CERF-P unit	Response time< 72 hours
Detect	Correctly identified agent as sarin	Positively identified all contaminated locations and personnel with no further cross-contamination	No unauthorized access to contaminated areas
Decontaminate	No cross contamination from areas	No further injuries due to contamination Structures re-opened for operations	No further injuries due to contamination
Support	Contaminated civilians receive proper medical care All incidents of contamination documented	Chemical agent identified and traced to source Efficacy determined	No cross contamination of areas No injuries due to disposal/neutralization of chemical

Source: Department of the Army, Field Manual 3-28 *Civil Support Operations* (Washington, DC: Headquarters, Department of the Army, 2010), annex J.

The CERFP is the preferred organization to conduct primary operations in this incident with the HRF operating as a coordination element enhancing unity of effort. The major requirement during this incident is specialized medical capabilities. Using the

tiered response framework and tailoring the response package to the incident identifies this response as effective.

Table 8. Evaluation Criteria: Respond	
Respond: An organized, rapid response is necessary during a CBRNE incident. Organizations must be able to gain situational awareness, activate, and, most importantly, have a structured response. The organization must be able to then move out of the environment when no longer necessary for operations.	
Gain and Maintain Situational Awareness:	Situational Awareness is rapidly gained with the capability of the WMD-CST. The chemical threat is determined and immediate decontamination is conducted.
Activate and Deploy Resources and Capabilities:	The WMD-CST being a state based unit, organized and equipped for rapid deployment, meets necessary requirements for incident. The WMD-CST is limited in capability. However, the CERFP and HRF add a tremendous amount of capability for medical support. Mass decontamination is a primary function of the CERFP. There is limited redundancy in local and state organizations for chemical decontamination and medical capability for weapons grade chemicals.
Coordinate Response Action:	The HRF essentially manages all response actions with the lead agency. The majority of response actions are through the CERFP.
Demobilize:	Due to small scale incident and self-deployability, WMD-CST can rapidly transition operations to civilian agencies. Due to the nature of the incident and the capability gap of other organizations, the CERFP and HRF will be required to maintain response to this incident.

Source: Department of Homeland Security, *National Response Framework* (Washington, DC: Government Printing Office, 2008), 32.

Large Scale Nuclear Incident Preparedness and Response

The incident response to the Chernobyl nuclear reactor meltdown differs from the previous cases in the study. The previous two incidents included two events that are considered terrorist events whereas the nuclear reactor was accidental. This incident is

determined to be of large scale based on the analysis of what is required for the response. Lines of effort are similar to the previous cases, and an assessment of response efforts was based on doctrinal tasks of the CBRNE response model.

Table 9. Chernobyl Meltdown LOEs

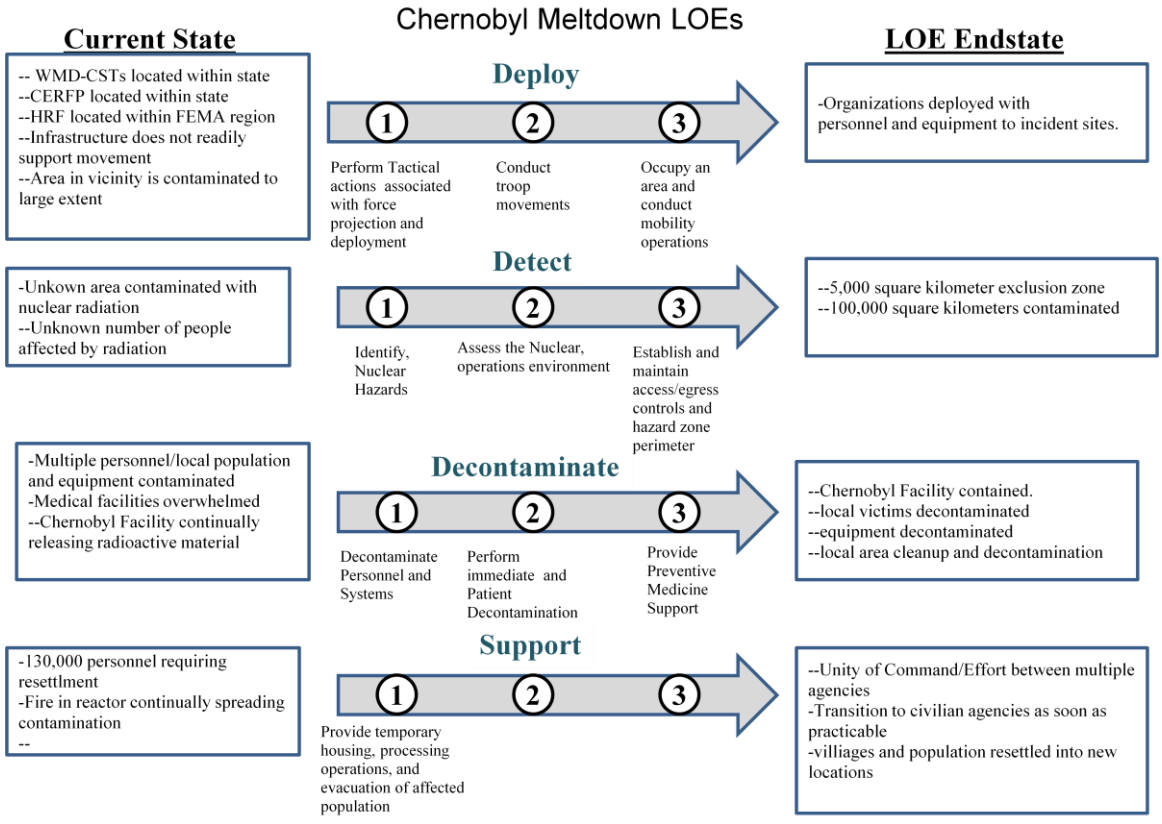

Figure 3. Chernobyl Meltdown LOEs

Source: Department of the Army, Field Manual 3-07 *Stability Operations* (Washington, DC: Headquarters, Department of the Army, 2008), 4-10.

The Chernobyl nuclear reactor meltdown is a large scale CBRNE incident. The effects of the radiation and contamination are vast and widespread. An incident of this scale would require multiple WMD-CST units, nearly all CERFP units, and activation of

the Defense CBRNE Response Force (DCRF) and Command and Control CBRN Consequence Response Elements (C2CREs). In addition to the CBRNE response, transportation, fire fighting, and additional medical assets are required to ensure effective response. The actions taken by the CBRNE response model would need to focus on determining the scope of contamination and evacuation of the population. Due to the sheer magnitude and type of contamination, it is not feasible that a full decontamination takes place.

Table 10. Chernobyl Nuclear Meltdown Measures of Effectiveness

OBJECTIVE	MOE #1	MOE #2	MOE #3
Deploy	Notification time before movement <3 hours according to doctrine	Number of personnel and equipment deployed = Full DCRF with specialized assets, multiple CERF-P and WMD-CST assets	Response time< 72 hours for initial responders. 3-7 days for follow on forces
Detect	Locations correctly determined for exclusion or limited exposure	Positively identified all contaminated locations and personnel Identify all personnel in exclusion zone	No unauthorized access to contaminated areas
Decontaminate	Decontamination of all civilians, equipment, and personnel moving from contaminated areas	No further injuries due to contamination	No further injuries due to contamination
Support	Contaminated civilians receive proper medical care All incidents of contamination documented Locations out of contaminated areas set up for temporary and permanent resettlement	Contain reactor site to inhibit spread of radioactive material	All civilians in contaminated areas identified and evacuated Essential services provided to dislocated civilians

Source: Department of the Army, Field Manual 3-28 *Civil Support Operations* (Washington, DC: Headquarters, Department of the Army, 2010), annex J.

The Chernobyl meltdown requires a significant amount of resources. In order to determine if the CBRNE response model is effective, unity of effort must be achieved through multiple organizations. The major requirements during this incident are evacuation, resettlement, and decontamination of civilians. In order to limit the spread of radioactive material, the CBRNE response model required specialized equipment and personnel which are not available to DoD. Elements such as these are found in the Department of Energy. The DoD supports other federal agencies. The limitation during this incident response is readily available manpower, deployable medical assets, and transportation equipment. Because of the tiered response and the capabilities of the DoD, the incident response is effective.

Table 11. Evaluation Criteria: Respond	
Respond: An organized, rapid response is necessary during a CBRNE incident. Organizations must be able to gain situational awareness, activate, and, most importantly, have a structured response. The organization must be able to then move out of the environment when no longer necessary for operations.	
Gain and Maintain Situational Awareness:	Situational Awareness is gained through time in analysis of environment. Contaminated area is very widespread. Testing and sampling by organizations determined exclusion zones and extent of contamination as well as population requiring evacuation.
Activate and Deploy Resources and Capabilities:	Immediate action is performed by WMD-CSTs in determining scope of incident. CERFP and DCRF assets with specialized medical and transportation meets necessary requirements to evacuate civilians. Large scale decontamination is provided through CERFP and DCRF assets. There is limited redundancy for decontamination and medical capability in local and state organizations. DoD response is limited in the provision of resettlement. Unity of Effort must be maintained through other federal agencies.
Coordinate Response Action:	The DCRF manages response actions with the lead agency. CBRNE response model effectively detects contaminated areas and decontaminates civilians and responders. Transportation of civilians to evacuation areas must be coordinated through other agencies.
Demobilize:	Due to the nature of the incident, demobilization of DoD forces becomes an issue. The size and scope of the incident coupled with the requirements exceed other organizations capabilities. DoD will maintain large numbers forces for extended times.

Source: Deparment of Homeland Security, *National Response Framework* (Washington, DC: Government Printing Office, 2008), 32.

Analysis

A cross comparison of the cases analyzed the differences between the size and scope of the incidents with the response and preparedness evaluation criteria. In small scale responses, the DoD CBRNE response model is effectively prepared to respond. The model is organized, trained, and equipped to respond to local incidents. The same is true

for medium scaled incidents. When a more regional response is needed, the CBRNE response model effectively responds to incidents.

The difference is when the incident increases in size to large scale. The response model is not entirely prepared for large scale incidents. The characteristics of the large nuclear incident showed that the training and equipping of the CBRNE response model did not meet the required actions during the incident.

Table 12. Evaluation Criteria: Comparison

	Small Scale Biological	Medium Scale Chemical	Large Scale Nuclear
Preparedness	Unit is trained, organized, and equipped to respond to small scale CBRNE incidents	Unit is trained, organized, and equipped to respond to medium scale CBRNE incidents	Unit is organized to respond to large scale CBRNE incidents. Incident characteristics define training and equipping requirements that exceed DoD capability.
Response	The doctrinal response meets suitability, feasibility, acceptability, and completeness.	The doctrinal response meets suitability, feasibility, acceptability, and completeness.	The doctrinal response meets suitability, acceptability, and feasibility, but does not meet completeness of incident response.

Source: Deparment of Homeland Security, *National Response Framework* (Washington, DC: Government Printing Office, 2008), 25-45.

Conclusion

The thesis question is: Can the DoDs current CBRNE response model provide effective response to CBRNE incidents of national significance? The answer to the thesis question is yes. The DoD CBRNE response model is effectively prepared and can

effectively respond to small, medium, and large incidents. Differences in the characteristics of incidents are the determining factor in the scope of response. The most critical finding during the analysis is that unity of effort is paramount to success in large scale incidents as specialized required actions during the incident exceed the capabilities of DoD organizations.

Chapter 4 completed the analysis of the CBRNE response model when applied to the cases defined in chapter 3. Chapter 5 presents the recommendations and conclusions for the thesis based on the analysis.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

But our role is to create those capacities ahead of time so that when a state has a need, they don't have to decide that they're in trouble and then make a call and go through the administrative process and then, a week later, the support shows up. If you look at how we prepared for Hurricane Dean just a few weeks ago when we thought a Category Five hurricane was going to hit Harlingen, Texas, we had people in place well before the event occurred, well before it turned south and began its movement towards Mexico.

— General Gene Renuart
Commander, NORAD and USNORTHCOM
Homeland Defense Symposium, Colorado Springs, CO, 10/03/07

Introduction

In response to the attacks at the World Trade Center on September 11th, 2001 and the Department of Defense (DoD) response to the Hurricane Katrina incident, the DoD underwent transformation. NORTHCOM began as the DoD response to the mission of supporting domestic incidents. The major change in the Chemical, Biological, Radiological, Nuclear, and High-Yield Explosive (CBRNE) response enterprise was the implementation of the Title 32 Homeland Response Force (HRF) and the Title 10 Defense CBRNE Response Force. The entire model increased in size and became regionally focused in a structure outlined in the National Response Framework (NRF).

Chapter 5 completes the study and summarizes the analysis of the current CBRNE response model. This chapter presents the results of the research as well as the recommendations and conclusions. Chapter 4 analyzed the CBRNE response model when applied to three separate cases. In all cases, it was determined that the current response model is effective when evaluated using the National Response Framework as a rubric.

The answer to the thesis was positive, however, the analysis found instances where changes would provide a more efficient response.

Research Findings

It is extremely difficult to answer the thesis question. In fact, it was much more difficult than the author anticipated. In the effort to determine if the new CBRNE response model effectively responds to incidents of national significance, the answer is yes. However, the incident is the determinant. The most important lesson in the thesis is in the guise of preparedness, one of the evaluation criteria. The research and analysis did answer one question well. The new CBRNE response model can and does evaluate past performance in training and actual incidents. The DoD incorporated multiple lessons learned from the anthrax mailings in 2001, the ricin scares in 2003, Hurricane Katrina, and the September 11, 2001 terrorist attacks on the World Trade Center into the new model. The CBRNE response model is a learning and evolving organization. Exercises such as Operation Vibrant Response demonstrate the efforts to improve the response model. The organization does its best to prepare for an all-hazards response.

The difficulty in answering the thesis question does not come from the CBRNE response model. The difficulty lies with the incidents themselves. One of the FEMA Federal Coordinating Officers stated that, "If you've responded to one disaster…you've responded to just one disaster." In other words, each disaster develops its own characteristics and nature. Every incident develops characteristics that pertain to the individual incident. Lines of effort change and measures of effectiveness differ dramatically from incident through response and recovery. The incidents themselves are not the only differences during disaster responses. Organizational command and control

structures change, lead agencies change, and the responding organizations may be completely different. In one disaster, FEMA acts as the lead federal agency, and in another, a local sheriff department may be the lead agency coordinating local, state, and federal response. Each organization has its own organizational caveats. In another disaster, the DoD response comes from an operational combat arms brigade that has attached specialized assets. Another disaster is provided a dedicated chemical warfare company. A DoD response is partially a function of resource availability and capability. While the incidents differ, the inclusiveness of the National Response Framework provides the system in which all organizations can and should organize to respond effectively.

The thesis answered whether the CBRNE response model effectively could respond to the case studies. In small and medium scale incidents, the CBRNE response model prepares and responds very effectively. When the incident is of large scale, the model is prepared and does respond, though not to the same level. The model is equipped, trained, and organized to react to certain incidents. Incidents outside the scope of the training, equipping, and manning require coordination with specialized assets.

In the case of the anthrax letters in the Capitol Hill region, the fundamental finding was the lack of expertise in the remediation process (Canter 2003, 8). The DoD response model is effective during this incident. It was specific in detail and required limited resourcing by the DoD. The efficacy of the anthrax considerably dropped the requirement of the DoD to provide manpower and equipment. Based on the NRF system, the incident response remained at the lowest level with specialists responding from federal organizations. Measures of effectiveness remained clear throughout the response

efforts and maximized unity of effort. The incident had a very distinct end state with the cleanup of the facilities which enhanced efforts.

The sarin gas incident was similar in scope to the previous case. The fundamental finding during the research was lack of unity of effort between law enforcement and medical personnel. The addition of the DoD response model and the application of the NRF to this incident enhances response. The primary flaw in the response to the incident was the lack of understanding what the chemical was. It was not until specialized personnel determined that it was in fact a nerve agent before the incident managers began to properly respond to the attacks (Burke 2007, 125).

The events surrounding the Chernobyl reactor meltdown increased the demand for unity of effort. The incident immediately overwhelmed local and state capacity, and federal elements were required to respond. The predominant finding in the analysis of the incident was lack of resources, specifically in manpower and specialized equipment and personnel. The scope of the incident demanded that multiple organizations respond. While there were no findings that there lacked a unified effort, it was assumed that the additional organizations caused increased management stress.

There are major strengths with the CBRNE response model. It is regional and keeps the focus of efforts at the lowest possible level. The responses are tiered in accordance with the NRF. This allows local incident responders to rapidly tap into a vast pool of manpower and equipment. The organization continually refines its preparedness to reflect the most important aspect of training exercises and incident responses. The evaluation and constant upgrading the system is the model's strength.

The National Response Framework gives no specific answers to solve incidents. It is difficult at best to give an answer as the problem has yet to be determined and, more importantly, defined. The CBRNE response model follows the guidance of the NRF. It is multi-tiered and is capable of reacting to incidents. The structure is designed to react to CBRNE incidents in a timely manner and retains the capability to mass if the need arises.

There is no direct answer to incident response. Plans reflect the framework of problem solving but give no direct answer. There is no silver bullet for incident response. The best that can be done is to prepare for the worst, and as unscientific as it sounds, hope for the best.

Recommendations

The research identified several minor issues. These issues affect unity of effort, one of the major identified issues in past responses. The lack of unity of effort causes friction and prevents efficient utilization of forces during incident response. The first and most pressing issue is a unified command structure. During incident response, forces are in either a Title 32 role or a Title 10 role. Under Title 10, the forces, including the National Guard, only operate at the discretion of the President, Secretary of Defense, and through its chain of command.

This often does affect unity of effort. Title 10 limits support by the response force due to legal restrictions. The legal restrictions imposed on the DoD response model have no impact on the actual CBRNE response but limit actions taken by CBRNE responders to complete missions. One of the responses to rectify this is the concept of dual status commanders. This allows a commander to both command Title 10 forces operating under federal law as well as Title 32 forces acting under state law. It eliminates issues posed by

Posse Comitatus and ensures a unified command structure. The limitation on this command structure is that bureaucracy causes issues between conflicting lines of operations.

As noted in the second case of the sarin attacks on the Tokyo subway system, there were issues surrounding the lack of situational awareness of the incident. A recommendation to rectify this situation is that during any incident that has the potential to be a CBRNE incident, the WMD-CST teams and the Defense Coordination Officer are deployed to the incident site. The WMD-CST retains the capability to immediately assess the agent and the Defense Coordination Officer maintains the lines of communication between federal, state and local agencies that would be able to assist with efforts.

Another issue found during the research is lack of unity of command between DoD forces and other local, state, and federal organizations. It is understood that the DoD always plays a supporting role in domestic response. Organizational caveats lead to increased bureaucracy between organizations and stymied efforts. The National Response Framework makes an effort to show that the incident commander retains full authority during response, but the fact is organizations are not required to answer to another organization. A recommendation is that during a federally controlled response, all organizations are mandated to be controlled by the incident commander. There is political recourse to this action; however it does ensure unified command.

One of the major findings during the research was the system in which the DoD is employed during CBRNE incident response. The DoD supports the lead agencies during CBRNE incident response. DoD forces are generally given specific taskings to respond and control very specific incidents. The problem is framed and very specific limits are

given to the responding element. This essentially enhances response efforts by keeping incident responders on the required task. However, it micro-manages efforts and can lead to decreased effectiveness in the holistic approach to incident response. A recommendation to alleviate this would be the adoption of the mission command concept as an operational command and control method.

CBRNE incidents are complex problems. Standard mission command and control with a single directive command system ensures unity of effort but limits the capabilities and efforts of lower level organizations. Mission command is the conduct of operations through a decentralized execution based on mission orders for effective mission accomplishment (Department of the Army 2003, 1-17). Successful mission command results from subordinate leaders and organizations exercising initiative within the intent to accomplish missions and requires an environment of trust and mutual understanding (Department of the Army 2003, 1-17). The concept of mission command is similar to the doctrine and the system the NRF proposes. Efforts begin at the lowest level according to the NRF. Utilizing mission command in conjunction with establishing set lines of efforts by the incident commander can increase the effectiveness of the overall response. This is an area that would benefit from further research.

During a small and medium scale incident such as the two defined in chapter 3, it was noted that the Marine Corps Chemical and Biological Incident Response Force (CBIRF) demonstrated an enhanced effectiveness not demonstrated by the Army units. The Army model assigns the mission of the CBRNE Emergency Response Force Package (CERFP) and Defense CBRNE Response Force (DCRF), the primary medium and large scale responders, to different units. The Marine Corps CBIRF is a standing organization

that continually retains the mission of the CBIRF. One area for further research is if the Army should adopt the CBIRF model of having a permanent organization with the CERFP and DCRF mission. This would eliminate issues such as an engineer battalion being deployed out of the MEB or the Military Police Battalion not being available because of equipment or personnel shortages. An allocation of these forces directly to NORTHCOM potentially solves some of the issues with efficiency at a cost of resources during a fiscally conservative time.

Conclusion

Chapter 5 concludes the research study. The research concluded that the current CBRNE response model adopted by the DoD provides an effective model to prepare and respond to CBRNE incidents of significance. In order to increase efficiency in the model, recommendations included increase of the dual status command roles during incident response as well as a possible legal mandate for incident commanders.

Areas of further research include the Army adopting the model of the CBIRF utilized by the Marine Corps. The Marine Corps CBIRF is a unit that is specifically assigned to respond to domestic CBRNE incidents. The mission never changes, and the organization remains the same. The Army model differs in that the mission of domestic CBRNE incident response is assigned to alternating organizations. The DCRF mission passes to a completely new organization after a specified amount of time. Adopting a new model within the DoD increases the financial, equipping, and personnel burden on a military that has current requirements supporting Operations New Dawn and Enduring Freedom. This further complicates the issues. Despite this, it potentially increases the overall effectiveness of the response model.

The dual status commander implementation is ongoing. The effect is that DoD responses to incidents are unified between Title 32 and Title 10 forces. This, however, comes at a cost. Federal mandate to ensure organizations unify under a single incident commander risks political fallout. While the effect of the dual status command unifies efforts between DoD forces, it does not ensure unified effort between military and civilian agencies, one of the major findings. An area for further study is changing doctrine and policy to allow the DoD to act as a lead federal agency. Major political issues may arise if it becomes mandated that civilian organizations are subordinate to military organizations. One major benefit to this, however, is that this creates a structure that is grounded in doctrine, trained in essential tasks, and possesses vast resources for incident response.

At the conclusion of this research, the DoD continues training and preparing for domestic CBRNE incidents. Training events focused on the current threats continue to force improvement of the response model. While it is impossible to prepare for every event, the current model demonstrates continual improvement and effectiveness.

GLOSSARY

C2CRE- Formerly the CCMRF 2 and CCMRF 3 elements of the National Guard. (Department of Defense Homeland Response Force (HRF) Fact Sheet).

CBRNE Consequence Management- The consequence management activities for all deliberate and inadvertent releases of chemical, biological, radiological, nuclear, and high-yield explosives that are undertaken when directed or authorized by the President. Also called CBRNE CM. (CBRNE Consequence Management, 2006, GL-6).

CCMRF- CCMRF is a task force (approximately 4,700 people) that operates under the authority of Title 10 (active and reserve components). A CCMRF is a Joint Force composed of a two star command and control headquarters with associated enablers and three subordinate colonel-level task forces: operations, medical, and aviation. Task Force Operations is formed around the nucleus of a maneuver enhancement brigade augmented by logistics and specialized CBRNE units. Task Force Operations is capable of CBRNE detection and decontamination and can provide transportation, logistics, communications and public affairs support to local, state and federal entities. Task Force Medical provides public health support, augments civilian medical facilities, conducts casualty collection operations, assists with patient movement, and provides medical logistics support. Task Force Aviation provides heavy- and medium-lift helicopters, including medical evacuation aircraft. (Army Posture Statement, 2010).

CERFP- CBRNE Emergency Response Force Package. An approximately two hundred person regional response force made up of National Guard Soldiers that generally remain under state government control. The NG CERFP elements are comprised of traditional National Guard (M-Day) Soldiers and Airmen (supported by a small staff of full time Guardsmen in Title 32 status) who are trained and equipped to integrate into the National Incident Management System (NIMS) to plan and conduct casualty search and extraction, medical triage and treatment, ambulatory and non-ambulatory decontamination, and fatality search and recovery. When directed, the NG CERFP can be pre-positioned or respond using organic transportation to an incident to support the Incident Commander. (National Guard Role in Homeland Defense, 2010, CERFP)

Command Assessment Element- The small team of personnel sent by the United States Northern Command or United States Pacific Command to a chemical, biological, radiological, nuclear, or high-yield explosives incident site to conduct a consequence management assessment and make an evaluation of potential shortfalls in federal and state capabilities, which may become requests for Department of Defense assistance. Also called CAE. (CBRNE Consequence Management, 2006, GL-7).

Crisis Management- Measures to identify, acquire, and plan the use of resources needed to anticipate, prevent, and/or resolve a threat or an act of terrorism. It is predominantly a law enforcement response, normally executed under federal law. Also called CrM. (CBRNE Consequence Management, 2006, GL-7).

DCRF- Formerly the Regular Army CCMRF 1 unit. (Department of Defense Homeland Response Force (HRF) Fact Sheet).

HRF- Homeland Response Force. Approximately 570 personnel with the capabilities of a CERFP but has substantial command and control and security capabilities. The HRF will augment the DCRF, C2CREs, WMD-CSTs and CERFPs. (Department of Defense Homeland Response Force (HRF) Fact Sheet).

Incident Management- All actions taken to prepare for, prevent, respond to, or recover from any event impacting lives or property. It includes pre-event, during, and post-event activities. It can be associated with attack, natural, or manmade situations involving disasters or other catastrophic occurrences. It includes military support to civil authorities, military assistance to civil authorities, military assistance during civil disturbances, and military assistance to law enforcement agencies programs under the umbrella of defense support to civil authorities. It includes both domestic and foreign support operations. It includes humanitarian aid and relief missions. Actions include measures to protect public health and safety, restore essential governmental services, and provide emergency relief to governments, businesses, and individuals affected by the incident. (CBRNE Consequence Management, 2006, GL-10).

Incident of National Significance- An actual or potential high-impact event that requires a coordinated and effective response by and appropriate combination of Federal, state, local, tribal, nongovernmental, and/or private-sector entities in order to save lives and minimize damage, and provide the basis for long-term community recovery and mitigation activities. (CBRNE Consequence Management, 2006, GL-10).

Joint Task Force – Civil Support- A standing joint task force established to plan and integrate Department of Defense support to the designated lead federal agency for domestic chemical, biological, radiological, nuclear, and high-yield explosives consequence management operations. (CBRNE Consequence Management, 2006, GL-11).

Toxic Industrial Material- Any toxic industrial material manufactured, stored, transported, or used in industrial or commercial processes. It includes toxic industrial chemicals, toxic industrial radiologicals, and toxic industrial biologicals. Also called TIM. (CBRNE Consequence Management, 2006, GL-14)

WMD-CST-Weapons of Mass Destruction-Civil Support Team. A twenty-two man full time National Guard response team with the mission to identify and assess CBRNE hazards and advise local authorities. The structure of the unit is divided into six sections: command, operations, communications, administration/logistics, medical/analytical, and survey. (National Guard Role in Homeland Defense, 2010, CST)

National Planning Scenarios FEMA

Key Scenario Sets	National Planning Scenarios
1. Explosives Attack – Bombing Using Improvised Explosive Device	Scenario 12: Explosives Attack – Bombing Using Improvised Explosive Device
2. Nuclear Attack	Scenario 1: Nuclear Detonation – Improvised Nuclear Device
3. Radiological Attack – Radiological Dispersal Device	Scenario 11: Radiological Attack – Radiological Dispersal Device
4. Biological Attack – With annexes for different pathogens	Scenario 2: Biological Attack – Aerosol Anthrax Scenario 4: Biological Attack – Plague Scenario 13: Biological Attack – Food Contamination Scenario 14: Biological Attack – Foreign Animal Disease
5. Chemical Attack – With annexes for different agents	Scenario 5: Chemical Attack – Blister Agent Scenario 6: Chemical Attack – Toxic Industrial Chemicals Scenario 7: Chemical Attack – Nerve Agent Scenario 8: Chemical Attack – Chlorine Tank Explosion
6. Natural Disaster – With annexes for different disasters	Scenario 9: Natural Disaster – Major Earthquake Scenario 10: Natural Disaster – Major Hurricane
7. Cyber Attack	Scenario 15: Cyber Attack
8. Pandemic Influenza	Scenario 3: Biological Disease Outbreak – Pandemic Influenza

Figure 4. National Planning Scenarios

Source: Federal Emergency Management Agency (FEMA), *IS-100b Course*, http://training.fema.gov/EMIWeb/IS/IS100b.asp (accessed 12 April 2011).

Figure 5. FEMA Regions

Source: Federal Emergency Management Agency (FEMA), *IS-100b Course*, http://training.fema.gov/EMIWeb/IS/IS100b.asp (accessed 12 April 2011).

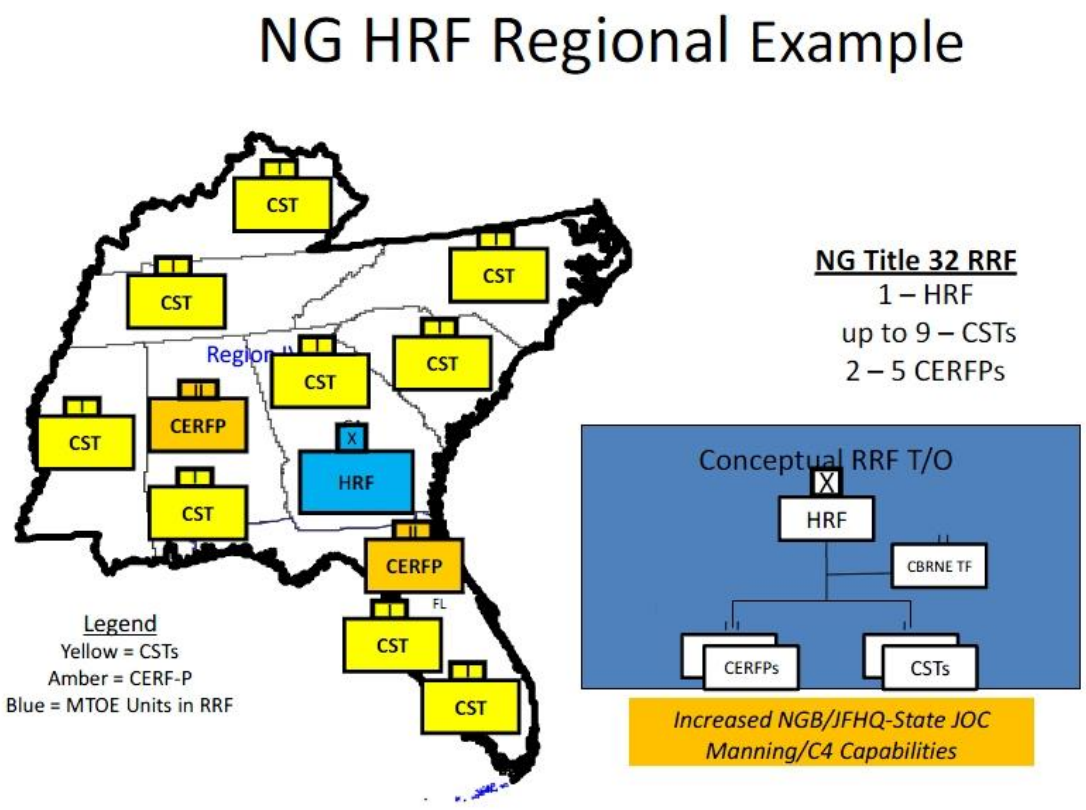

Figure 6. NG HRF Regional Example

Source: National Guard Bureau, *Implementation base plan (IMPLAN) – Homeland Respsonse Force 5 (HRF)* (Arlington, VA: Government Printing Office, 2010), 15.

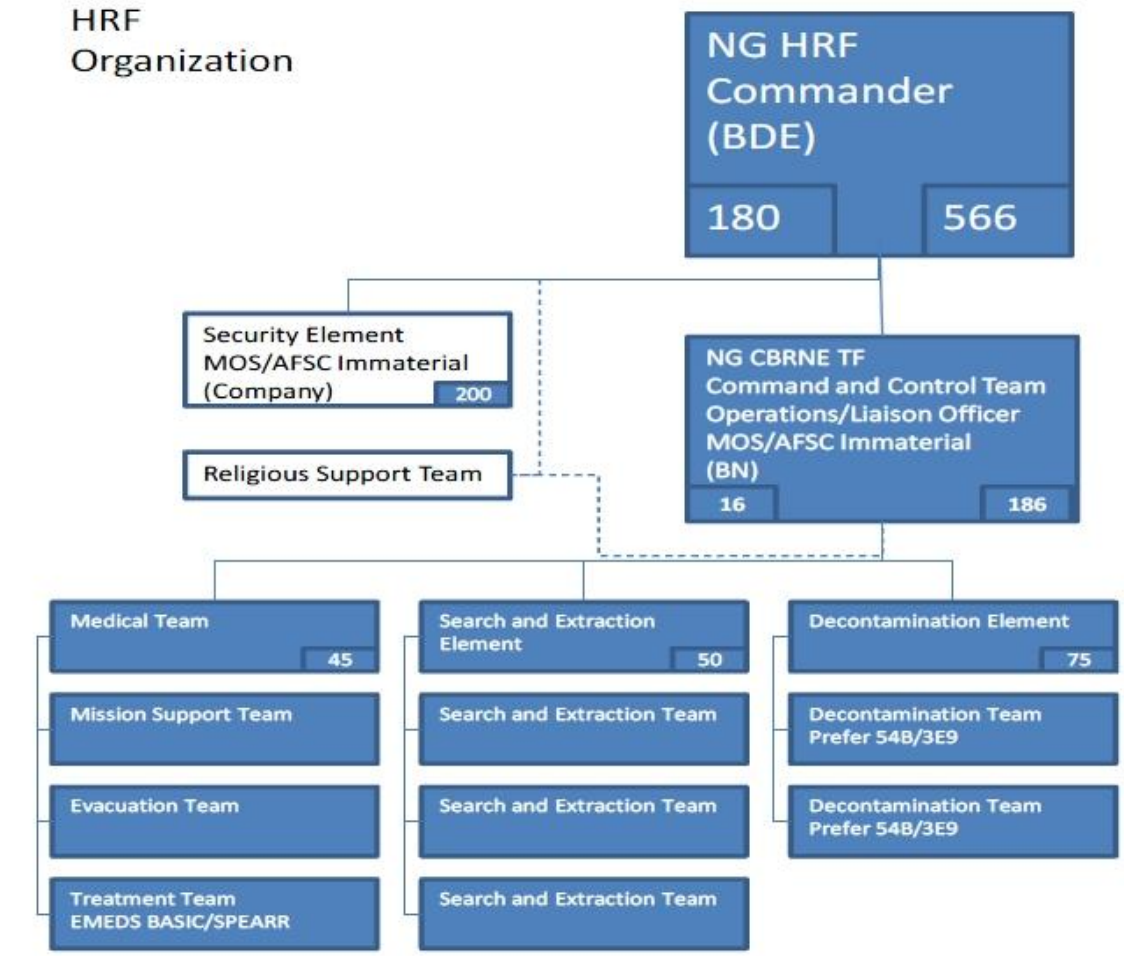

Figure 7. HRF Organization

Source: National Guard Bureau, *Implementation base plan (IMPLAN) – Homeland Respsonse Force 5 (HRF)* (Arlington, VA: Government Printing Office, 2010), 16.

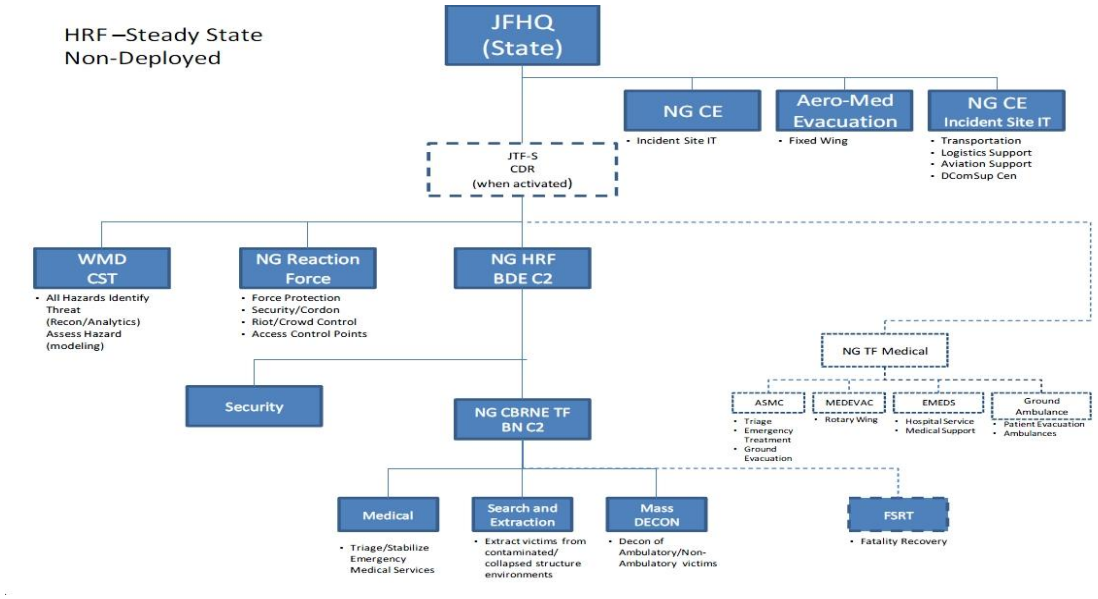

Figure 8. HRF in a Non-Deployed Status

Source: National Guard Bureau, *Implementation base plan (IMPLAN) – Homeland Respsonse Force 5 (HRF)* (Arlington, VA: Government Printing Office, 2010), 16.

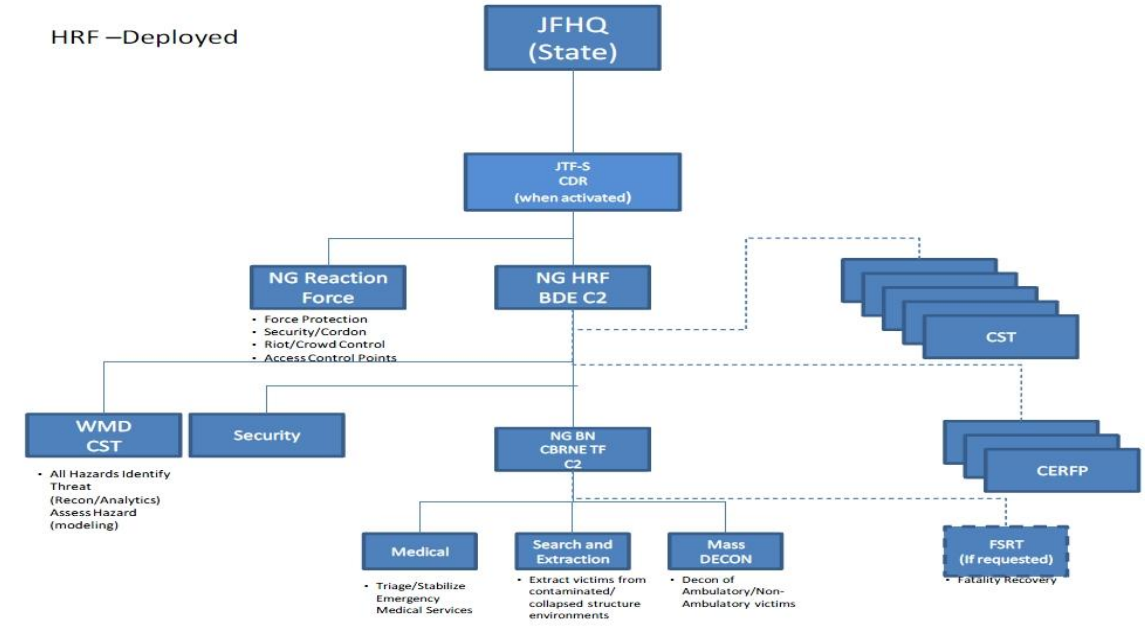

Figure 9. HRF in a Deployed Status

Source: National Guard Bureau, *Implementation base plan (IMPLAN) – Homeland Respsonse Force 5 (HRF)* (Arlington, VA: Government Printing Office, 2010), 17.

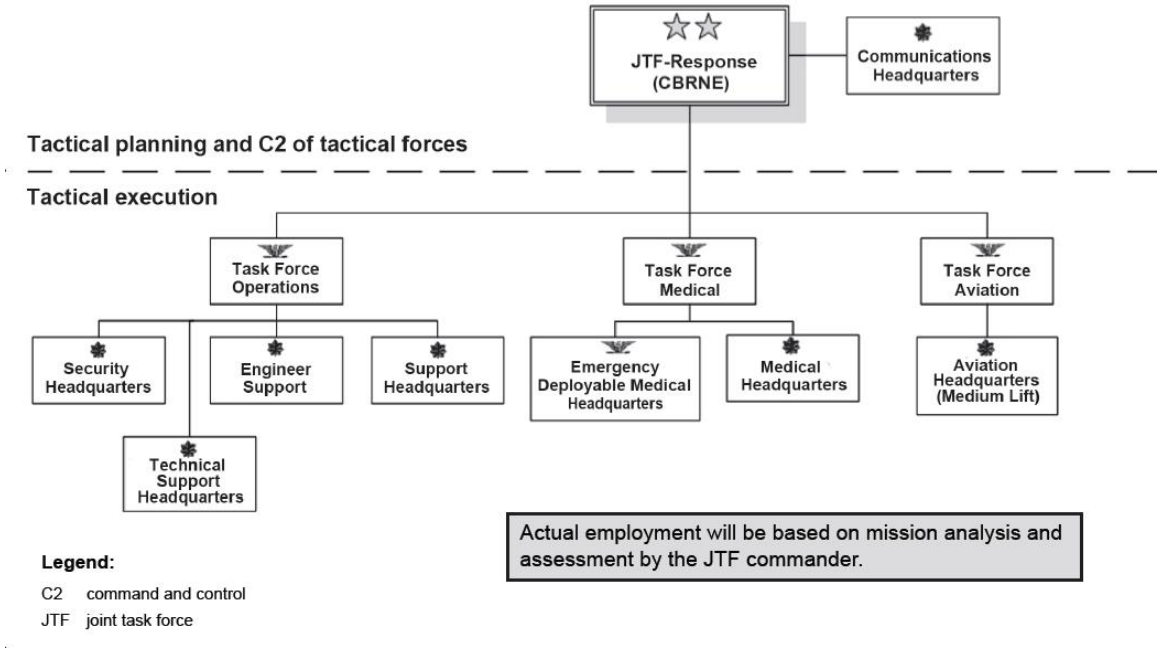

Figure 10. DCRF/CCMRF Structure

Source: Mark T. Anderson and Matthew K. McLaughlin, CCMRF: The Title 10 Initial-Entry Force, *Army Chemical Review* (Summer 2009): 14.

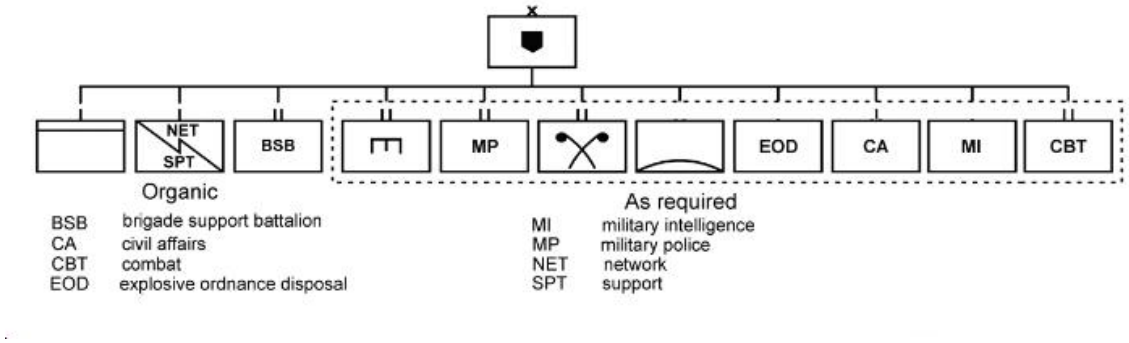

Figure 11. Maneuver Enhancement Brigade Structure

Source: Department of the Army, Field Manual 3-90.31 *Maneuver Enhancement Brigade Operations* (Washington, DC: Government Printing Office, 2009), 2-3

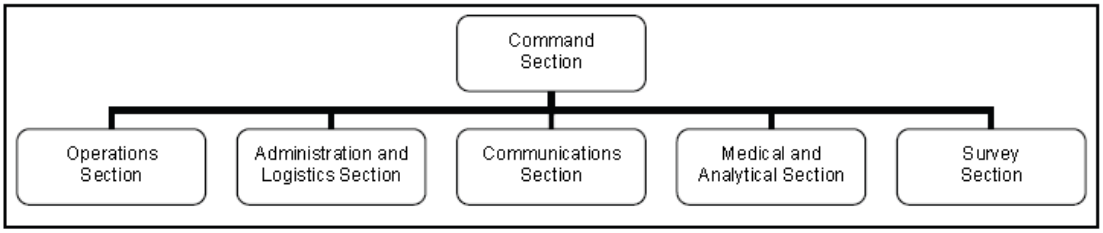

Figure 12. Weapon of Mass Destruction-Civil Support Team Structure
Source: Department of the Army, Field Manual 3-11.22, *Weapons of Mass Destruction–Civil Support Team Operations* (Washington, DC: Government Printing Office, 2007), 2-3.

Figure 13. FEMA Disaster Defining Rubric
Source: Federal Emergency Management Agency (FEMA), ~~"D~~efining Disasters," http://training.fema.gov/EMIWeb/edu/docs/hazdem/Session%206--Defining%20Disaster%20Slides.ppt (accessed May 2011), 8.

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10 U.S. Code

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18 U.S. Code

18 U.S. Code § 1385. The Posse Comitatus Act.

31 U.S. Code § 1535. The Economy Act.

32 U.S. Code National Guard.

33 U.S. Code §701n. Emergency Response to Natural Disasters.

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