CBRN WEAPONS OF MASS DESTRUCTION: THE RELEVANCE OF THE UNITED STATES ARMY'S CHEMICAL CORPS IN THE SUPPORT OF HOMELAND SECURITY AND DEFENSE AGAINST STATE AND NON-STATE ACTORS

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Homeland Security Studies

by

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In 2002 homeland security became the number one priority in the National Military Strategy. With evidence of terrorism in the United States (US), protecting the homeland became the new mission. The slightest mention of a chemical, biological, radiological, and nuclear (CBRN) weapons of mass destruction (WMD) threat can cause outrage, fear, terror, and panic. The US Army recognizes the three-dimensional nature of modern warfare and the need to conduct a fluid mix of offensive, defensive, stability operations and defense support of civil authorities simultaneously. The current state and non-state actors have CBRN WMD capabilities or desire to acquire them. The threat or employment of CBRN WMD, can seriously destroy US national powers. The deadly, destructive, and disruptive effects of these weapons and materials merit continuous consideration by the president, government, military and US citizens. The US military must train and remain prepared to conduct the full range of military operations throughout the operational environment, including the United States.

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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.

ABSTRACT

CBRN WEAPONS OF MASS DESTRUCTION: THE RELEVANCE OF THE UNITED STATES ARMY'S CHEMICAL CORPS IN THE SUPPORT OF HOMELAND SECURITY AND DEFENSE AGAINST STATE AND NON-STATE ACTORS, by MAJ Jennifer L. Blackwell, 102 pages.

In 2002 homeland security became the number one priority in the National Military Strategy. With evidence of terrorism in the United States (US), protecting the homeland became the new mission. The slightest mention of a chemical, biological, radiological, and nuclear (CBRN) weapons of mass destruction (WMD) threat can cause outrage, fear, terror, and panic. The US Army recognizes the three-dimensional nature of modern warfare and the need to conduct a fluid mix of offensive, defensive, stability operations and defense support of civil authorities simultaneously. The current state and non-state actors have CBRN WMD capabilities or desire to acquire them. The threat or employment of CBRN WMD, can seriously destroy US national powers. The deadly, destructive, and disruptive effects of these weapons and materials merit continuous consideration by the president, government, military and US citizens. The US military must train and remain prepared to conduct the full range of military operations throughout the operational environment, including the United States.

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To my fellow Dragon Soldiers: “Elementis Regamus Proelium” “We rule the battle through the elements” and “All Honor and Glory to the Regiment!” This paper is dedicated to the Chemical Soldiers both past and present. Dragon Soldiers, continue to guard America’s force, serving as the chemical, biological, radiological, and nuclear counterforce; continue to protect the homeland.

As I reflect on these past several months, it is hard for me to believe that my year at the Command and General Staff Officer College is ending. Thank you to my family, friends, fellow Dragon Soldiers, and my MMAS committee for your positive feedback and words of encouragement during my time writing this thesis.

All the Best,

MAJ Jennifer L. Blackwell

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ACRONYMS

CBRN	Chemical, Biological, Radiological, Nuclear
CWMD	Counter Weapons of Mass Destruction
CTR	Cooperative Threat Reduction
CWC	Chemical Weapons Convention
CWS	Chemical Warfare Service
DOD	Department of Defense
DOTMLPF-P	Doctrine, Organization, Training, Material, Leadership and Education, Personnel, Facilities, and Policy
DRE	Deployment Readiness Exercise
DSCA	Defense Support of Civil Authorities
NBCRV	M1135 Stryker Nuclear, Biological, and Chemical Reconnaissance Vehicle
SSRC	Syria's Science Studies and Research Center
US	United States
WMD	Weapons of Mass Destruction
WWI	World War I

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CHAPTER 1

INTRODUCTION

> The dogmas of the quiet past, are inadequate to the stormy present. The occasion is piled high with difficulty, and we must rise with the occasion. As our case is new, so must we think anew, and act anew. We must disenthrall ourselves, and then we shall save our country. Fellow-citizens, we cannot escape history.[1]
>
> — President Abraham Lincoln, *1862 Address to Congress*

The US Army Chemical Corps has a history that dates to World War I (WWI) in Germany. As President Abraham Lincoln stated, to know your present is to reflect on the past. The historical chemical, biological, radiological, and nuclear (CBRN) threats to our military forces and our homeland are still prevalent. Since the enemy is developing new threats and tactics for delivery of CBRN Weapons of Mass Destruction (WMD), the United States Army Chemical Corps must change and continuously update doctrine, organization, training, material, leadership and education, personnel, facilities, and policy (DOTMLPF-P) to remain a critical asset in the protection of our homeland from an attack.

The use of CBRN as a WMD is nothing new; however, the United States (US) has not experienced a catastrophic event. CBRN warfare has been a hot topic recently due to the recent chemical attack in Syria and nuclear missile testing in North Korea. Given the new threats and as technology advances, the US military must continue to conduct Unified Land Operations to seize, retain and exploit the initiative and to gain and

[1] Abraham Lincoln, "Annual Message to Congress December 1, 1862," in *Collected Works of Abraham Lincoln,* vol. 5, ed. Roy P. Basler (New Brunswick, NJ: Rutgers University Press,1953), 5:537.

maintain a relative advantage over our adversaries; state actors, non-state actors, terrorists and their supporters.[2]

Threats to the homeland have occurred throughout history; however, the Department of Homeland Security is relatively new and did not become relevant until 2002 following the September 11, 2001, attacks on the World Trade Center and the Pentagon, which were the worse acts of terrorism to occur in the United States. Homeland security developed as an executable strategy to protect civilians and critical infrastructure against domestic terrorism. CBRN WMD pose a significant threat to the instruments of national powers of the United States; Diplomacy, Information, Military, and Economy. Can you imagine if 9-11 was a CBRN WMD attack? The question of, "If and when state or non-state actors use it, will America be ready?" looms in the back of everyone's minds.

Chapter Arrangements

This study has five chapters which dissect the status of the US Army Chemical Corps to collect relevant data. Chapter 1 introduces the problem statement, provides background information to frame the problem, states thesis research questions, assumptions, scope of the research, limitations, and delimitations. It also lists definitions with key military terms to familiarize the audience with military terms. Chapter 2 provides a review of relevant literature to aid the study. The literature review focuses on the historical and present day uses of CBRN warfare. It also covers an overview of the

[2] Department of the Army, Army Doctrine Reference Publication (ADRP) 5-0, *The Operations Process* (Washington, DC: Government Printing Office, 2012), 1-2.

US Army Chemical Corps History, National Security Strategy, National Military Strategy, and an overview of the Department of Homeland Security and Defense. Chapter 3 introduces the research methodology used to conduct this study--qualitative inquiry and narrative research design. Chapter 4 provides an analysis of the findings from the research methodology through DOTMLPF-P and the narrative research from journals, Master of Military Art and Science (MMAS) theses, and articles written by chemical officers. This chapter will identify major themes within the findings and identify gaps and recommendations. Chapter 5 will present a summary of the analysis and recommendations and answer the research questions.

Problem Statement

Chemical, biological, radiological, and nuclear WMD pose a significant threat to the instruments of national powers of the United States. Many fellow Soldiers and senior leaders question whether or not the US Army Chemical Corps is relevant. However, many fail to realize that preparedness to deal with the WMD threat is the responsibility of the United States Army Chemical Corps.

Proposed Research Question

Is the United States Army Chemical Corps relevant in the support of homeland security and defense against CBRN weapons of mass destruction from state and non-state actors?

Secondary Research Question

How does the US Army Chemical Corps fix the perception that other branches have about their branch of service within the US Army?

Assumptions

The United States Army Chemical Corps provides a service to this nation that we hope we will never have to use. The Chemical Corps is America's insurance policy designed to give the homeland a peace of mind if a CBRN threat or attack occurs. The United States and its allies are concerned with the development and confirmed testing of CBRN WMD in rogue states. Additionally, non-state actor's interest in causing panic, terror, and violence among innocent civilians can lead them to use a CBRN WMD. This is a serious concern given the amount of instructions on how to design and build a WMD are easily accessible on the internet. Non-state actors can also easily obtain the CBRN agents, materials, and equipment and build a CBRN WMD.

Scope

This research is limited to the active duty United States Army Chemical Corps. CBRN is the only WMD, or catastrophic event focused on affecting the United States in this paper. Throughout the paper WMD and CBRN WMD are interchangeable. The study aims to identify and address the relevancy of the Chemical Corps and uses the DOTMLPF-P framework to identify gaps and shortfalls with supporting homeland security and defense.

Limitations

The research is a qualitative inquiry and narrative research design. Additional study would include visits to the United States Army Chemical Corps units to discuss their capabilities and view a demonstration of those capabilities. During the review of

DOTMLPF-P, the last "P" for policy is not evaluated in the Chapter 4 analysis. The data contained in this study is unclassified. All information is available for public release.

Delimitations

It is important to understand that not all terrorist attacks in the US are CBRN WMD and not all CBRN incidents are terrorist attacks. For a terrorist attack to be categorized as a CBRN WMD, the use of a CBRN element that results in a high level of destruction must be involved. The opinions and conclusions expressed throughout the paper are those of the student author and do not necessarily represent the views of either the Command and General Staff College, the United States Army Chemical Corps and/or other government agencies.

Definitions

Adversary-A party acknowledged as potentially hostile to a friendly party and against which the use of force may be envisaged.[3]

Biological Warfare (BW)-Agents that are living microorganisms that cause fatal or incapacitating diseases, as well as toxins (nonliving poisons extracted from living bacteria, plants, and animals, or synthesized in the laboratory). Biological weapons, unlike chemical weapons, have an incubation period of two days or more before symptoms develop. Microbial pathogens used for military purposes include bacteria

[3] Joint Chiefs of Staff, Joint Publication (JP) 3-0, *Joint Operations* (Washington, DC: Government Printing Office, 2017), GL6.

(Anthrax, Tularemia, and Plague), viruses (Venezuelan equine encephalitis, Marburg hemorrhagic fever, and Smallpox), and rickettsia (Q fever).[4]

Catastrophic Event-Any natural or man-made incident, including terrorism, which results in extraordinary levels of mass casualties, damage, or disruption severely affecting the population, infrastructure, environment, economy, national morale, and-or government functions.[5]

Chemical, Biological, Radiological, and Nuclear Consequence Management-Actions took to plan, prepare, respond to, and recover from chemical, biological, radiological, and nuclear incidents.[6]

Chemical, Biological, Radiological, and Nuclear Responders-Department of Defense military and civilian personnel who are trained to respond to CBRN incidents and certified to operate safely at appropriate levels according to Section 120, Part 1910, Title 29 Code of Federal Regulations (29 CFR 1910.120) and NFPA 472.[7]

Chemical Warfare (CW)-Agents that are man-made, super toxic chemicals that can be dispersed as a gas, vapor-liquid, aerosol (microscopic droplets), or adsorbed onto a

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[4] Jonathan B. Tucker, ed., *Toxic Terror, Assessing Terrorist Use of Chemical and Biological Weapons* (Cambridge, MA: John F. Kennedy School of Government, Harvard University, 2000), 4.

[5] Joint Chiefs of Staff, Joint Publication (JP) 3-28, *Defense Support of Civil Authorities* (Washington, DC: Government Printing Office, 2013), GL5.

[6] Department of the Army, Army Techniques Publication (ATP) 3-11.4, *Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Consequence Management Operations* (Washington, DC: Government Printing Office, 2015), 1-2.

[7] Ibid.

fine talcum-like powder to create dusty agents. Basic classes of chemical agents include choking agents that damage lung tissue (chlorine) blood agents that interfere with cellular respiration (hydrogen cyanide), blister agents that cause server chemical burns to the skin and lungs (mustard gas, lewisite), and nerve agents that disrupt nerve-impulse transmission in the central and peripheral nervous systems, causing convulsions and death by respiratory paralysis (sarin, VX). Chemical agents vary in toxicity and persistence. Volatile agents (sarin) disperse rapidly and persistent agents (VX or sulfur mustard) remain toxic for days to weeks and require decontamination.[8]

Combating Terrorism-Combating terrorism involves actions to oppose terrorism from all threats. It encompasses antiterrorism, defensive measures taken to reduce vulnerability to terrorist acts, and offensive measures to prevent, deter, preempt, and respond to terrorism.[9]

Consequence Management Response Force-A brigade-size combined arms task force tailored as a reinforcing effort for Defense Support of Civil Authorities (DSCA) in response to CBRN incidents. It operates under Title 10 USC authority and in support of US Northern Command under JTF-CS. A CBRNE consequence management response force constitutes the majority of the JTF-CS task force response requirements and provides force-tailored capabilities (such as casualty decontamination, security operations, medical triage and treatment, aviation, logistics, and transportation).[10]

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[8] Tucker, 3.

[9] Joint Chiefs of Staff, JP 3-0, VI-6.

[10] Department of the Army, ATP 3-11.4, A22.

Contamination Avoidance-Individual and-or unit measures that are taken to reduce the effects of CBRN hazards.[11]

Cooperative Threat Reduction-Activities that are undertaken with the consent and cooperation of host nation authorities in a permissive environment to enhance physical security and to reduce, dismantle, redirect, and-or improve the protection of a state's existing WMD program, stockpiles, and capabilities. The program supports national security strategy by pursuing objectives to prevent the proliferation of WMD and related materials, technologies, and expertise from former Soviet Union states.[12]

Defense Support of Civil Authorities (DSCA)-The support provided in response to requests for assistance from civil authorities for domestic emergencies, law enforcement support, and other domestic activities, or from qualifying entities for special events. Disaster management or emergency management is the term used to designate the efforts of communities or businesses to plan for and coordinate all the personnel and materials required to mitigate the effects of, or recover from natural or man-made disasters, or acts of terrorism. Military response to natural and man-made disasters, law enforcement, special events, and other domestic activities on US soil (states, territories, tribal lands, etc.). The purpose is to save lives, prevent human suffering, and mitigate

[11] Joint Chiefs of Staff, Joint Publication (JP) 3-11, *Operations in Chemical, Biological, Radiological, and Nuclear Environments* (Washington, DC: Government Printing Office, 2013), GL7.

[12] Defense Threat Reduction Agency, "Nunn-Lugar Cooperative-Threat Reduction Program," accessed April 17, 2017, http://www.dtra.mil/Missions/Partnering/Cooperative-Threat-Reduction-Program/.

great property loss. The United States Department of Defense (DOD) is never the lead agency in DSCA.[13]

Deployment-The relocation of forces and materiel to desired operational areas. Deployment encompasses all activities from origin or home station through destination, specifically including intra-continental US, inter-theater, and intra-theater movement legs, staging, and holding areas.[14]

Deterrence-The prevention of action by the existence of a credible threat of unacceptable counteraction and-or belief that the cost of action outweighs the perceived benefits.[15]

Doctrine, Organization, Training, Material, Leadership and Education, Personnel, Facilities, and Policy (DOTMLPF-P)-Policies, duties, responsibilities, and relationships applicable to the Army Force Modernization Proponent System, to include determining doctrine, organization, training, materiel, leadership and education, personnel, and facilities requirements with regard to a particular function or branch.[16]

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[13] Norman M. Wade, *Homeland Defense and DSCA* (Lakeland, FL: The Lightning Press, 2015), 1.

[14] Department of the Army, Army Regulation (AR) 525-93, *Military Operations Army Deployment and Redeployment* (Washington, DC: Government Printing Office, 2014), 44.

[15] Joint Chiefs of Staff, JP 3-0, GL8.

[16] Department of the Army, Army Regulation (AR) 5-22, *The Army Modernization Proponent System* (Washington, DC: Government Printing Office, 2015), 1.

Homeland-The physical region that includes the continental United States, Alaska, Hawaii, United States territories, and surrounding territorial waters and airspace.[17]

Homeland Defense-Protecting the United States against an attack by a military force of a foreign country. It is largely reactive, a posture whereby the US military has primary responsibility.[18] The protection of the United States sovereignty, territory, domestic population, and critical infrastructure against external threats and aggression, or other threats as directed by the President.[19]

Homeland Security-A concerted national effort to prevent terrorist attacks within the United States, reduce America's vulnerability to terrorism, major disasters, and other emergencies; and minimize the damage and recover from attacks that do occur, major disasters, and other emergencies that occur.[20]

Hostile Act-An attack or other use of force against the United States, United States forces, or other designated persons or property to preclude or impede the mission and-or duties of United States forces, including the recovery of United States personnel or vital United States Government property.[21]

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[17] Joint Chiefs of Staff, JP 3-28, GL6.

[18] Bruce Maxwell, *Homeland Security a Documentary History* (Washington DC, A Division of Congressional Quarterly, 2004). xxi.

[19] Joint Chiefs of Staff, Joint Publication (JP) 3-27, *Homeland Defense* (Washington, DC: Government Printing Office, 2013), i.

[20] Wade, 1.

[21] Joint Chiefs of Staff, JP 3-28, GL6.

Nonproliferation-Use of military capabilities in conjunction with a whole-of-government effort, and within a state's legal authorities, to deter and prevent the acquisition of WMD by dissuading or impeding access to or distribution of sensitive technologies, material, and expertise by and between state and non-state actors of concern.[22]

Readiness- The ability of US military forces to fight and meet the demands of the national military strategy. Readiness is the synthesis of two distinct, but interrelated levels: unit readiness and joint readiness. Unit readiness is the ability to provide capabilities required by the CCDRs to execute their assigned missions. This is derived from the ability of each unit to deliver the outputs for which it was designed. Joint readiness is the CCDR's ability to integrate and synchronize ready combat and support forces to execute the assigned missions.[23]

Terrorism-The deliberate creation and exploitation of fear through violence or the threat of violence in the pursuit of political change.[24]

Threat-Any combination of actors, entities, or forces that have the capability and intent to harm United States forces, United States national interests, or the homeland.[25]

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[22] Joint Chiefs of Staff, JP 3-0, VI-6.

[23] Department of the Army, AR 525-93, 45.

[24] Bruce Hoffman, *Inside Terrorism*, rev. ed. (New York: Columbia University Press, 2006), 40.

[25] Department of the Army, Army Doctrine Reference Publication (ADRP) 3-0, *Operations* (Washington, DC: Government Printing Office, 2016), Glossary 9.

Weapons of Mass Destruction (WMD)-Chemical, biological, radiological, or nuclear weapons capable of a high order of destruction or causing mass casualties, and excluding the means of transporting or propelling the weapon where such means is a separable and divisible part of the weapon.[26]

Summary

Chapter 1 covers the purpose of the study and discusses the effort to analyze the United States Army Chemical Corps and determine if they remain relevant in support of homeland security and defense against CBRN WMD from state and non-state actors. This study is significant because the relevancy of the Chemical Corps has been debated. From the inception of the Chemical Corps to present day, chemical soldiers must repeatedly explain the purpose of the branch's existence.

[26] Joint Chiefs of Staff, Joint Publication (JP) 3-40, *Countering Weapons of Mass Destruction* (Washington, DC: Government Printing Office, 2014), GL5.

CHAPTER 2

LITERATURE REVIEW

The purpose of the literature review is to gain background information in order to answer the following questions: Is the United States Army Chemical Corps relevant in support of homeland security and defense against CBRN weapons of mass destruction from state and non-state actors? How does the Chemical Corps fix the perception that other branches have about their branch of service within the US Army? This section will review CBRN warfare history, Chemical Corps history, the National Security Strategy, National Defense Strategy, National Military Strategy, and provide an overview of homeland security and defense.

Chemical

A chemical agent is a substance "intended for use in military operations to kill, seriously injure, or incapacitate because of its physiological effects."[27] Combatants have used chemicals and incapacitating smoke screens for over a thousand years. The first noted use was in 2000 B.C. during the wars of ancient India. The use of smoke screens, incendiary devices, and toxic fumes caused inactivity on its adversaries.[28]

The first use of chemical warfare that involved the US, was in WWI when the French used chemical weapons against the Germans in 1914. In previous wars, the

[27] Department of the Army, Navy and Airforce, *NATO Handbook on the Medical Aspects of NBC Defensive Operations AMedP-6(B*) (Washington, DC: Government Printing Office, 1996), Part 3: 1-1.

[28] Seymour M. Hersh, *Chemical and Biological Warfare* (Indianapolis, IN: Bobbs-Merrill Company, 1968), 3.

majority of the casualties resulted from bullets versus airborne delivery of chemical weapons. Given the stalemate caused by trench warfare, they needed to use of chemical warfare to uproot the enemy. The French were the first to use chemical warfare during WWI when they used hand and rifle grenades filled with tear gas artillery shells against the Germans. On April 22, 1915, the Germans released a lethal cloud of chlorine gas on French lines in Ypres. Gas masks were developed and rushed to the Allies frontlines. The chlorine caused panic and confusion, resulting in over 5,000 deaths and 10,000 injuries. The US forces entered WWI in 1917 and were not involved in gas attacks until February 25, 1918. US units were hit with phosgene shells, a deadly choking agent that attacks the respiratory tract, causing swelling of membranes and lack of oxygen.[29]

Mustard gas developed by the Germans, caused an estimate of 400,000 casualties in WWI. Both sides fired almost 58,000 tons of chemical weapons. Lewisite was also developed by the US that blistered the skin and penetrated the body.[30] The offensive use of chemical agents became the new tactic for war due to the fact it was easily dispersed over large areas and penetrated well defended positions. The method of employment of chemical agents was against specific targets with effects that include ddelayed or immediate incapacitation, disorientation, or death.[31]

The first significant use of tear gas in WWI gave the French the advantage; however, it was temporary. A new chemical agent designed by one side was eventually

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[29] Ibid., 4-6.

[30] Ibid., 5-6.

[31] Shirley D. Tuorinsky, ed *Medical Aspects of Chemical Warfare* (Washington, DC: Office of the Surgeon General, 2008), 2.

countered the other with weapons of greater lethality and effects. It eventually became a competition to develop better chemical protection, make the current chemicals more potent, and to develop new ways to disperse the chemical weapons.[32]

As a result of the devastating use of chemical weapons in warfare, a protocol for the prohibition of the use of asphyxiating, poisonous, or other gases was signed in 1925 called the Geneva Protocol. The protocol prohibited the development, production, or stockpiling of chemical weapons. Many States that approved the protocol reserved the right to use banned weapons against States that were not a part of the Geneva Protocol or as retaliation, if chemical weapons were used against them. By 1980, twenty-five States were reported as possessing chemical weapons capabilities.[33]

The Chemical Weapons Convention (CWC) became official on April 29, 1997 and allowed rigorous verification of compliance by State Parties. The CWC is the "first disarmament agreement negotiated within a multilateral framework that provides for the elimination of an entire category of weapons of mass destruction under international control. The Organization for the Prohibition of Chemical Weapons was formally established shortly after". Chemical stockpiles to this day are continuously being destroyed due to the Chemical Weapons Convention.[34]

By the end of the 20th century, the use of chemical weapons expanded beyond the battlefield as terrorist organizations started using agents against civilian populations.

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[32] Hersh, 6.

[33] United Nations Office for Disarmament Affairs, "Chemical Weapons," accessed February 1, 2017, https://www.un.org/disarmament/wmd/chemical/.

[34] Ibid.

Non-state actors and terrorist organizations interested in the mass lethality and the powerful psychological effects of these agents has resulted in an increased concern for the potential use of chemical weapons.[35] Due to new and growing technology such as the internet, non-state actors have the ability and knowledge to develop CBRN WMD. In 1995 sarin, a deadly nerve agent was released by Aum Shinrikyo, a well-funded Japanese, religious cult. The cult released sarin into five separate subway cars in downtown Tokyo. The attack caused panic, confusion, and terror.[36]

On April 4, 2017, a chemical attack in Syria, killed close to 100 people and wounded 500. The world was in shock and outraged since 80 percent of the casualties were woman and children. Syrian President Bashar al-Assad denied that his military used chemical weapons. He blamed rebels for the attack.[37] The United States responded on April 6, 2017 with a missile strike followed by sanctions, making it one of the largest sanction actions in history. The US claimed that the 271 employees of Syria's Science Studies and Research Center were responsible for "developing and producing non-conventional weapons and the means to deliver them." Sanctions were also placed on Syria and the Syria's Science Studies and Research Center by former President George

[35] Tuorinsky, 2.

[36] Holly Fletcher, "Aum Shinrikyo: A Profile of the Japanese Religious Cult that Carried Out the 1995 Subway Sarin Attack," *Council on Foreign Relations*, June 19, 2012, accessed May 1, 2017, https://www.cfr.org/backgrounder/aum-shinrikyo.

[37] Kareem Khadder et al., "Suspected Gas Attack in Syria Reportedly Kills Dozens," *CNN*, April 7, 2017, accessed April 27, 2017, http://www.cnn.com/2017/04/04/middleeast/idlib-syria-attack/.

W. Bush who claimed they were making weapons of mass destruction. Former President Barack Obama threatened military action in 2013 due to a suspected chemical attack.[38]

Biological

A biological agent is "a microorganism, or toxin derived from it, which causes disease in man, plants or animals, or causes deterioration of material." Biological warfare agents are normally divided into three categories: antipersonnel, anti-animal, and antiplant.[39]

Some of the first uses of biological warfare included Hannibal the Carthaginian putting "venomous snakes onto the enemy ships of Pergamus at Eurymedon in 190 BC". Another case in Scythain when archers used arrows dipped in blood and manure of decomposing bodies in 400 BC.[40] In 590 B.C. during the First Sacred War, the heavily fortified city of Kirrha was being besieged by the Amphictyonic League. Kirrha's water supply was cut off by the invaders, and they suffered from dehydration. The League, led by Athens and Sicyon, poisoned the water supply with hellebore roots. Once they turned the water back on the severely dehydrated city indulged in the contaminated water. The biological effects of illness, stomach cramps, and diarrhea made them defenseless and

[38] Foreign Policy, "United States Sanctions Hundreds for Syrian," April 24, 2017, accessed May 1, 2017, http://foreignpolicy.com/2017/04/24/united-states-sanctions-hundreds-for-syrian-chemical-weapons-attack/.

[39] Department of the Army, Navy and Airforce, Part 2:1-1 and 8-9.

[40] Jeffery K. Smart, M.A., *Medical Aspects of Chemical and Biological Warfare* (Aberdeen Proving Ground, MD: US Army Chemical and Biological Defense Command, 2014), 12.

allowed the city to be taken. Poisoning the water was an effective strategy in seizing the city.[41]

There are many additional noted events such as Barbarossa using the tactic of dead bodies as the carrier of a biological agent which proved particularly effective against an enemy's water supply in the battle of Tortona in 1155. De Mussis, a Mongol, catapulted bubonic plague infected bodies into Caffa in 1346. In 1495, the Spanish drank wine infected by the French with leprosy patients' blood. In 1650 Siemenowics, a Polish artillery general, put saliva from rabid dogs into hollow spheres and fired them at enemies.[42]

During Pontiac's Rebellion in New England in 1763, Colonel Henry Bouquet, a British officer, proposed giving the Native Americans at Fort Pitt, Pennsylvania, blankets infected with smallpox. The disease devastated the Native American population. In 1861 during the Civil War, Union troops advancing south into Maryland and other border states were warned of the possibility of receiving poisoned food and water from unknown civilians. Despite the warnings, there were several instances where soldiers thought they were poisoned after eating or drinking. In 1863, confederate soldiers retreating in Mississippi, left dead animals in wells and ponds to deny water sources to the Union troops. Dr. Luke Blackburn, a future governor of Kentucky, used biological weapons by

[41] Ancient History and Civilization, "Poison Waters, Deadly Vapors," accessed November 30, 2016, http://erenow.com/ancient/greek-fire-poison-arrows-scorpion-bombs/6.html.

[42] Smart, 12.

infecting clothing with smallpox and yellow fever and then sold the clothing to unsuspicious Union troops.

Before WWI, the United States had little knowledge on preparing soldiers for future wars with biological agents. Present-day threats include the anthrax mailings in 2001, and ricin mailings to the White House and Senate between 2003 and 2004. These events altered the Chemical Corps' mission, focusing on the use of biological warfare by terrorists.[43]

Radiological

An example of a radiological dispersal device (RDD) is a "dirty bomb." It is a combination of explosives and radioactive material. Most dirty bombs will not release enough radiation to kill people or cause severe illness; however, the conventional explosive will cause the most destruction. An attack with a dirty bomb will cause fear and panic, contaminate property and personnel, and require decontamination from chemical units.[44] Radiological exposure devices (RED) are a highly radioactive source and effective when placed in a location exposing radiation to people. State actors most likely will not use radiological weapons; however, non-state actors and terrorist organizations wishing to inflict psychological and economic damage may use it.[45]

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[43] Dana A. Shea and Frank Gottron, RL32391, *Small-Scale Terrorist Attacks Using Chemical and Biological Agents: An Assessment Framework and Preliminary Comparisons* (Washington, DC: Congressional Research Service, 2004), CRS-1.

[44] United States Nuclear Regulatory Commission, "Fact Sheet on Dirty Bombs," December 2012, accessed May 1, 2017, https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/fs-dirty-bombs.html.

[45] Joint Chiefs of Staff, JP 3-40, II-3.

In 1995, extremists from Chechen threatened to bundle radioactive material with explosives to use against Russian forces in order to force them to withdraw from Chechnya. Reportedly, no explosives were used; however, officials later retrieved a package of cesium-137 the rebels had buried in a Moscow park.[46] A dirty bomb is ideal for employment by terrorists because the supplies necessary to build the weapons are moderately easy to acquire and the technology is simple. Elements in dirty bombs include isotopes such as cobalt-60, cesium-137, americium-241, strontium-90, iridium-192, and plutonium. These materials are in everyday locations found around the world including hospitals, industrial facilities, and research facilities such as universities.[47] Radioactive materials used for research purposes such as: diagnosing and treating illnesses, sterilizing equipment, and inspecting equipment. The Nuclear Regulatory Commission combined with 37 "Agreement" States who also have radioactive material, require over 22,000 licenses to handle or store radioactive material. Measures have been significantly strengthened since the attacks of September 11, 2001 and state regulations require owners licensed to properly store radioactive material to secure it from unauthorized access.[48]

A dirty bomb differs drastically from a nuclear bomb. A nuclear bomb creates an explosion that is millions of times more powerful, creating a cloud of radiation which can spread tens to hundreds of square miles. Radiation from a dirty bomb is dispersed within

[46] United States Nuclear Regulatory Commission.

[47] Stimson: Innovative Ideas Changing the World, "The Issue with RDD," May 31, 2007, accessed May 1, 2017, https://www.stimson.org/radiological-dispersal-devices-rdds.

[48] United States Nuclear Regulatory Commission.

feet or miles of the explosion. A dirty bomb can range from a minor disruption to a catastrophic destruction, depending on the size of the bomb and amount of radioactive material used. The effects of radiation exposure would be determined by "the amount of radiation absorbed by the body the type of radiation (alpha, beta, or gamma); the distance from the radiation to an individual; the means of exposure-external or internal (absorbed by the skin, inhaled, or ingested); and the length of time exposed."[49]

Nuclear

The concept of limited war took on new meaning with the birth of the "nuclear age because total war in the modern era meant an unacceptable level of destruction". The atomic bomb was the "sovereign remedy for all military ailments," allowing the United States to achieve success through "annihilative victories."[50] Once the Soviets also developed the atomic bomb the US lost the relative advantage. The US debated on finding and developing a bigger and better bomb. The national military and foreign policy was reexamined and the product became known as the NSC-68.[51]

America's negative biases and economic reasons limited military means for a larger military, allowing the US to use the technological advantage of the atomic bomb. However, the result of NSC-68 was to avoid reliance on nuclear weapons and build up political, economic, and military power. The invention of "nuclear weapons indicated that

[49] Ibid.

[50] Russell F. Wrigley, *The American Way of War: A History of United States Military Strategy and Policy* (Bloomington, IN: University Press, 1973), 382.

[51] Michal W. Cannon, *Rebirth of Limited War* (H303ORD Reading, Command and General Staff College, 2016), 106.

the costs of total war in the nuclear age could well exceed the value of any objective". The fear of a nuclear holocaust and its ultimate cost has limited not only US objectives in war but the means used to achieve those objectives. The political emphasis on nuclear weapons clouded the development of counterinsurgency strategy and doctrine, forcing the United States to accept a new era of limited war. Total nuclear war with all available state actors with capabilities would result in complete destruction of all involved.[52]

At the beginning of the Korean War in 1950, the strategic priority is given to nuclear weapons limited warfare. There was solid difference between General Douglas MacArthur and President Harry S. Truman. Truman believed in the repression of North Koreans above the 38th parallel. MacArthur disagreed and was determined to destroy the Communists. Truman believed the war is limited war because he refused to allow the battle to escalate with direct conventional or nuclear attacks in China. They limited US participation to a level they considered acceptable.[53]

The New Look Strategy developed after President Eisenhower's election in 1952, as the first Republican president following 20 years of Democratic administrations, and a nation exhausted after World War II. President Eisenhower determined that the nation's defense depended on nuclear superiority, as a deterrent and if deterrence should fail, the

[52] Ibid.

[53] Stephen Morillo, Jeremy Black, and Paul Lococo, *War In World History: Society, Technology, and War from Ancient Times to the Present,* vol. 1 (New York: McGraw-Hill Humanities, 2008), 576.

keystone of victory. This reliance on nuclear weapons reduced the need for large conventional forces, and in theory reduced the requirement for defense spending.[54]

The "pentomic" division structure was the US Army's version of "duck and cover," and was meant to increase the survivability of light infantry and airborne formations on a nuclear battlefield. This required the Army to reorganize from the "triangular" structure of three regiments per division that fought in World War II to five battle groups widely dispersed on the battlefield, in theory protecting its forces through dispersal and mitigating the effect of tactical nuclear weapons.[55]

General Maxwell Taylor's advocacy for "Flexible Response" was an attempt to increase the Army's relevance in the post-World War II national security strategy and protect limited resources by advocating the Army's need to respond to limited conflicts. This ran contrary to Eisenhower's "New Look" strategy, which unsurprisingly garnered support from the other service components that sought to protect their role in a national security strategy reliant on strategic nuclear deterrence.[56]

The US military advocated for tactical nuclear weapons. The Kennedy Administration saw tactical nuclear weapons as a solution to the problem of the Warsaw Pact overwhelming NATO's defensive positions in Western Europe during the Cold War. Tactical nuclear weapons would, in theory, aid the defense, limit damage to the

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[54] Donald Melcher and John Siemer, *How to Build the Wrong Army Toward Combined Arms Warfare* (H3010RB Reading, Command and General Staff College, 2016), 146-157.

[55] Ibid.

[56] Ibid.

environment, and would likely be an area of advantage for western powers. Unfortunately, the Soviets built their tactical nuclear weapons, which served a purpose for offensive forces and provoke a preemptive strategic attack. Bernard Brodie stated, "A people saved by us through our free use of nuclear weapons over their territories would probably be the last that would ever ask us to help them."[57]

The theory of Mutual Assured Destruction, first advocated by Dr. John von Neumann, and later translated to national policy by Secretary of Defense Robert McNamara was a balanced international stability between the USSR and the United States in which both countries possessed the capability to obliterate the world if provoked. This strategy required consideration of "First Strike" destruction of your adversary's retaliatory capability and "Second Strike" capability absorption of the "First Strike" with the capacity to inflict devastating retaliation. The key to MAD was both sides possessing strong retaliatory capabilities. McNamara focused on intercontinental ballistic missiles, as we cannot protect populations, but can protect missiles. MAD was McNamara's policy of trying to deter deliberate nuclear attacks on the US or allies by the promise of reprisal on the user of said weapons.[58]

Today, the use of nuclear power and its associated materials has spread across the world. There are currently thirty countries that have a total of 100 major facilities involved in enrichment, conversion, fuel fabrication and activities to support global nuclear fuel. These states are also operating 400 commercial nuclear power reactors and

[57] Peter Paret, ed., *Makers of Modern Strategy from Machiavelli to the Nuclear Age* (Princeton, NJ: Princeton University Press, 1943), 738-766.

[58] Ibid., 758.

250 research reactors. This on top of the list of other 1,000 plus locations that are involved in storage and the use of nuclear materials highlights the upscale task of monitoring and assuring peacetime use of these materials. The United States, Russia, China, France, and United Kingdom are the only states accounted for as Nuclear Weapons States.[59]

When France in 1960 and China in 1964 tested their first nuclear weapons, there was a huge push for a non-proliferation association. The Nuclear Non-Proliferation Treaty (NPT) was established in 1968 and multiple states agreed to three nuclear principles: preventing the spread of nuclear weapons; pursuing global nuclear disbarment, and the encouraging the peaceful uses of nuclear energy.[60]

With the rise in the demand for the use of nuclear energy, there will be a concern over the control and proper accountability of nuclear technology and nuclear material. The primary concern are the export controls from state to non-state actors and the testing and development of nuclear materials from declared non-nuclear weapons states outside the NPT.[61]

From 1976 to 2004, nuclear scientist Dr. Abdul Qadeer Khan was in the middle of the global nuclear black market. He was not the first to profit from the illegal trade in

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[59] Stephan M. Francis, "The Diversion of Nuclear Materials for Terrorist Use," in *Terrorism and Weapons of Mass Destruction*, ed, Ian Bellany (London: Routledge Taylor Francis Group, 2007), 201-205.

[60] Ibid., 201.

[61] Ibid., 223.

destructive technologies, but he enhanced the union of the market.[62] Khan's proliferation network was largely a non-state actor conducting nuclear commerce without the authorization of the Pakistani state. Their neighbor India, significantly complicated Pakistan's nuclear effort, when in 1974 they conducted a "peaceful nuclear experiment in which it detonated a nuclear explosive device at the Pokhran test site". This test alerted the world to the dangers of a free flow of nuclear information and made Pakistan hungry to be next. The United States significantly strengthened the controls on the spread of key technologies through the Western supplier cartels.[63]

The Khan network managed to undermine nuclear exports from around the world. They took Urenco's centrifuge enrichment technology and transferred it to Pakistan. Obtaining this equipment led to the development enrichment facilities, capable of producing enriched uranium for nuclear weapons use. The network also made nuclear transfers from Pakistan to Iran, North Korea, Libya, and possibly other states. Khan did much to spread nuclear weapons technology. He also removed key obstacles in Pakistan's successful quest for nuclear weapons and allowed North Korea and Iran to continue their quest of nuclear desires after they run into dead ends in their attempt to acquire unsafe guarded plutonium. These activities call into question the ability of Pakistan to safeguard and secure its nuclear arsenal and, how well new nuclear states'can

[62] Christopher O. Clary, "The A. Q. Khan Network: Causes and Implications" (Master's Thesis Naval Postgraduate School, Monterey, CA, 2005), 87.

[63] Ibid., 1.

gauge the internal and external threats to their new arsenals. This incident made the United States think about new nuclear states and the dangers of nuclear proliferation.[64]

Khan's nuclear supplier network constituted the most severe loss of control of nuclear technology. For the first time in history, all of the keys to a nuclear weapon including the material, supplier networks, the enrichment technology, and warhead designs, were out of state oversight and control. Pakistan's security measures and nuclear safety failed to prevent the transmission of secret nuclear technology.[65] The Pakistan government provided Khan too much authority, had minimal nuclear oversight, and was slow to react to internal and external warnings with what Khan was really doing. The United States was too slow in realizing Khan's growing danger, despite having intimations of his nuclear trade by the early 1990s.[66]

In 2000, in the initial phases of Khan's assistance to Libya, the British and US intelligence agencies had "evidence of shipments of centrifuge technology from Khan's network to Libya". By 2002, the British Joint Intelligence Committee had concluded that Khan had moved his operations base from Pakistan to Dubai, and reported the "use of production facilities in Malaysia". Moreover, the British concluded, "A. Q. Khan's network was central to all aspects of the Libyan nuclear weapons program." At some

[64] Ibid., 24, 87.

[65] Ibid., 1.

[66] Ibid., 95.

point, the United States attained evidence that Libya had acquired a nuclear weapons design from Khan.[67]

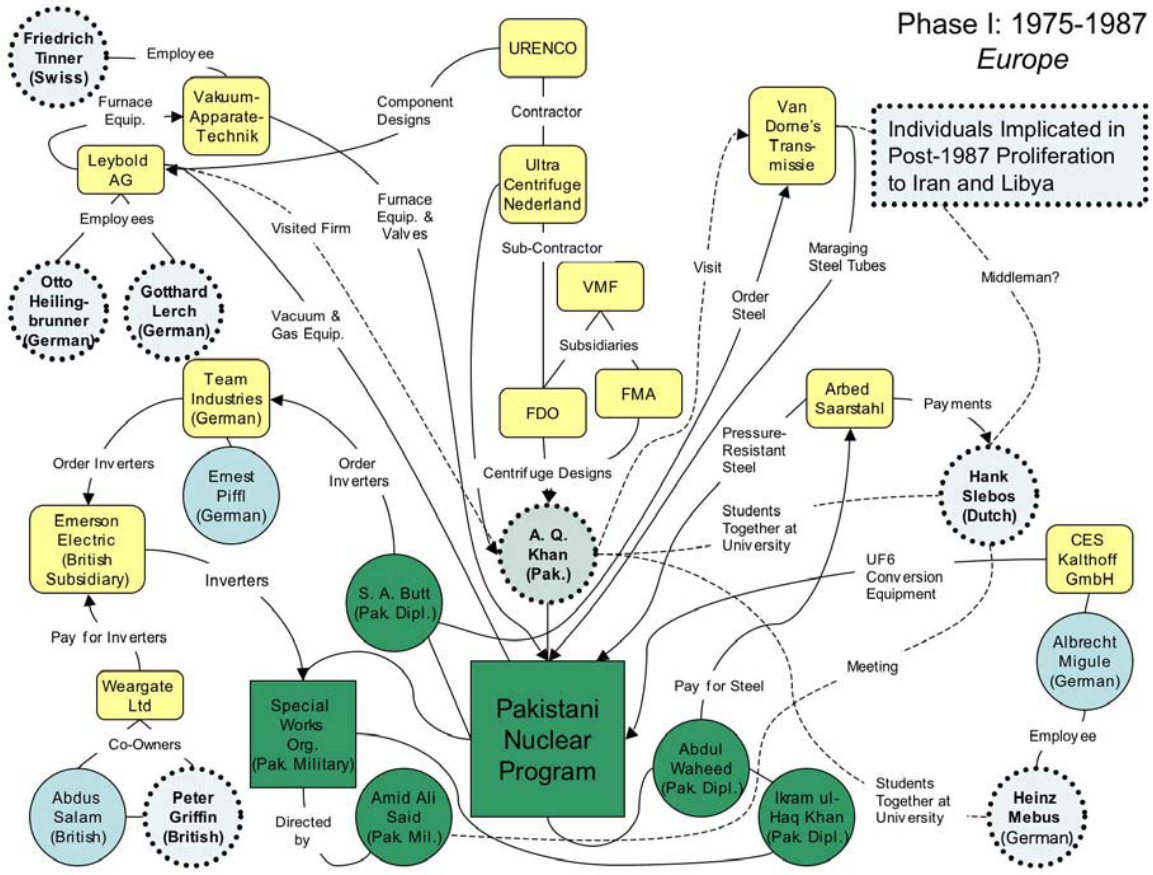

Figure 1 Individuals Implicated in Khan's Nuclear Network

Source: Christopher O. Clary, "The A. Q. Khan Network: Causes and Implications" (Master's Thesis Naval Postgraduate School, Monterey, CA, 2005), 83.

[67] Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction, *Report of the Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction* (Washington, DC: Government Printing Office, March 2005), 257; Lord Butler, Chairman, *Review of Intelligence on Weapons of Mass Destruction* (London: The Stationary Office, 2004), 17.

Today's threat to the US homeland is North Korea and its leader Kim Jong-un. He intends to fulfill his pursuit of a nuclear missile capable of striking the US. There is doubt within US intelligence agencies over how advanced North Korea's nuclear and missile programs are. North Korea claimed in April 2017 that the US homeland is now within range of its missiles after it successfully test-fired a new rocket. North Korea claims that a missile, "is capable of carrying a large-scale, heavy nuclear warhead."[68]

History of the Chemical Corps

"Whenever an activity deals primarily with the same things again and again-with the same ends and the same means, even though there may be minor variations and in infinite diversity of combinations-these things are susceptible of rational study."[69]

Military history is susceptible to rational study with the hopes of not repeating itself. WWI influenced military innovation during the interwar period of 1918 to 1939, allowing countries time to review lessons learned, identify capability gaps, develop solutions, assess effectiveness, and integrate the new resources into their force. The US military developed numerous innovations in preparation for future battles. Due to the use of chemical agents as a means of WMD the Chemical Corps was born. Throughout WWI there was a need for a branch of service to assist in this new trench warfare, resulting in General Pershing creating the Gas Service. The American Expeditionary Force was

[68] The Guardian, "North Korea Says Missile Tested Over Weekend Can Carry Nuclear Warhead," accessed May 1, 2017, https://www.theguardian.com/world/2017/may/15/north-korea-missile-tested-over-weekend-can-carry-nuclear-warhead.

[69] Carl von Clausewitz, *On War,* ed. and trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976), 141.

trained for defense against gas attacks. On June 28, 1918, the War Department established the Chemical Warfare Service (CWS) to manage chemical defensive and offensive programs. Chemical warfare was a likely threat in future conflicts; therefore, Congress established the CWS as a permanent branch of service in the Army in 1920.[70]

During the interwar period, research and development were conducted to ensure a credible chemical offensive and defensive posture. The victory of these programs helped prevent the use of chemical weapons by adversaries in World War II during which the CWS deployed delivery means and chemical munitions stocks in all theaters. Eventually, CWS expanded its battlefield capabilities with smoke generators and 4.2-inch chemical mortars. The CWS eventually assumed responsibility for managing developments in biological, as well as chemical warfare. After World War II, the CWS was renamed the Chemical Corps. The Chemical Corps continued working to improve both chemical and biological offensive and defensive, including smoke and flame programs.[71]

The Chemical Corps conducted several extensive studies to improve its organization and training capabilities throughout the 1950s. A new training facility at Fort McClellan, Alabama, opened in 1951 and offered more space and training options. After more than thirty years in Maryland, the Chemical School moved to Fort McClellan early in 1952. In 1954, the emphasis on individual training for chemical warfare resulted in the elimination of the unit gas officer, who had previously been responsible for chemical training and readiness. After the change, troop commanders took over the

[70] US Army, "The US Army Chemical Corps History," accessed November 8, 2016, http://www.wood.army.mil/newweb/chemhistory.html.

[71] Ibid.

responsibility and were anticipated to include biological and chemical training in all their maneuvers and field exercises.[72]

After years of hard work and spreading the need for chemical and biological preparedness, the Chemical Corps was at the brink of deactivation. Colonel John M. Palmer, the head of the Chemical Corps Training Command, reflected on the problem in 1960, "The quickest way to reduce the effectiveness of a military training program is to train without purpose or sense of urgency. Unfortunately, for forty years an aimless approach has largely characterized unit chemical warfare training in the US Army. . . . Much of the Army still appears to visualize chemical warfare . . . as an annoying distraction from normal combat training."[73]

In January 1961, Secretary of Defense Robert S. McNamara initiated 150 projects to provide an appraisal of US military capabilities. Project 80 and Project 112, had significant impacts on the chemical and biological weapons program. Project 112's objective was to evaluate chemical and biological weapons "for use as strategic weapons and for limited war applications". In result of this study, a recommendation to spotlight chemical weapons and particularly to increase long-term funding which was approved for immediate action by the deputy secretary of defense. One of the responses was the creation of Deseret Test Center, Utah, intended for extra-continental chemical and biological agent testing, including trials at sea, and arctic and tropical environmental

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[72] "Abolish unit gas officer positions," *Armed Forces Chemical Journal* (1954): 8:4.

[73] J. M. Palmer, "Chemical Warfare Training," *Armed Forces Chemical Journal*. (1930): 14:28.

testing. However, Project 80 resulted in a committee to review the organization of the Army. McNamara felt that the Chemical Corps' knowledge, experience, and training was not being "infused" into the rest of the Army because the combat troops were "structurally separated" from the corps, particularly in the areas of training, research, and development.[74]

The 1962 the Defense Department ordered a realignment of functions. Most of the technical service headquarters establishments were discontinued and their functions merged into three field commands, including the Chemical Corps. The training mission of the chief chemical officer was assigned to the Continental Army Command; the development of doctrine was assigned to the new Combat Development Command; and the logistical function, including all arsenals, laboratories, and proving grounds, was assigned to the new Army Materiel Command. The effects of the reorganization were quickly felt over the next couple of years. The chemical warfare training program made significant improvements; however, more realistic field training was still required to prepare soldiers for the modern battlefield agents. The throwing of tear gas grenades became standard training during field exercises. The mandatory 40-hour or 80-hour schools prepared the officers and noncommissioned officers in being the subject matter expert at their units. Chemical officers were now even assigned at the brigade level and a

[74] US Army Chemical Corps, *Summary of Major Events and Problems, FY1961–62* (Army Chemical Center, MD: US Army Chemical Center Historical Center), 9-20, 124-126, 131-132.

chemical operations sergeant at the battalion. Classroom instructions and training on CBR defense as a subject was inserted into the training schedules.[75]

Throughout the Korean War, the Chemical Corps continued to provide smoke screening operations and mechanized the production of napalm by developing the M30 mortar. Post-Vietnam, the Chemical Corps found itself in danger of deactivation again; however, with the increasing global CBRN threat, the abolishment never happened.[76] Today the US pledged to destroy its stocks of chemical and biological weapons and renounced their use for retaliation. This change removes all offensive capabilities except for small testing quantities for protective posture. The US still maintains a substantial defensive posture for weapons of mass destruction. During the 1980s, the Chemical Corps began a regeneration of its forces throughout the Army with the activation of CBRN units, and development of new and innovative equipment to support the new mission of CBRN Defense.[77]

United States National Security Strategy

The National Security Strategy published in March 2006, outlined key strategic threats against the United States. The strategy prevented state and non-state actors from threatening our nation and its allies with WMD. Terrorists try to create as many casualties as possible and seek WMD capabilities. Denying terrorist's WMD will require

[75] W. H. Anckaitis, "Realistic CBR Training," *Armed Forces Chemical Journal* (1964): 18:16.

[76] US Army, "The US Army Chemical Corps History."

[77] Ibid.

new international approaches and new tools. The US is "working with partner nations to improve security at vulnerable nuclear sites worldwide and bolster the ability of states to detect, disrupt, and respond to terrorist activity involving WMD."[78]

On May 27, 2010, the National Security Strategy released by the 44th President of the United States Barack Obama, was committed to "securing the homeland against 21st-century threats by preventing terrorist attacks and other threats against our homeland, preparing and planning for emergencies, and investing in strong response and recovery capabilities."[79] President Obama, laid out a strategic approach for advancing American interests, including the security of the American people, a growing US economy, support for US values, and an international order that can address 21st-century challenges.[80]

United States National Defense Strategy

> This nation must have ready forces that can bring victory to our country, and safety to our people . . . innovative doctrine, strategy, and weaponry . . . to revolutionize the battlefield of the future and to keep the peace by defining war on our terms. . . . We will build the security of America by fighting our enemies abroad, and protecting our folks here at home.[81]

In June 2008, the National Defense Strategy, outlined the objective of preventing adversaries from acquiring or using WMD by breaking it down into three key elements:

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[78] The White House, *The United States National Security Strategy*, accessed February 1, 2017, https://georgewbush whitehouse.archives.gov/nsc/nss/2006/index.html.

[79] President Barack Obama, "Homeland Security," accessed February 1, 2017, https://obamawhitehouse.archives.gov/issues/homeland-security.

[80] President Barack Obama, "Defense." accessed February 1, 2017, https://obamawhitehouse.archives.gov/issues/defense.

[81] George W. Bush, *National Defense Appropriations Bill*, 2002.

Non-Proliferation-efforts to deny WMD and their components to adversaries; counter proliferation-active efforts to defend against and defeat WMD and missile threats before they are unleashed, and consequence management-improved protection against WMDs in order to mitigate their consequences.[82]

United States National Military Strategy

The Army must be able to rapidly adapt to new developing threats and maintain an advantage over previous ones. The 2015 National Military Strategy describes how the Army will employ military forces to protect and advance the United States national interests. It calls for a greater innovated, integrated, and ready force. Success depends on how well the Army works with the other services. Also, if the military instrument of power can support the other national instruments of power.[83]

The United States Homeland Defense and Security

The United States Homeland is a functional theater of operation. It is the visible region that includes the continental United States (CONUS), Hawaii, Alaska, US territories and surrounding waters and airspace. Article I, Section 8 of the US Constitution gives Congress the power to provide for the common defense and authorized organizing and arming a service. The DOD formed from the amendment to the National Security Act of 1947, became a department in 1956. The US employs all instruments of

[82] Department of Defense, *National Defense Strategy* (Arlington, VA: Department of Defense, 2008), 14.

[83] Department of Defense, *The National Military Strategy of the United States of America* (Arlington, VA: Department of Defense, 2015), i.

national power to continuously defeat threats to the homeland. Homeland defense, homeland security, and DSCA operations may occur simultaneously. DOD executes the homeland defense mission by detecting, deterring, preventing, and defeating against threats from actors of concern as far forward from the US as possible. The mission of the DOD is to provide the military forces needed to deter war and protect the security of the US[84]

Following September 11, 2001, priorities changed, and there was pressure for Congress and the intelligence community to focus on protecting the homeland from terrorists. In October 2001, President Bush created the Office of Homeland Security, and on November 19, 2002, Congress passed the Homeland Security Act of 2002. This new department was the greatest reorganization of the federal government agencies since the National Security Act of 1947. The act created the Department of Homeland Security.[85]

In October 2007, President George W. Bush states **"**While America is safer, we are not yet safe. Because of determined terrorist enemies and nature's unyielding power, significant challenges remain, including: The War on Terror remains a generational struggle, and our entire Nation must be engaged and prepared to participate in this effort. Terrorists have declared their intention to acquire and use weapons of mass destruction to

[84] Joint Chiefs of Staff, JP 3-27, I-1 to I-3.

[85] Raphael Perl, *Terrorism: Reducing Vulnerabilities and Improving Responses: U.S - Russian Workshop Proceedings* (Washington, DC: Congressional Research Service, 2004), 177.

inflict catastrophic attacks against the United States and our allies, partners, and other interests."[86]

The former President stated, "We will focus on reducing the risk of these high-consequence, nontraditional threats: Ensuring that decision-makers have the tools they need to manage disease outbreaks by linking health care providers, hospitals, and public health agencies. By building on America's unparalleled talent and through international partnerships, we can create new drugs, vaccines, and diagnostic tests, and manufacture them more quickly and efficiently. Strengthening our nuclear security by enhancing our nuclear detection architecture and ensuring that our own nuclear materials are secure. By establishing well-planned, well-rehearsed, plans for coordinated response, we will also ensure a capability that can dramatically diminish the consequences of chemical, biological, radiological or nuclear incidents."[87]

Summary

The literature review was used to gain background information to answer the primary question: Is the United States Army's Chemical Corps relevant in the support of homeland security and defense against CBRN weapons of mass destruction from state and non-state actors? The review of this chapter gives an overview on the use of CBRN warfare, Chemical Corps history, National Security Strategy, National Defense Strategy, National Military Strategy, and the Homeland Defense Strategy.

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[86] President of the United States, *The National Strategy for Homeland Security* (Washington, DC: The White House, 2007), i.

[87] Ibid.

CHAPTER 3

THE RESEARCH METHODOLOGY

Introduction

The purpose of this chapter is to describe the research method used to answer the questions: Is the United States Army Chemical Corps relevant in the support of homeland security and defense against CBRN weapons of mass destruction from state and non-state actors? How does the US Army Chemical Corps fix the perception that other branches have of their branch within the US Army? The methodology research used for this study is a qualitative inquiry and narrative research design.

Methodology

This qualitative research began with assumptions from chemical Soldiers and senior leaders continuously questioning if the Chemical Corps is relevant. The use of a theoretical lens and the study of the research problem required a narrative research design reviewing DOTMLPF findings and articles written by chemical officers currently serving or previously serving in the United States active duty Chemical Corps. To study this problem, the collection of data is placed under study, and data analysis is used to establish patterns or themes throughout the narrative search.[88]

This investigation systematically used a predefined set of procedures to answer questions, collect evidence and produces findings that were not determined in advance and produces findings that were applicable beyond the immediate boundaries of the

[88] John W. Creswell, *Qualitative Approach and the Use of the Book Qualitative Inquiry and Research Design* (Thousand Oaks, CA: Sage Publications, 2007), 35.

study. Qualitative research methods are interpretative and seek to provide a wealth of understanding based on words, rather than numbers.[89] However, the research is a number of activities that locates the observer in the world, making the world visible, and studies issues in the natural setting.[90]

The narrative study is used to differentiate types of research by analytic strategies used by authors.[91] Within this research there is multiple analysis on the mission and visions of the major Chemical Corps commands, an overview of the Chemical Corps key leader's opinions found in news articles, journals, and thesis; and DOTMLPF framework. The collection of information will not involve any direct engagement with people through interviews, surveys, focus groups, observations, or other means.

Challenges

Challenges within the research methodology include setting aside biases, theoretical ideas, and discriminating sampling. "Cognitive biases refer to ways of thinking or a thought process that produces errors in judgment or decision making, or at least departures from the use of normative rules or standards."[92] Much of our thinking is

[89] Family Heath International, "Qualitative Research Methods: Data Collector's Field Guide: Qualitative Research Methods Overview. Module 1. P. 1," accessed May 1, 2017, https://www.ccs.neu.edu/course/is4800sp12/resources/qualmethods.pdf.

[90] Norma K. Denzin and Yvonna S. Lincoln, eds., *The Sage Handbook of Qualitative Research*, 3rd ed. (Thousand Oaks, CA: Sage 2005), 3.

[91] Creswell, 54.

[92] T. Gilovich, Dale W. Griffin, and Daniel Kahneman, eds., *Heuristics and Biases: The Psychology of Intuitive Judgment* (Cambridge, UK: Cambridge University Press, 2002), 1–18.

faulty and biased. Cognition is the mental method of knowing which includes awareness, perception, reasoning, and intuition. A cognitive bias is an unconscious belief that conditions, governs, or compels human behavior. "Biases negatively affect decisions when individuals interpret information, including conflicting evidence, as confirmation of previously held beliefs."[93]

A bias to avoid is the status quo bias. As senior leaders in the Chemical Corps may be comfortable and avoid changing the framework of the branch or the need for it existence, displaying the inclination to remain relevant. When individuals avoid change, they assign unwarranted weight to information that justifies maintaining the current conditions. This bias is more prevalent under conditions of stress where stability and predictability are a source of comfort.[94]

Summary

The qualitative inquiry and narrative research design is the methodology used in this research and is most suitable for this study. The purpose of the study is to convey the importance placed on our national security and defense concerning the use of CBRN WMD. The primary goal is to analyze the readiness of the United States Army Chemical Corps to face the WMD threat in the contemporary operating environment. The aim of this methodology is to avoid challenges in writing styles and use an unbiased analysis of

[93] Department of the Army, Army Techniques Publication (ATP) 5-0.1, *Army Design Methodology* (Washington, DC: Government Printing Office, 2015) A-1 – A-2.

[94] Ibid.

the capability of the United States Army Chemical Corps. The study will give a deeper understanding of the corp's capabilities and answer the thesis questions.

CHAPTER 4

ANALYSIS

Introduction

The analysis for this study follows a five-step research process by defining the problem, reviewing relevant information, interpreting research data through a research methodology using the framework process DOTMLPF-P and reviewing articles written by chemical officers highlighting the relevancy of the Chemical Corps, collecting data information from secondary sources, and develop viable recommendations. This narrative research analyzes the Chemical Corps and answers the questions: Is the United States Army's Chemical Corps relevant in the support of homeland security and defense against CBRN weapons of mass destruction from state and non-state actors? How does the Chemical Corps fix the perception that other branches have of their branch within the US Army?

Step 1: Definition of the Problem

The greatest threat to the US is the use of CBRN WMD by state and non-state actors. Many soldiers, including senior leaders, and a generation of young leaders lack a full understanding of the capabilities of the Chemical Corps and how the corps supports the Army, United States, and its allies and partners. Many have the perception that the Chemical Corps is irrelevant and does not need to be a primary branch within the United States Army. Others also feel that the Reserves and National Guard can cover the duties of the active duty force.

Step 2: Review of Relevant Information

Chapter 2 reviewed relevant literature regarding the Chemical Corps history. It gave a brief overview of the historical and present day CBRN Warfare, United States National Security Strategy, United States Defense Strategy, United States Military Strategy, and United States Homeland Defense and Security. This information establishes a baseline, historical overview, and a present-day perspective with determining that the need for the chemical corps still exists. The historical and current threat determined the reviewed dynamic contributes to the decision to continue to use the Chemical Corps as a primary branch in the United States Active Duty Military.

Current CBRN WMD Threat

"The US faces a rapidly changing global security environment that is volatile, unstable, and increasingly threatening to US interests. It is time now for the Army to examine how to adapt to face future challenges within this dynamic environment."[95]

The homeland operational environments, which make up homeland defense and homeland security, require "ongoing coordination with interagency and multinational partners to integrate capabilities and facilitate unified action". The homeland is confronted by a variety of disparate and interrelated threats that demand coordinated procedures and synchronized efforts among interagency partners. In this complex

[95] Raymond Odierno, *Force 2025 and Beyond Setting the Course* (Memorandum from the Chief of Staff of the United States Army, July 22, 2014).

environment, there are numerous threats across multiple jurisdictions that are addressed by a diverse group of actively involved.[96]

Defining and understanding terrorism and understanding the motivations and the historical evolution of terrorism and the terrorist mindset of the multiple groups are still complex. Trying to define the mere term of terrorism is difficult as the meaning and usage of the word have changed over time.[97] According to the FBI: "Terrorism is the unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives."[98] The Department of State defines terrorism as: "Premeditated, politically motivated violence perpetrated against noncombatant targets by subnational groups or clandestine agents."[99] The Department of Defense defines terrorism as: "Calculated use of violence or threat of violence to inculcate fear; intended to coerce or to intimidate governments or societies in the pursuit of goals that are generally political, religious, or ideological."[100] The Patriot Act passed on October 24, 2001 defines terrorist activity as: "any activity that is unlawful under US law or the laws of the place where it was committed and involves: hijacking or sabotage of an aircraft, vessel, vehicle, or other conveyance; hostage taking; a violent attack on the internationally protected person;

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[96] Joint Chiefs of Staff, JP 3-27, I-2 – I-3.

[97] Hoffman, *Inside Terrorism*, 28.

[98] Command and General Staff College, A529, "Understanding Terrorism" (CGSC Course Briefing, March 21, 2017).

[99] Ibid.

[100] Ibid.

assassination; or the use of any biological agent, chemical agent, nuclear weapon or dangerous device, with intent to endanger, directly or indirectly, the safety of one or more individuals or to cause substantial damage to property."[101]

Chemical, biological, radiological, and nuclear WMD "agents pose uniquely destructive threats. They can empower a small group of actors with terrible destructive potential. Thus, combatting WMD as far from our homeland as possible is a key mission for the US military". "The US teams with multinational and US interagency partners to locate, track, interdict, and secure or destroy WMD, its components, and the means and facilities needed to make it, wherever possible."[102]

Terrorist cells such as Al-Qa'ida can acquire WMD materials, thus posing a threat to the United States. They have access to an extensive variety of potential agents and delivery means for a CBRN attacks. Al-Qa'ida's goal is the use of CBRN WMD to cause mass casualties; causing panic and disruption. Terrorists who attack the US homeland are likely to use asymmetric tactics and techniques. They will avoid well-secured and heavily defended targets "hard targets" and attack vulnerable "soft targets." Vulnerable targets may include US and partner nations' airports, naval ports, lines of communication, staging areas, civilian populations, critical infrastructure, information centers, military police, and government agencies. If an attack is going to happen the US, must determine

[101] Ibid.

[102] Department of Defense, *The National Military Strategy of the United States of America*, 11-12.

if there is an intentional employment of, or intent to employ, weapons or improvised devices to produce a CBRN attack.[103]

Proliferation is a threat to the homeland because of the transfer of WMD related technology, expertise, and materials from suppliers to hostile state or non-state actors. The proliferation of WMD and supporting technologies and the expansion of terrorism have made the potential use of these weapons against the United States and its allies more likely. Transfer between states to other countries that are out of compliance with the rules and regulations is a serious threat to the United States. The same issues with non-state actors, they risk acquisition of WMD by actors of concern. Many non-state actors who operate outside of international and state controls are difficult to detect and are deeply buried targets in underground facilities.[104]

The WMD activity continuum is a complex but identifiable process with several generic activities that together constitute the progression from conceptualization to use. This continuum represents key decision points by an actor to acquire, develop, proliferate, or use WMD.

[103] Joint Chiefs of Staff, JP 3-0, I-4.

[104] Joint Chiefs of Staff, JP 3-40, II-13.

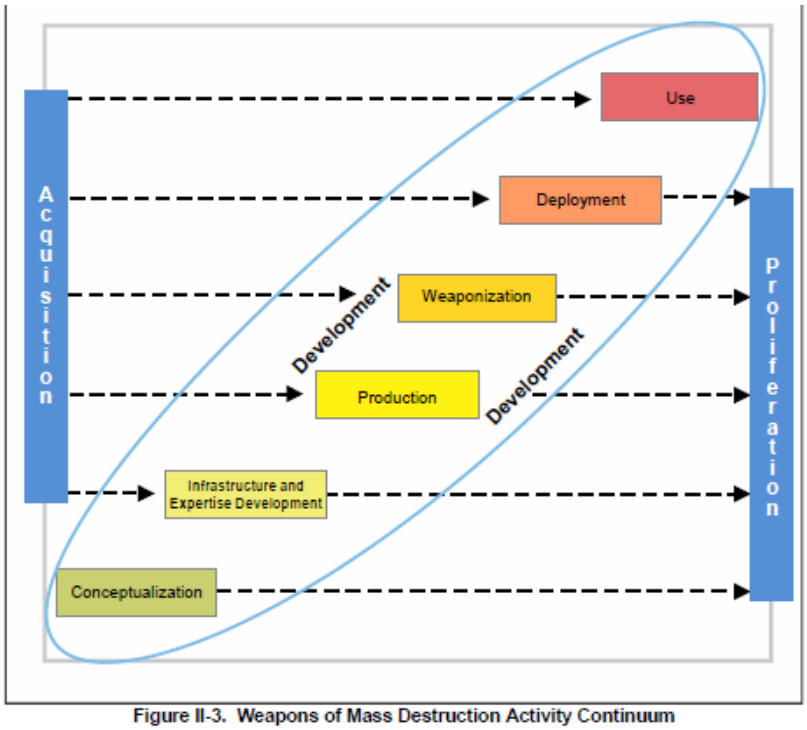

Figure 2 WMD Activity Continuum

Source: Joint Chiefs of Staff, Joint Publication (JP) 3-40, *Countering Weapons of Mass Destruction* (Washington, DC: Government Printing Office, 2014), II-12.

"The proliferation of missile technology has enabled many states to acquire delivery systems that can range well outside their borders. A number of states have systems that can strike targets within the United States with long-range WMD delivery systems". Globalization and emerging technologies allow small terrorist groups to use asymmetric approaches with relative ease and little cost. These threats all contribute to the a possible CBRN environment.

Figure 3 Homeland Defense Strategic Threat Environment

Source: Joint Chiefs of Staff, Joint Publication (JP) 3-27, *Homeland Defense* (Washington, DC: Government Printing Office, 2013), I-4.

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Using the framework in Joint Force planning determines that the Chemical Corps is fixing organizational problems and overcoming barriers to the organization's vision and mission based on the realities of the CBRN environmental threat impacting the Homeland. It was very paramount that the Chemical Corps continues efforts in its relevancy through Army and Joint Force strategic planning guidance and approaches.

Doctrine

Doctrine is the military's publication that cover how the military forces contribute to operations. It is a not hard set of rules, rather a guide to action. The Chemical Corps must continue to refine its doctrine to arm soldiers with the tools they need to predict the enemy threat accurately and respond in the event of an attack. Below are highlights of

some of the current and anticipated updates to CBRN Joint Publications, Multi-Service Publications, Army Techniques Publications, and Training Manuals.

CBRN Joint Publications

JP 3-11, *Operations in Chemical, Biological, Radiological, and Nuclear (CBRN) Environments* 4 October 2013 Current. Will be updated in the near future according to a formal assessment report that recommends a change rather than a full revision. JP 3-11 is based on a new definition of the CBRN environment as "an operational environment that includes CBRN threats and hazards and their potential resulting effects." Rather than dwelling on post-event hazards that require reactions, the focus is on pre-event threats and hazards that allow proactive measures. JP 3-11 also includes information about the new, validated, and approved concepts of hazard awareness, understanding, and contamination mitigation.

JP 3-27, *Homeland Defense* 29 July 2013 Current. JP 3-27 provides information across the range of military operations (including interorganizational coordination, planning, and mission command) that is required to defeat external threats to, and aggression against, the homeland or other threats as directed by the President. JP 3-27 covers the federal and state interagency coordination of roles that are unique to homeland defense and then refers to JP 3-08, *Interorganizational Coordination During Joint Operations*, for more detailed guidance. JP 3-27 also addresses the dual roles of the Army National Guard in federal and state chains of command and explains how those roles affect homeland defense.

JP 3-28, *Civil Support* 31 July 2013 Current. JP 3-28 provides overarching guidelines and principles to assist commanders and staffs in planning, conducting, and assessing defense support of civil authorities (DSCA). It introduces the principle of civilian agencies being in charge of domestic operations that receive military support. It also discusses the unique command relationships and coordinating processes to be used when operating in DSCA capacity. JP 3-28 discusses selected aspects of supporting and sustaining the joint force during these specific types of operations.

JP 3-40, *Countering Weapons of Mass Destruction* 31 October 2014 Current. JP 3-40 provides a framework focused on a series of strategic approaches. Countering weapons of mass destruction (WMD) lines of effort are to prevent acquisition, contain and reduce threats, and respond to crises. These lines of effort are supported by the *prepare* strategic enabler. Sections describing the Countering Terrorism Campaign and explaining how countering WMD relates to DSCA have also been added. JP 3-40 continues to focus on "left of boom" (dissuade, deter, disrupt) proactive measures.

JP 3-41, *Chemical, Biological, Radiological, and Nuclear Consequence Management* 21 June 2012 Updated publication changing CBRN Consequence Management to CBRN Response to incorporate the new Department of Defense (DOD) integrated CBRN response enterprise capabilities and joint force matrix will be published soon.[105]

CBRN Multi-Service Publications

The USACBRNS is the US Army proponent and lead agent for eight tactical-level, multi-Service publications. Seven of the publications are by the Joint Requirements Office for CBRN Defense (J-8), Joint Chiefs of Staff.

FM 3-11 MCWP 3-37.1 NWP 3-11 AFTTP 3-2.42, *Multi-Service Doctrine for Chemical, Biological, Radiological, and Nuclear Operations* 1 July 2011 Current. Will be revised in the near future due to revision of JP 3-11. The revision timeline will be based on guidance from the Joint Requirements Office and a decision from all four Services. Field Manual (FM) 3-11 is the only field manual for which the USACBRNS is the lead agent. It focuses on combating WMD, discusses the strategic pillars and tactical objectives, and translates the military mission areas into eight tactical tasks. This represents a huge paradigm shift for the CBRN community. Our focus moves toward the more proactive role of conducting or supporting active defense, interdiction operations, offensive operations, and elimination operations and away from the reactive role of passive defense (including avoidance, protection, and decontamination).

ATP 3-11.23 MCWP 3-37.7 NTTP 3-11.35 AFTTP 3-2.71, *Multi-Service Tactics, Techniques, and Procedures for Weapons of Mass Destruction Elimination Operations* 1 November 2013 Current. Army Techniques Publication (ATP) 3-11.23, describes the WMD–elimination isolation activity as the seam that links the battle handover from a conventional CBRN force conducting the assessment task to the technical CBRN force conducting exploitation and destruction tasks. It educates the reader on performing the entire process from cradle (reconnoitering) to grave (monitoring and redirecting) and on planning, preparing, executing, and assessing considerations throughout.

ATP 3-11.32 MCWP 3-37.2 NTTP 3-11.37 *Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Passive Defense* 13 May 2016 Current. ATP 3-11.32 contains information for conducting

[105] "Doctrine Update US Army Maneuver Support Center of Excellence Capabilities Development Integration Directorate Concepts, Organization, and Doctrine Development Division," *Chemical Review* (Winter 2016): 55-56, accessed March 20, 2017, http://www.wood.army.mil/chmdsd/.

operations; performing tactics, techniques, and procedures (TTP); and understanding how to carry out CBRN passive defense. A complementary technical manual (TM) (TM 3-11.32/MCRP 10-10E.5, NTRP 311.25, AFTTP 3-2.56) will be published in 2016. It will contain reference material for CBRN warning, reporting, and hazard prediction procedures.

ATP 3-11.36 MCRP 3-37B NTTP 3-11.34 AFTTP 3-2.70, Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Aspects of Command and Control 1 November 2013 Under revision. The name will change to Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Planning. ATP 3-11.36 includes the doctrinal employment of CBRN capabilities (organizations, personnel, technology, and information) to characterize CBRN threats and hazards, including toxic industrial material, for the commander and the force. This manual also incorporates the joint doctrine elements for combating WMD. It is designed to provide operational- and tactical-level commanders and staffs with capability employment planning data and considerations to shape military operations involving CBRN threats and hazards and operations in CBRN environments.

ATP 3-11.37 MCWP 3-37.4 NTTP 3-11.29 AFTTP 3-2.44, Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Reconnaissance and Surveillance 25 March 2013 Current. ATP 3-11.37 establishes forms, modes, and methods of (and tasks for) CBRN reconnaissance and surveillance. It also establishes four new CBRN hazard identification levels that have been accepted by combatant commanders and the medical community for environmental samples and clinical specimens. These hazard identification levels allow the conventional force to provide the commander with sample identification at higher levels of confidence. This, in turn, allows the commander to make timely, higher-level decisions that enhance force protection, improve mission accomplishment, and result in resource savings. It establishes a sample management process and educates Soldiers on the protocols of the process, from sample collection through transfer. Finally, it instructs Soldiers on dismounted reconnaissance operations in urban environments.

ATP 3-11.41 MCRP 3-37.2C NTTP 3-11.24 AFTTP(I) 3-2.37, Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Consequence Management Operations 30 July 2015 Current. Update will be made in the near future to incorporate changes from the new JP 3-41. ATP 3-11.41 provides commanders, staffs, key agencies, and military members with a key reference for planning and conducting CBRN consequence management. This publication provides a reference for planning, resourcing, and executing CBRN consequence management in support of domestic or foreign agencies responding to a CBRN incident. The principal audience for this multi-Service publication consists of CBRN responders who plan and conduct CBRN consequence management operations in domestic, foreign, or theater operational environments, to include military installations.

ATP 3-11.46 AFTTP 3-2.81, *Weapons of Mass Destruction–Civil Support Team Operations* 20 May 2014 Current. ATP 3-11.46 serves as the foundation for WMD-CST doctrine. It focuses on the organization, mission, mission command, and operations of WMD-CSTs, which are full-time Army National Guard units designed to provide the specialized capability necessary to respond to intentional and unintentional incidents and natural and man-made disasters. The WMD-CST, a component of the CRE, provides direct support to local, tribal, state, and federal emergency responders, including fire, police, and emergency medical service personnel. Unless federalized under Title 10, US Code (10 USC), *Armed Forces*, WMD-CSTs operate in 32 USC, *National Guard*, status within the United States and its territories and possessions. Responding under the authority of the state governor, WMD-CSTs assist agencies that may be overwhelmed or may require specific technical capabilities which are not otherwise readily available.

ATP 3-11.47 AFTTP 3-2.79, Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives Enhanced Response Force Package (CERFP) and Homeland Response Force (HRF) Operations 26 April 2013 Current. ATP 3-11.47 contains detailed tactical doctrine and TTP and sets the foundation for the tactical employment of the CERFP and HRF. The CERFP and HRF can be pre-positioned, or they can respond to an incident using existing organic transportation and Army National Guard/Air National Guard units that are in 32 USC status. These units are trained and equipped to integrate under the National Incident Management System in support of an incident commander. The CERFP supports the incident commander by planning and exercising mission command, casualty search and extraction, ambulatory and nonambulatory mass casualty decontamination, emergency medical triage and patient stabilization, and fatality search and recovery. The HRF supports the incident commander by planning, mission command, security operations and, if applicable, CERFP operations.[106]

CBRN Army Techniques Publications

The USACBRNS is the US Army proponent for four tactical-level, Army-only publications.

ATP 3-11.24, *Technical Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives (CBRNE) Force Employment* 6 May 2014 Current. ATP 3-11.24 describes how CBRNE forces support combatant commanders through every phase of operations conducted in-theater and in the homeland. This is important in educating those who are outside the CBRN community with regard to the true capabilities of the technical CBRNE force. The appendixes include information

[106] "Doctrine Update US Army Maneuver Support Center of Excellence Capabilities Development Integration Directorate Concepts, Organization, and Doctrine Development Division," 55-56.

about specific technical CBRNE force missions, organizations, capabilities, and employment considerations.

ATP 3-11.50, *Battlefield Obscuration* 15 May 2014 Current. ATP 3-11.50 provides TTP to plan obscuration operations and employ obscurants during, or in support of, unified land military operations at the tactical through operational levels of war.

ATP 3-90.40, *Combined Arms Countering Weapons of Mass Destruction* TBD Under development. ATP 3-90.40 will provide tactical-level commanders, staffs, and key agencies with a primary reference for planning, synchronizing, integrating, and executing combined arms countering weapons of mass destruction.[107]

CBRN Technical Manuals

The USACBRNS is the proponent and approving authority for two TMs.

TM 3-11.32 MCRP 10-10E.5 NTRP 311.25 AFTTP 3-2.56, Multi-Service Reference for Chemical, Biological, Radiological, and Nuclear (CBRN) Warning, Reporting, and Hazard Prediction Procedures TBD Under development. Will be published 1st quarter FY 17. TM 3-11.32 will provide reference material for CBRN warning messages, incident reporting, and hazard prediction procedures.

TM 3-11.42 MCWP 3-38.1NTTP 3-11.36 AFTTP 3-2.82, *Multi-Service Tactics, Techniques, and Procedures for Installation Emergency Management* 23 June 2014 Current. TM 3-11.42 addresses the installation commander's response to an incident that takes place on an installation. The scope of this revision has been expanded from CBRN defense to all-hazards installation emergency management, which includes the management of CBRN events. The publication defines the roles of DOD installation commanders and staffs and provides the TTP associated with installation planning and preparedness for, response to, and recovery from all hazards in order to save lives, protect property, and sustain mission readiness.

TM 3-11.91 MCRP 3-37.1B NTRP 3-11.32 AFTTP 3-2.55, *Chemical, Biological, Radiological, and Nuclear Threats and Hazards* TBD Under development. Will revise and supersede FM 3-11.9 and FM 3-11.11. TM 3-11.91 will serve as a one-stop shop for information to help understand the CBRN environment. It will include the technical aspects of CBRN threats and hazards, including information about the chemistry of homemade explosives. In addition to the technical information on CBRN threats and hazards, it will also include basic educational

[107] "Doctrine Update US Army Maneuver Support Center of Excellence Capabilities Development Integration Directorate Concepts, Organization, and Doctrine Development Division," 55-56.

> information and cover the "so what" and the field behavior of CBRN hazards (including riot control agents and herbicides). The appendixes will contain scientific CBRN data, and the centerpiece of the manual will be the CBRN threats and hazards diagram.[108]

Organization

With the creation of the Department of Homeland Security in 2002, the DOD plays an important role in the use of the military forces in homeland security. The DOD activated a new regional combatant command, United States Northern Command (USNORTHCOM) in October 2002, which plays the lead role in homeland defense for missile or air attack. It is the DOD's top priority to support homeland security missions in the event of a CBRN attack by providing personnel and resources.[109] The mission of chemical units is for combatant commanders to utilize the protection warfighting capabilities. Each organization within the structure of the Chemical Corps has a mission and vision, concluding the continues fight for combating CBRN WMD.

Joint Task Force-Civil Support

Joint Task Force-Civil Support is assigned to USNORTHCOM and is under the Commander of the United States Army North (CDRUSARNORTH). JTF-CS plans and integrates DOD support for "CBRN response utilizing five core capabilities: identification and detection; technical and nontechnical search and extraction; mass casualty and non-casualty decontamination; medical triage and stabilization; and medical

[108] "Doctrine Update US Army Maneuver Support Center of Excellence Capabilities Development Integration Directorate Concepts, Organization, and Doctrine Development Division," 55-56.

[109] Perl, 182.

and nonmedical air and ground evacuation". When approved by the Secretary of Defense and directed by CDRUSNORTHCOM, JTF-CS deploys to the CBRN "incident site and executes timely and effective command and control of designated DOD CBRN response forces, supporting civil authorities to save lives, prevent injury, and provide critical life support".[110] USNORTHCOM Mission: "partners to conduct homeland defense, civil support and security cooperation to defend and secure the United States and its interests."[111]

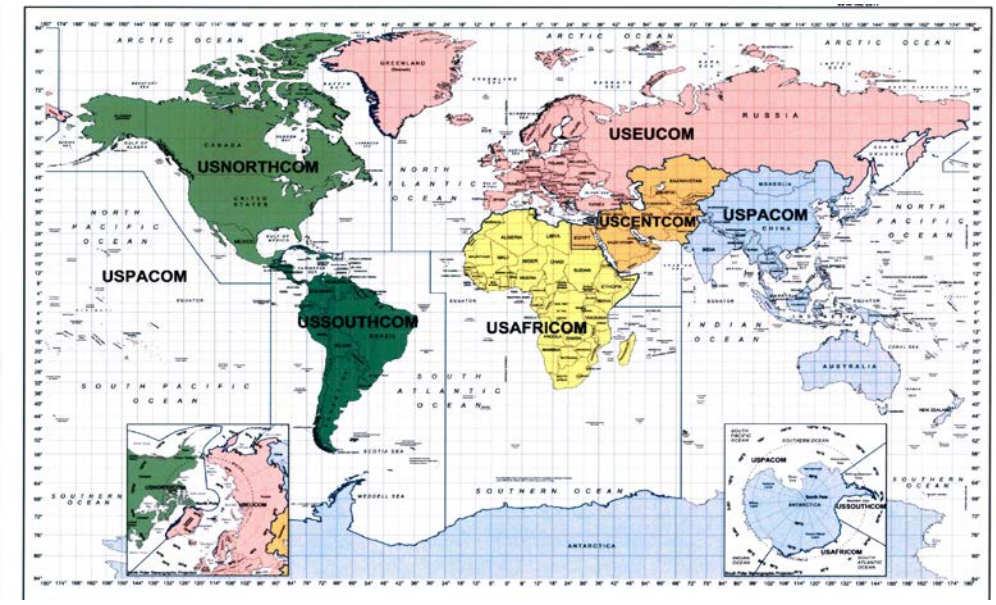

Figure 4 USNORTHCOM Area of Responsibility

Source: Unified Land Operations (ULO): Homeland Defense and Defense Support of Civil Authorities(DSCA) Briefing Slides provided to author by CPT Victoria Wallace.

[110] Joint Chiefs of Staff, Joint Publication (JP) 3-41, *Chemical, Biological, Radiological, and Nuclear Response* (Washington, DC: Government Printing Office, 2016), II-5.

[111] United States Northern Command, "About USNORTHCOM," accessed 1 May 2, 2017, http://www.northcom.mil/About-USNORTHCOM/.

20th CBRNE Command

"The 20th CBRNE Command deploys to support unified land operations and performs mission command for Army and/or Joint CBRN and EOD Forces to achieve National CWMD, Homeland Defense, and Defense Support to Civil Authorities (DSCA) objectives, while providing globally responsive CBRN and EOD forces to combatant commands. Its primary focus is: Counter IED (CIED) Operations, Render Safe and Disposal of all Explosive Ordnance (EO) and Improvised Explosive Devices (IED), Counter Weapons of Mass Destruction (CWMD) Operations, CBRNE Reconnaissance and Surveillance Operations, Decontamination of Personnel, Equipment, and Fixed Sites, CBRNE and WMD Consequence Management Operations, Field Laboratory Analysis of Suspected CBRNE Materials, Agents, and Toxins."[112]

United States Chemical Corps School

Mission: "The CBRN School trains Joint and International Service members; develops leaders; supports training in units, develops multi-service and Army doctrine; builds the future CBRN force; and is the Joint Combat Developer for the Joint Chemical, Biological, Radiological and Nuclear Defense Program." Vision: "The Army's unique technical response force of choice providing scalable, expeditionary, and operationally adaptable experts, teams, and formations, standing ready to defeat the impacts of all hazardous material, and assist DoD and Army efforts to counter weapons of mass destruction, across the full spectrum of Unified Land Operations . . . anytime . . .

[112] William E King, "20th CBRNE Command" (Brief to Command and General Staff College Students, October 2016).

anywhere. Enabled by world-class education and training and internationally recognized certifications, and backed by the scientific weight of the United States and the collective capabilities of a network of domestic and world-wide JIIM-IA responders and partners."[113]

3rd CBRN Brigade

The 3rd CBRN BDE is the only chemical BDE that aligns under the US Army Training and Doctrine Command (TRADOC) Mission: The 3rd Chemical Brigade conducts Basic Combat Training and Advanced Individual Training in Transportation and CBRN Operations, and develops extraordinary Leaders and Soldiers who enable mission success for any unit, in any environment. Vision: Extraordinary Professionals . . . we serve others, instill excellence, develop, educate, train, care and lead to make a difference every day, in every life. End State: Extraordinary Professionals who enable mission success for any unit, in any environment.[114]

48th Chemical Brigade

The 48th Chemical Brigade located at Fort Hood, Texas falls under the 20th CBRNE Command of Aberdeen Proving Ground, Maryland, and is tasked with supporting missions related to CBRN threats. The brigade is spread across eight installations. 48th Chemical Brigade provides trained, equipped, and ready forces to

[113] US Army CBRN School, Fort Leonard Wood, Missouri, "Chemical, Biological, Radiological and Nuclear School," accessed February 1, 2017, http://www.wood.army.mil/newweb/chemical/index.htm.

[114] 3rd Chemical Brigade, "CBRNS Home," accessed February 1, 2017, http://www.wood.army.mil/newweb/chemical/3rdChem/3rdChem.html.

conduct CBRN operations in support of Combatant Commanders or other Government Agencies to prevent shape, and counter CBRNE threats in defense of the Nation at home and abroad. Their purpose is to build adaptable CBRNE Battalion Task Force and Company Teams that maintain tactical and technical proficiency in CBRN, Defense Chemical, Biological, Radiological, Nuclear, Response Force, and Decisive Action (DA) in support of maneuver commanders. The BDE trains on realistic deployment training exercises that will better train their Soldiers to react to a CBRN incident or attack. The Brigade will maintain a posture at all times capable of deployment to counter CBRNE threats which real life missions supporting the Department of the Army (DA), and DSCA operations.[115]

[115] 48th Chemical Brigade Dragon Fire Exercise Brief, Slides provided to author by S-3, 48th Cm BDE.

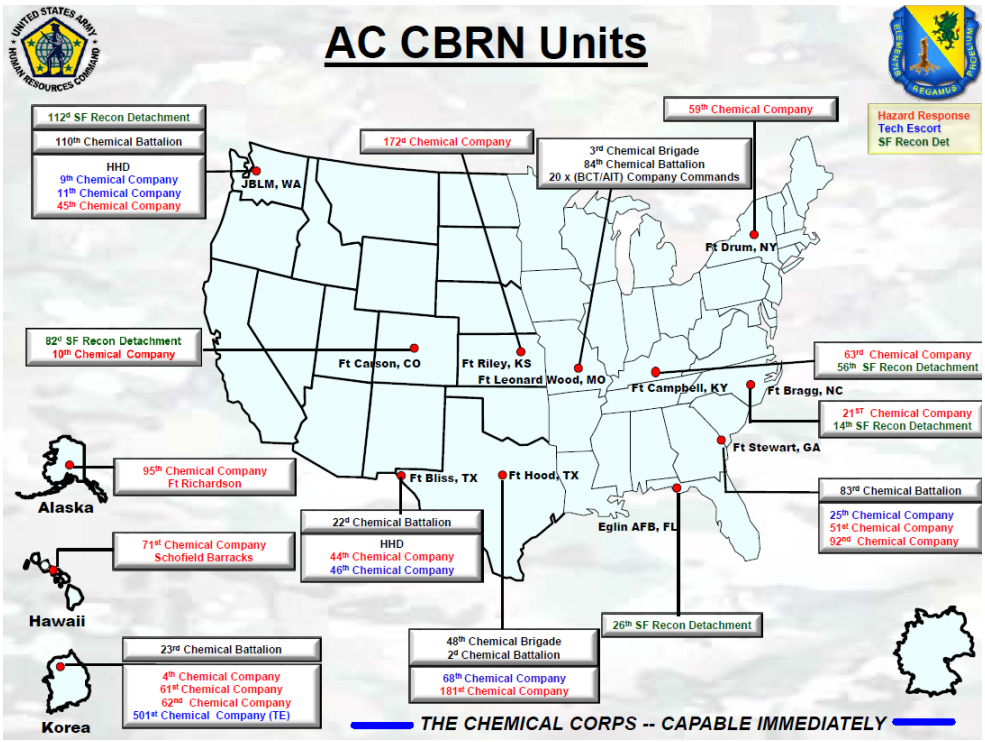

Figure 5 Active Component CBRN Units

Source: Human Resources Command Chemical Branch, Briefing Slides provided to author by CPT Benjamin Williams, April 28, 2017.

Training

The Chemical Corps must continue to improve training at all levels.

TRADOC

The TRADOC functions of design, acquire, build, and improve are crucial to enable the chemical soldiers to meet specific CBRN missions. These priorities are defined in the Army Strategic Plan between now and 2050 outlined by the current Chief of Staff of the Army General Mark A. Milley. His number one priority is “Readiness” (Current Fight); followed by the “Future Army” (Future Fight) and “Take Care of the

Troops" (Always). These aimpoints describe Army's capabilities and conditions for the Current Fight, Next Fight and Future Fight.

3rd Chemical Brigade

The current basic and advanced educational schooling that enables the Chemical Corps to line up with the readiness and future fight, for both chemical enlisted and officers are:

1. Advanced Individual Training: Chemical Operations Specialist (74D): after completion of Basic Training enlisted soldiers attend AIT where they learn basic Soldiering skills for 19 weeks. Part of this time is spent in the classroom and part in the field. Soldiers will learn defensive procedures for CBRN warfare and preparation of emergency response.

2. Chemical Basic Officer Leadership Course (CBOLC): is a 17-week course, which provides CBRN lieutenants the technical and tactical skills and knowledge to perform the duties and responsibilities required of platoon leaders and battalion level CBRN officers. This instruction is both externally and internally directed and includes Chemical, Biological, Radiological, Nuclear and HAZMAT operations, as well as combined arms operations. Each course typically consists of 45-50 students, typically 48 Army officers and 2 Coalition Partners from areas as diverse as Europe, the Middle East, and Asia.

3. Chemical Officer Basic Course Captains Career Course (CBRNC3): is a 22-week course, which provides company grade CBRN Officers the technical skills and knowledge to perform the duties and responsibilities required of company commanders and brigade level battle staff CBRN Officers. This instruction is both externally and internally directed; and includes chemical, biological, radiological, and nuclear operations, as well as combined arms operations. This course will dive extensively into current Army and CBRN doctrine. Course completion is required for branch qualification. Each course normally consists of 25-30 students, typically: 20 Army Officers; and 5 Coalition Partners from areas as diverse as Europe, the Middle East, and Southeast Asia.

4. Chemical Warrant Officer Basic Course (CBRN WOBC): is a 16-week course, which provides CBRN Warrant Officers with the technical and tactical skills to perform the duties and responsibilities required of Maneuver/Area Support Company CBRN Technicians and Technical Escort Assistant Team Leaders. The instruction is both internally and externally directed and includes Chemical, Biological, Radiological, Nuclear and HAZMAT operations, Advanced

Decontamination operations, Basic Radiation Safety, Mounted and Dismounted Reconnaissance, as well as combined arms operations

5. Chemical Warrant Officer Advanced Course (CBRN WOAC): is a 13-week course, which provides CBRN Warrant Officers with the technical and tactical skills to perform the duties and responsibilities required of CBRN Battalion or Division level CBRN Staff Officers. This instruction is both externally and internally directed and includes Chemical, Biological, Radiological, Nuclear threat and vulnerability assessment, HAZMAT operations, Advanced Radiation Safety, WMD Elimination Operations, as well as combined arms operations. Each class typically consists of 10-12 students from all components.[116]

Forces Command

The Chemical Corps is continuing its efforts to support the warfighting community and engaging with all combat training centers to reestablish the CBRN passive defense capability within the brigade combat team (BCT). This engagement has resulted in a renewed focus on BCTs preparing for the continuity of operations in a CBRN environment, along with the individual equipment and skills required to support those operations. The creation of agile CBRN technical force capability/capacity within an existing organic BCT structure is critical to these efforts.[117]

To prepare for a CBRN attack, a Chemical Battalion is tasked on the Global Response Force and-or the Defense Chemical Biological Radiological Nuclear Response Force (DCERF). Annually the units assigned to DCERF conduct a deployment readiness exercise (DRE). The DRE is intended to assess the Modified Table of Organization and Equipment of the units and the installation's deployment support capability. The DREs

[116] 3rd Chemical Brigade.

[117] Brigadier General James E. Bonner, "Chief of Chemical and Commandant, US Army Chemical, Biological, Radiological, and Nuclear School," *Army Chemical Review* (Winter 2016): 2-3.

will normally be conducted on an unannounced or limited notice based onof the unit to be assessed. Pre-DRE training may be conducted with regularly scheduled training such as sergeants time training, field training exercises (FTXs), or training center rotations.[118]

Overall, there is a recall standard during the DRE that is established by the battalion commander. The time from alert notification to deployment is the reaction requirement for an approved force package is 96 hours per the units OPLAN. All Soldiers and equipment are prepared to deploy in accordance with published Transportation Component Command air flow, port call message and in accordance with individual Soldier readiness requirements.[119]

There are three levels to the DRE. A Level I DRE is designed to evaluate a unit's ability to alert, assemble, and conduct Soldier readiness tasks and ensure the appropriate deployment certifications, appointment orders, standard operating procedures, movement request submission process, and system documentation is in place to complete a limited notice deployment. Mandatory requirements include: the unit will alert, assemble, and conduct Soldier Readiness Processing in accordance with AR 600–8–10, assemble key load teams (air and rail), TC–AIMS II operator, and HAZMAT certified and verify appointment orders are current and required training certificates are on-hand to conduct these functions, inspect UMO books for appointment orders, training certificates, recall rosters, OEL, transportation requests, BBPCT requirements, convoy standard operating procedure for movement to the port of embarkation (POE), standard operating procedure

[118] Department of the Army, AR 525-93, 18.

[119] Ibid.

on proper marking of vehicles and containers, and complete load plans for each loaded vehicle, trailer, container, and 463L pallet. Ensure a commander approved generic UDL is loaded into the TC–AIMS II.[120]

A Level II DRE includes all Level I DRE activities and is designed to evaluate a unit's ability to conduct complete load-out operations and installation turn-in activities that support a limited notice deployment. Actual packing of a representative sample of the overall unit onto transportation platforms should be accomplished but installation turn-in can be simulated. Transportation mock-ups may be used. At a minimum the exercise will include the following: load containers and inspect documentation to include HAZMAT, BBPCT procured and utilized during containerization, vehicle preparation for all modes of travel and inspection of documentation to include marking and-or weighing, execution of local and-or internal area movement requests procedures for buses, baggage trucks, and material handling equipment (MHE) support, execution of convoy movements that support deployment plan. Units will ensure a commander approved UDL is submitted into the computerized movement, planning and status system by the ITO.[121]

A Level III DRE includes Level II DRE activities and is designed to evaluate a unit's ability to conduct strategic movement by air or surface in support of a limited notice deployment. Level III DRE will include: preparation of a unit for deployment to

[120] Ibid., 18.

[121] Ibid.

participate in designated training, unit will deploy, execute training mission, and redeploy to home station and the commander will ensure an approved UDL is executed.[122]

48th CBRNC Brigade

In 2012, the command team of the 48th Chemical Brigade cased the unit's colors to serve as the headquarters of the Operation United Assistance mission in Liberia. It was the first deployment in the "Spartan" Brigade's history to deploy outside of the USPACOM Area of Operation. The mission was for the chemical soldiers to continue to lead the fight against the Ebola virus in West Africa, Liberia. The Soldiers from Fort Hood replaced the 101st Airborne Division from Fort Campbell, Kentucky, as the headquarters in the fight against the spread of the Ebola virus.[123]

In the spring of 2017, 48th CBRN Brigade conducted a battalion evaluation training at the Yakima Training Center, to validate the proficiency of CBRN operations for 22nd Chemical Battalion. The purpose was to ensure the battalion was trained and ready to conduct CBRN operations is support of the Combatant Commanders (CCDR) or other Government Agencies to prevent (interdict), shape (eliminate), and counter (offense and defense) CBRNE threats in defense of the Nation at home and abroad; all operational environments.[124]

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[122] Ibid., 19.

[123] Rose L. Thayer, "48th Chemical Brigade to Head Up Africa Mission," *Killeen Daily Herald*, March 8, 2015.

[124] 48th Chemical Brigade Dragon Fire Exercise Brief, slides provided to author by S-3, 48th Cm BDE.

Some of the training objectives included: Conduct Deployment and Redeployment Operations; Exercise Mission Command of CBRN operations; Gunnery Crew Qualification; Conduct Weapons of Mass Destruction Elimination Operations; Validate CBRNE Companies as Fully Operational Capable (FOC) after stationing and CBRN FDU implementation; CRT Certification; and Establish Techniques, Tactics and Procedures for the integration of Coalition Forces CBRN capabilities.[125]

Materiel

The Chemical Corps has a planning effort that develops a road map for Army capability development and modernization. Corps leadership are currently working with the Army staff to review critical CBRN capabilities and requirements through the new Strategic Portfolio Analysis Review (SPAR). The SPAR is a comprehensive, coordinated SPAR is a new forum that will combine Army Long-Range Investment Requirements Analysis (LIRA) and the Capabilities Portfolio Review process. The objective of SPAR is to provide portfolio priorities and cross-portfolio options to align efforts and priorities and ensure that our Soldiers receive the right capabilities in a timeframe that makes them useful on the battlefield and within budget. In addition to reviewing Army equities, the Army, as the executive agent for the Chemical and Biological Defense Program, will evaluate joint capabilities in the SPAR. In total, the effort should allow the chemical units to inform their senior leaders of the most critical CBRN and CWMD capabilities to support the future force.[126]

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[125] Ibid.

[126] Bonner, 2-3.

The Chemical Corp's state-of-the-art CBRN technology is the M1135 Stryker Nuclear, Biological, and Chemical Reconnaissance Vehicle (NBCRV). It replaced the M9A1 Fox Reconnaissance vehicle in 2010. CBRN testing machines are integrated within the vehicle to perform CBRN sampling reporting, detection, identification, and marking of these hazards. Reconnaissance units conduct zone, area, and route missions to determine the extent and presence of CBRN contamination using the CBRN reconnaissance techniques of survey, surveillance, search, and sampling. The NBCRV has an over-pressure system and filter that provides protection for the Soldiers from CBRN agents. The NBCRV's upscale armor provides ballistic protection against small mines, arms, and artillery fragments; including rocket-propelled grenades. Currently the Army is developing a reactive armor kit for the NBCRV to increase its survivability.[127]

The NBCRV team consists of: a Stryker NBCRV and a four-person crew; Stryker BCT has one platoon of three NBCRV teams; Heavy BCT has one squad of two NBCRV teams; Division or Corps Chemical Company has six NBCRV teams. The CBRN mission equipment package includes the following: Joint Biological Point Detection System; Joint Service Lightweight Standoff Chemical Agent; Detector; Chemical and Biological Mass Spectrometer; Chemical Vapor Sampling and Storage System; NATO standard markers and deployment system; Automatic Chemical Agent Detector Alarm; and Radiological Detectors.[128]

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[127] Office of the Director, Operational Test and Evaluation, Army Programs: "M1135 Stryker Nuclear, Biological, and Chemical Reconnaissance Vehicle (NBCRV)," accessed December 1, 2016, http://www.dote.osd.mil/pub/reports/FY2009/pdf/army/2009strykernbcrv.pdf.

[128] Ibid.

Currently, the Chemical Corps joint project manager for nuclear, biological, and chemical contamination avoidance is planning an NBCRV sensor upgrade to address obsolescence issues, correct reliability and performance issues, and potentially integrate new technologies with a proposed fielding in fiscal year 2024. The upgrade will include updating the platform with the next generation of chemical detector increment systems, updating radiological (nuclear) sensors, implementing engineering changes, and replacing the automatic chemical agent detector alarm in the interim.[129]

Leadership and Education

Chemical Corp's commanders and staff use operational art as a cognitive approach to conceptual planning, supported by their skills, knowledge, experience, creativity and judgment to employ the military forces. The planning develops strategies, campaigns, and operations integrating ends ways and means.[130] Army Design Methodology (ADM) is an approach for applying critical and creative thinking to understand, visualize, and describe problems and approaches to solving them.[131] During operations, ADM supports organizational learning as the command more readily adapts to changing circumstances. Critical thinking and creative thinking are essential leader skills and key components of ADM.

Commanders supported by their staffs use the operations process to drive the conceptual and detailed planning necessary to understand, visualize, and describe their

[129] Bonner, 3.

[130] Department of the Army, ADRP 5-0, 2-4.

[131] Ibid., 1-11.

operational environment, make smart decisions, and lead and assess military operations. It is important to ensure there is an effective transition between the conceptual planning associated with ADM to the detailed planning of Military Decision Making Process (MDMP). Given your staff group's ADM process. A successful transition is conducted when the commander and staff gather the proper tools used for ADM and MDMP. Together the ADM and MDMP help the commander and the staff to develop understanding.[132] The proper transition and sequence helps better their understanding of the operation environment, frame the problem, and develop an operational approach to guide more detailed planning.[133]

The Army is made up of six Warfighting Functions: movement and maneuver, protection, sustainment, fires, mission command, and intelligence. The Chemical Corps falls under the protection cell, along with military police, engineers, and air defense. The protection Warfighting Functions safeguards the force, personnel, systems, and physical assets of the US and unified land partners. Together the protection cell provides the survivability to remain alive, in existence and combat effective; for both combatants and noncombatants.[134] The chief of protection supervises the protection element requirements for the chemical corps units, mitigates measures of threats and hazards, assesses hazards

[132] Ibid., A-1 – A-2.

[133] Ibid., 2-24.

[134] Department of the Army, Army Doctrine Publication (ADP) 3-37, *Protection* (Washington, DC: Government Printing Office, 2012), 1-2.

and threats, develops risk control measures, and refines chemical, biological, radiological, and nuclear operations.[135]

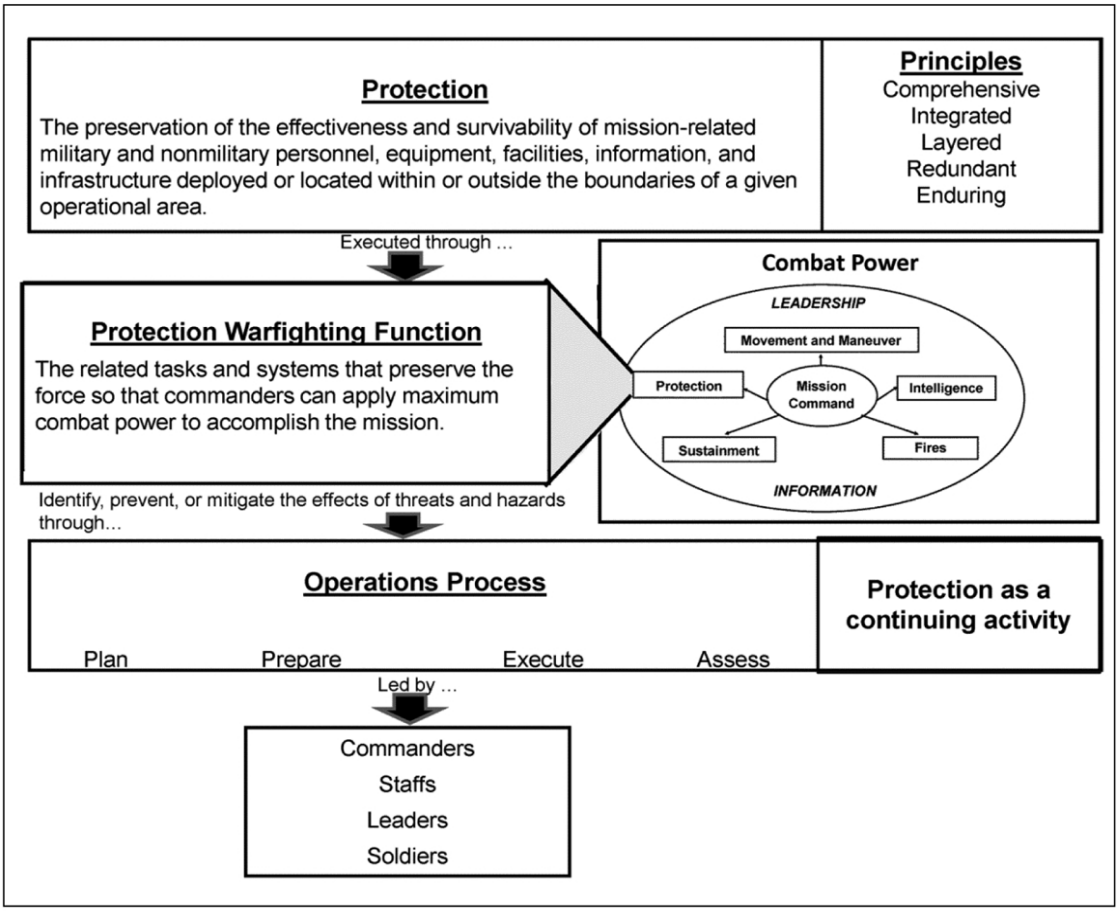

Figure 6 Protection Logic Map

Source: Department of the Army, Army Doctrine Publication (ADP) 3-37, *Protection* (Washington, DC: Government Printing Office, 2012), iii.

[135] Department of the Army, Army Tactics, Techniques, and Procedures (ATTP) 5-0.1, *Commander and Staff Officer Guide* (Washington, DC: Government Printing Office, 2011) 4-24 – 4-25.

Personnel

Despite increased strategic CBRN concerns and operational responsibilities, the Army has progressively reduced the size and capability of the Chemical Corps over the past five years. The branch is over strength making promotions boards competitive across the ranks. The below chart lists the rank listing the current individual strength versus chemical authorized positions.

	INV	CM AUTH	INV vs AUTH
COL	40	27	148%
LTC	92	68	135%
MAJ	158	119	133%
CPT	416	274	152%
LT	476	356	134%
WO	57	68	84%
Total	1239	912	136%

Figure 7 CBRN Officer Strength

Source: Human Resources Command Chemical Branch, Briefing Slides provided to author by CPT Benjamin Williams, April 28, 2017.

Facilities

On June 26, 2007, the First Lieutenant Joseph Terry CBRN WMD Response Training Facility was opened. It stretches across forty acres at Fort Leonard Wood, Missouri and will be used by US Army, sister services, US international partners, Department of Defense's emergency response teams in support of homeland security

missions. The overall purpose of the facility was to increase the Nations readiness to defend itself from CBRN accidents and attacks.[136]

The facility overall has five training areas, office space for instructors, classrooms, training bays, and a sensor and detector lab. The intermodal training area trains individuals and groups on site search, characterization, sampling, and survey; giving realistic training on possible harmful substances entering the US by cargo ships. Another training areas has four buildings connected by tunnels, used for different CBRN scenarios. The vehicular training area, trains CBRN responders to perform operations used to control a variety of truck spill scenarios. The railcar training area has 200 feet of rail and four different types of railcars. They will be used to conduct training on a number of CBRN railcar attacks and spill scenarios.[137] On July 5, 2013 there was a third expansion of the Terry facility. The expansion included a new wing which will allow the facility to increase the number of students each.[138]

At Fort Leonard Wood, Missouri, the Chemical Corps has a training facility, the E.F. Bullene Chemical Defense Training Facility (CDTF), allows for triaing with live agents. Its mission is to conduct live CBRN defense training in a toxic CBRN agent environment for Army, Joint, and Allied service members to enhance individual and

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[136] Christian DeLuca, "Chemical Corps Dedicates First Lieutenant Terry Training Facility," *Army Chemical Review* (July-December 2007): 12.

[137] Ibid., 12.

[138] Martha Yoshida, "Fort Leonard Wood Celebrates Expansion of CBRN Training Facility," US Army Leonard Wood, July 5, 2013, accessed May 1, 2017, https://www.army.mil/article/107036/Fort_Leonard_Wood_celebrates_expansion_of_CBRN_training_facility.

collective proficiency and confidence in themselves and their equipment; conduct chemical surety operations. The CDTF produces GB/VX, employs the use of biological agent Bacillus globigii (BG) and radiation source Cesium 137. It has a fully contained indoor, climate-controlled negative air-pressure facility with visitor observation area. It can train up to five groups of ten soldiers per bay utilizing eight training bays totaling 50 per day.[139]

The toxic training transformation initiative of CDTF is being undertaken for the purpose of expanding and enhancing the quality of CWMD training for US and allied operational forces and joint—multinational institutional training programs. This transformation initiative involves the creation of training scenarios within our existing training facility through the use of props, technology, special effects, and live toxic hazards. The vision of the training transformation is to deliver the most robust, realistic, and rigorous CWMD training conceivable. The range of hazards will expand from the chemical warfare material currently in use, sarin, nerve agent and venomous agents, to include select biosafety Level 2 biological materials and a select list of toxic industrial chemical and toxic industrial material hazards.[140]

Master of Military Art and Science Review

The below Master of Military Art and Science was written by Major Brian Hoffman during his time as a student at the United States Marine Corps Command and

[139] E. F. Bullene CBRN Defense Training Facility, "Training," accessed February 15, 2017, http://www.wood.army.mil/CDTF/CDTF.html.

[140] Bonner, 3.

Staff College. He is currently a Lieutenant Colonel serving as the 110th Technical Escort Battalion Commander at Joint Base Lewis-McChord. His thesis topic: “To better support the nation's CBRNE defense and combating WMD efforts, the Army must facilitate a paradigm shift with regard to CBRN defense training, improve the image of the Chemical Corps and CBRN Soldiers, reorganize its CBRNE assets into a CBRNE branch, and provide better CBRN support to maneuver forces.”[141]

In the thesis, Hoffman expressed the US Army Chemical Corps historically has not performed its primary mission in combat and instead executed additional missions outside of CBRN missions. These additional missions included “convoy security, base defense, force protection and detention facility operations, personal security detail, operation centers, and general logistical support.” He expressed that, “decades of not providing CBRN support to Commanders in combat, highlighted by the current operations in Afghanistan and Iraq, raise legitimate questions about the Chemical Corps’ relevance to the US Army. The historical complacency throughout the entire Army with regard to CBRN defense and the Chemical Corps’ failure to adapt adequately to the contemporary operational environment have contributed to a branch with little relevance to the operational Army.” He recommended that to remain relevant the Army and the Chemical Corps must integrate CBRN training to all personnel throughout the forces. As a result, the “Chemical Corps needs a significant paradigm shift in CBRN defense training, the consolidation of EOD, Chemical Corps and Functional Area 52 into a

[141] Brain Hoffman, “Relevance of The US Army Chemical Corps” (Master’s Thesis, United States Marine Corps Command and Staff College, Quantico, VA, 2010), i.

CBRNE branch, and the introduction of CBRN warrant officers to infantry and armor battalions and brigades throughout the Army."[142]

Hoffman concluded, the Chemical Corps will find itself continuing to explain its relevance if the Army does not approach integrated CBRNE defense during training in the operational Army. The Corps must reduce the stigma of CBRN defense training, and ultimately improve Soldier readiness to survive in a CBRN environment.[143]

United States Chemical Review

The United States Army Chemical Review is a magazine of key events and announcements within the Chemical Corps. It highlights any changes in capabilities and readiness throughout the Corps. It is published twice a year by the United States Army Chemical, Biological, Radiological, and Nuclear School located in Fort Leonard Wood, Missouri.

Brigadier General Maria R. Gervais served as the 28th Chief of Chemical and Commandant of the US Army Chemical, Biological, Radiological, and Nuclear School for two years. In the Army Chemical Review Summer 2016 edition, she stated that during her last two years as commandant, she observed that the WMD threat is increasing and not going away. She stated that the army needs the CBRN capabilities in order for the Army to maintain prepared and ready for a CBRN WMD. If the corps is not prepared to

[142] Ibid.

[143] Ibid.

train and equip the American Expeditionary Forces for chemical combat, the corps failed its overall mission.[144]

During her time as the Chemical Commandant, the Corps fielded the nuclear, biological, and chemical reconnaissance vehicle (NBCRV) and the dismounted reconnaissance sets, kits, and outfits (DRSKO). It is a result of the Force Design Update (FDU) and one of the most evolutionary changes to the Chemical Corps Regiment, maintaining its relevancy with the changing chemical operational threat. The Commandant stated that the change improves the ability to "guard the force, protect the homeland, and address the emerging countering WMD mission that the Army will lead for the Department of Defense." With this new capability, the corps is now a proactive counterforce, more expeditionary and agile. Compared to the past, focused on the Cold War era of biological detection and decontamination.[145]

In the *United States Army Chemical Review* January-June 2006 edition, then Captain James P. Harwell, was serving as CBRN response team leader in A-110th Chemical Battalion (Technical Escort) Fort Lewis, Washington. wrote an article titled the "Army and Chemical Corps Transformation." Captain Harwell is currently a Lieutenant Colonel serving as the incoming Commander of 22nd Chemical Battalion located at Fort Bliss, Texas. His article discussed that during peacetime, change within the Army is slow, however during wartime change must occur more rapidly. Resources must be

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[144] Brigadier General Maria R. Gervais, "Chief of Chemical and Commandant, US Army Chemical, Biological, Radiological, and Nuclear School," *Army Chemical Review* (Summer 2016): 2.

[145] Ibid., 2-3.

provided to deployed Soldiers and operational forces must be strengthened quickly. He talks about how the Army is undergoing its most profound restructuring in more than 50 years.[146]

Captain Harwell discussed how in 1989 the US Army Training and Doctrine Commander General Carl Vuono introduced imperatives known as DOTLMS, that would change the Army force structure. Later it evolved into DOTMLPF and applied to all components of the joint force. Because technology and the wartime environment change at a fast pace, combat developers must apply DOTMLPF to seek countermeasures to emerging threats. Harwell states that the Chemical Corps is a proponent for many initiatives supporting the traditional warfighter mission and the homeland defense. And chemical combat developers must identify countermeasures to reduce the threat to US personnel.[147]

In his conclusion, Harwell stated that during wartime it is difficult at any part of the operational spectrum for combat development. Developers must consider demands of battle and never lose sight of the competitor threats. Applying DOTMLPF ensures the newly designed units are capable of supporting current and future operations. Units that do not adapt to the changing operational environment face the possibility of operational irrelevance, presenting soft targets to a dangerous enemy.[148]

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[146] James P. Harwell, "Army and Chemical Corps Transformation," *Army Chemical Review* (January-June 2006): 5.

[147] Ibid.

[148] Ibid., 11.

In the *United States Army Chemical Review* Winter 2012 edition, Captain Christopher J. Woloszyn, wrote the article, "Interdiction Operations and the US Army Chemical Corps." In his article, he stated that according to the *National Military Strategy to Combat Weapons of Mass Destruction*, DOD is responsible for: "offensive operations, elimination operations, interdiction operations, passive defense, active defense, WMD consequence management, security cooperation and partner activities, and threat reduction cooperation." The 2010, National Security Strategy stated that the current administration, "has no greater responsibility than the safety and security of the American people. And there is no greater threat to the American people than WMD." He wrote that terrorist groups have priority on acquiring WMD and DOD "needs to look to the left of the boom" allowing the Chemical Corps to contribute interdiction operations with Special Operations Forces (SOF). Interdiction includes actions to "divert, disrupt, delay or destroy an enemy's surface capabilities before they can be used to achieve objectives."[149]

In Woloszyn's conclusion, he stated that the interdiction of WMD is an important mission area because the proliferation of WMD is a real threat. The overall goal is to prevent the employment of WMD, and the Chemical Corps has the capabilities of supporting the mission without additional forces, able to assist the mission supporting the SOF. Together they will have to share tactics, techniques, and procedures to accomplish the mission.[150]

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[149] Christopher J. Woloszyn, "Interdiction Operations and the US Army Chemical Corps," *Army Chemical Review* (Winter 2012): 22.

[150] Ibid., 25.

Step 3: Collection of Data

The collection of data was executed by gathering and measuring information pertaining to the relevancy of the Chemical Corps. This was achieved by reviewing relevant literature and analyzing existing information. Reviewing relevant data allowed for the establishment of a theoretical framework for the study as well as guiding the nature of the study to answer the secondary research question. Analyzing how the United States military utilizes the Chemical Corps allowed for a complete assessment necessary to recommend future deployments to support the homeland. The findings from that analysis helped in framing the perspective under which to consider the use of the Chemical Corps.

Capabilities

The 48th Chemical Brigade has an international responsibility to protect the homeland and our allies. Information across the DOTMLPF-P construct all align with the key capabilities of “CWMD Operations, CBRNE Reconnaissance and Surveillance Operations, Decontamination of Personnel, Equipment, and Fixed Sites, CBRNE and WMD Consequence Management Operations, and Field Laboratory Analysis of Suspected CBRNE Materials, Agents, and Toxins”. When directed by the Secretary of Defense, the DOD CBRN Response Enterprise conducts CBRN response operations within the US and its territories to support civil authorities in response to CBRN incidents in order to minimize human suffering and save lives. Therefore, the Chemical Corps has the current capabilities to respond to a chemical attack on the homeland.

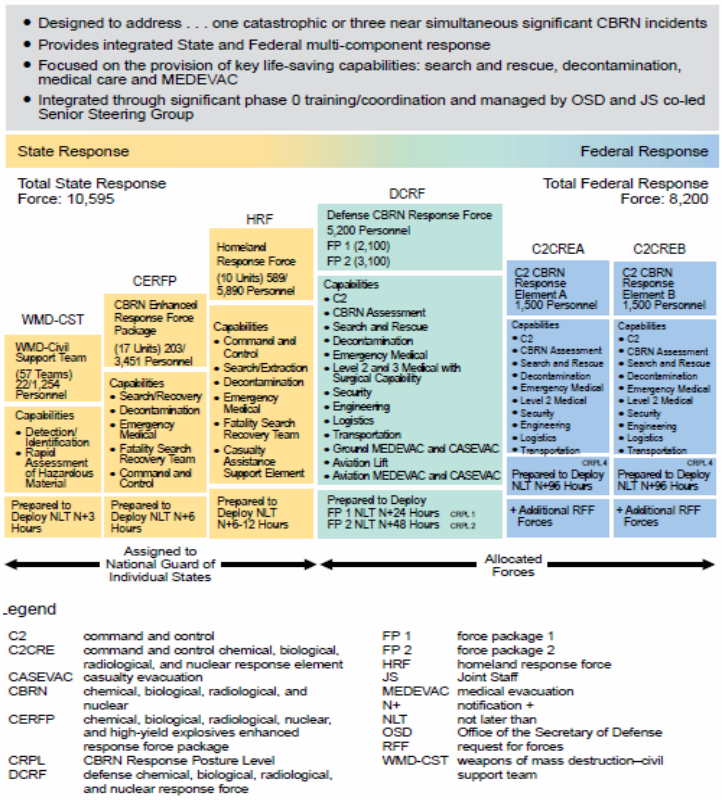

Figure 8 DOD CBRN Response Enterprise

Source: Joint Chiefs of Staff, Joint Publication (JP) 3-41, *Chemical, Biological, Radiological, and Nuclear Response* (Washington, DC: Government Printing Office, 2014), C-1.

Deployment Prerequisites

There are key requirements that must be in place for a military force to deploy within the homeland in the event of a catastrophic chemical attack by state or non-state actor. The requirements determined are a strong command structure, deployment training on realistic chemical attacks, and sufficient resources; all essential to successfully conduct deployment operations. Clear tasks and objectives should be completed throughout the training, planning, and execution by chemical FORSCOM units. At the

TRADOC institutional level future and current chemical leaders are being instilled with the most up-to-date doctrine and trained on the latest equipment.

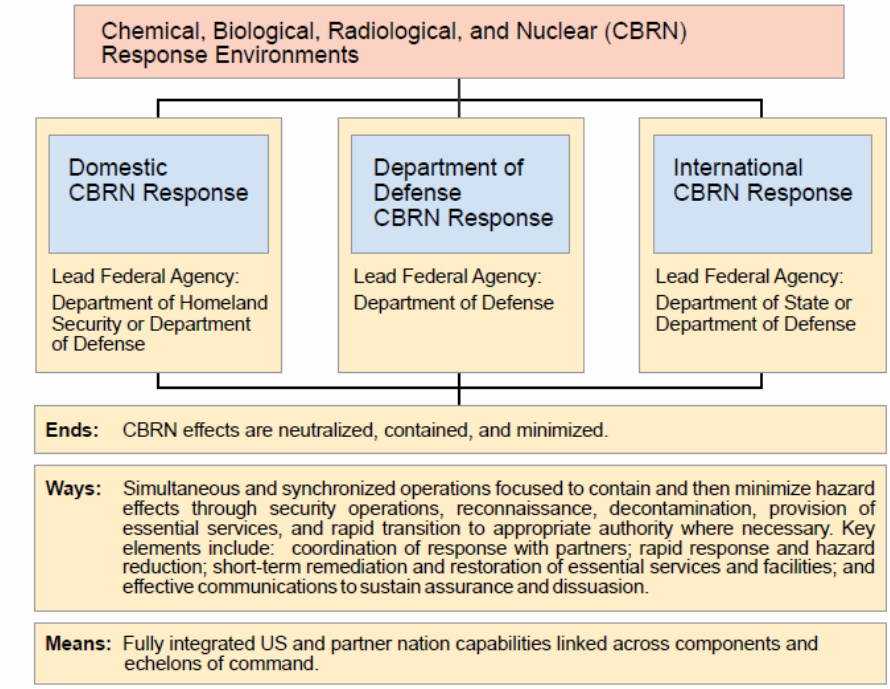

Figure 9 CBRN Responses

Source: Joint Chiefs of Staff, Joint Publication (JP) 3-41, *Chemical, Biological, Radiological, and Nuclear Response* (Washington, DC: Government Printing Office, 2014), I-2.

Step 4: Data Analysis

The analysis of the data determines that the Chemical Corps is relevant in the continued homeland defense and security that the United States needs as America's Counterforce against CBRN WMD. The standard for CWMD is that we are so successful in our preparations that no adversary dare use it and thus the Chemical Corps never has to do its job. Deterrence, in this case is a mixture of the potential use of force combined

with the ability to deny any advantage to an adversary through their use of WMD. Combined with the ability to operate within the conditions caused by WMD with such effectiveness that no adversary perceives that they might gain an advantage by the use of WMD. The Chemical Corps updates DOTMLPF-P imperatives to ensure that newly designed or redesigned units are capable of supporting current and future operations. In today's rapidly changing battlefield environment, it is critical that field commanders and experienced operators are active members of the combat development process.

Major themes found throughout the research include:

1 Homeland Security and Defense is a number one priority since the September 11, 2001 attack on the trade center and pentagon.

2. Historical use of CBRN warfare is state actors against state actors.

3. The Chemical Corps has fought to remain relevant for years.

4. The Chemical Corps has continued to improve DOTMLPF-P and train other US branches of service and allied forces on CBRN.

5. Rouge states and their use and testing of CBRN weapons.

6. The strategic objective of non-state actors is to cause panic, terror, and violence to innocent civilians, which can lead them to want to use a CBRN WMD.

7. The old terrorism vs new terrorism, is that terrorists are no longer using terrorism for society or government specific change; rather gone international to support global cause and the US homeland has become a primary target.

8. Non-state actors are loosely linked cells that do not rely on a single leader or state sponsor making it difficult to gain CBRN intelligence against an enemy in hiding.

9. State and non-state actors have a wide variety of potential agents and delivery means to choose from for CBRN WMD attacks.
10. Globalization and the technological and communication revolution have changed the nature of terrorism with increased knowledge of CBRN WMD scientific material.

Step 5: Developing Viable Recommendations

Research analysis across the DOTMLPF shows that the Chemical Corps is making strides in completing the prerequisites in the event a chemical unit has to respond to a real-life chemical threat. To better support the nation's CBRNE defense and combating WMD efforts, the Army must continue to focus on defense training, improve the image of the Chemical Corps and CBRN Soldiers, and provide better CBRN support to maneuver forces. BCTs need to make CBRN readiness a priority and allow the chemical soldiers to perform their assigned CBRN training. Ultimately, improving soldier and unit readiness to survive in a CBRN environment, without significant changes in how the Army approaches CBRNE defense.

CHAPTER 5

CONCLUSION

Introduction

This study uses a research methodology based on qualitative inquiry and narrative research design using DOTMLPF and articles written by chemical officers that highlight the relevance of the United States Chemical Corps. It gives a holistic examination to assess the conditions to determine if the United States Army's Chemical Corps is relevant in the support of homeland security and defense against CBRN weapons of mass destruction from state and non-state actors; and how does the Chemical Corps fix the perception that other branches have of them within the US Army.

Findings

Research determines that the Chemical Corps has made great strides towards improving relevancy since its existence. The CBRN WMD threat to the United States has changed dramatically in recent years. In the current environment, the United States may experience a higher likelihood of a CBRN attack on its military forces and civilian population. With the terrorist attacks on America in 2001, the original Chemical Corp's mission of "protecting the force" extended to comprise a role in Homeland Security and Defense. Today the Corp's mission is supported by up-to-date facilities for CBRN development, research, and engineering at Aberdeen Proving Ground; equipment production at Pine Bluff Arsenal; training at Fort Leonard Wood; and material testing at Dugway Proving Ground. The Chemical Corps continues to stand as a faithful deterrent to the use of WMD by those who would choose them to further their aggressive goals.

The use of the Chemical Corps to defeat and permanently deter state and non-state actors is currently a success because to date there has not been a major CBRN WMD catastrophic event in the United States.

The use of chemical agents by state and non-state actors is recognized more than ever as a threat to the US homeland and to deployed US troops. Terrorist groups have the knowledge and the financial support to design and disperse CBRN weapons. Also, a great percentage of the world's population now has the ability and knowledge to develop CBRN weapons of mass destruction. The United States Army's Chemical Corps finds itself at the forefront of the War against Terrorism. Their training and capabilities have evolved and are relevant in the DOTMLPF research meeting the standards of protection applied domestically.

The attack on September 11, 2001 did not involve chemical weapons, however, it did uncover terrorist's desire to use unconventional weapons. The United States then realized America's vulnerability to non-state actors and terrorist attacks. Today, the Chemical's Corp's mission is to provide CBRN defense through contamination avoidance, decontamination, and CBRN protection has evolved into supporting the Joint Forces with combating WMD capabilities in the areas of Non-Proliferation, Counter-proliferation and Consequence Management. In the coming years, the Chemical Corps will continue to remain focused on providing world-class CBRN capabilities to their joint warfighting community, regional allies, and the Nation.

Recommendations

To change the perception of the Chemical Corps being irrelevant, the corps must make a paradigm shift and communicate a strategic, operational, and tactical message of

the reconstruction of the corps and the continued systems development throughout DOTMLPF-P. The senior leaders within the Chemical Corps, maneuver commanders, and chemical soldiers must present this message that the Corps is ready for the present and future operational environment; giving a positive perception benefiting the Chemical Corps and its relevancy.

The Chemical Corps must continue to focus on defense training, improve the image of the Corps and CBRN Soldiers, and provide up-to-date CBRN expertise to maneuver forces. Moreover, continue to support the United States against state and non-state actors on the Global War on Terrorism. The Chemical Corps vision is “America’s CBRN Counterforce”, in order to accomplish the mission Chemical Soldiers in the units need to advise their commanders on all CBRN issues. All soldiers need to be trained at the unit level on their individual CBRN equipment. It is the Chemical Soldier’s responsibility to remain relevant and inforce CBRN training within the maneuver units. Additionally, they must study articles on CBRN topics and CBRN doctrine, increasing their knowledge and expertise, to prepare the needs of the US Army for the present and future CBRN threats.

Further Research

Additional study would include visits to the United States Army Chemical Corps units to discuss their capabilities and view a demonstration of those capabilities. Further research would include the study of the United States Army National Guard and the United States Army Reserves and their relevance in the support of homeland security and defense against CBRN weapons of mass destruction from state and non-state actors.

Summary

The research concludes that the Chemical Corps has continuously made efforts to remain relevant since its birth. As long as hostile state and non-state actors, including terrorists and their supporters exist, the Chemical Corps will always be a strategic asset especially when it comes to homeland security and defense. The Chemical Corps is currently a trained force that is ready for countering CBRN WMD from state and non-state actors across the homeland.

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