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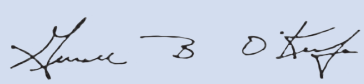

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Army Chemical Review

The Professional Bulletin of the Chemical Corps

PB 3-16-2, Winter 2016

Cover photographs: U.S. Army photos

Chief of Chemical and Commandant, U.S. Army Chemical, Biological, Radiological, and Nuclear School

I assumed command of the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS) during a change of command ceremony on 26 May 2016. I'm indeed honored to serve as the 29th Chief of Chemical. This would not have been possible without the training and mentoring that I received from many commissioned and noncommissioned officers throughout my career—too many to name individually. To all of them I say, "Thank you. I'm extremely grateful."

Brigadier General James E. Bonner

I would also like to thank Brigadier General Maria R. Gervais for her leadership. While she was Commandant, USACBRNS expanded existing credentialing opportunities. These opportunities include an associate emergency manager certification made available through partnership with the International Association of Emergency Managers. Additionally, Brigadier General Gervais' strategic vision enabled the school to implement a 14-week Chemical, Biological, Radiological, and Nuclear (CBRN) Warrant Officer Basic Course; complete the first Warrant Officer Advanced Course; complete a force design update; and field state-of-the-art CBRN technologies (nuclear, chemical, and biological reconnaissance vehicle [NBCRV]; dismounted reconnaissance sets, kits, and outfits), which led to the most evolutionary changes to the Regiment in the past 30 years.

In keeping with the evolutionary innovations started by Brigadier General Gervais, I am excited to announce the following initiatives that our Regiment will be executing through the lens of the U.S. Special Operations Command, the Maneuver Center of Excellence, the 20th CBRNE Command, and the U.S. Northern Command to increase readiness as defined by the four pillars of manning, equipping, training, and leader development. In the coming years, we will continue to remain focused on providing world-class CBRN capabilities to our joint warfighting community, our regional allies, and our Nation.

The initiatives are broken down by doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy (DOTMLPF-P):

- **(D)** Army Techniques Publication (ATP) 3-90.40, *Combined Arms Countering Weapons of Mass Destruction*, is being developed to answer the need from the field for doctrine that improves the interoperability of maneuver forces and enablers while validating the combined arms approach to countering weapons of mass destruction (CWMD) missions. 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 CWMD operations. In order to integrate current doctrine, lessons learned, and new concepts, a team of writers from the Maneuver Center of Excellence, the Maneuver Support Center of Excellence, the Intelligence Center of Excellence, the Fires Center of Excellence, the U.S. Army Nuclear and Combating Weapons of Mass Destruction Agency, and the Asymmetric Warfare Group has contributed its expertise to the writing process. A draft was staffed to key stakeholders and subject matter experts in October with the goal of publishing the new doctrine by 2d quarter 2017.
- **(D)** We have an ongoing research and development study (which the Vice Chief of Staff of the Army has approved) on improving the Army CWMD consequence management response capability using a whole-of-government approach to ensure that existing Department of Defense CBRN force structure is effectively and efficiently employed in search of domestic response operations.
- **(D, T)** The Joint Experimentation and Analysis Division, USACBRNS, conducted a tactical decontamination line of effort in April 2016, and results were used to create a 14-step procedure for maneuver forces to conduct extended immediate decontamination in lieu of operational or thorough decontamination. This concept and the associated technology are being submitted and integrated into Army Expeditionary Warrior Experiment 2017.
- **(O, T)** In our continued efforts to support our warfighting community, we are 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.
- **(O, M)** In the coming months, the USACBRNS team will work 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

planning effort that develops a road map for Army capability development and modernization. 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 us to inform our senior leaders of the most critical CBRN and CWMD capabilities to support the future force.

- **(M)** The 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.
- **(L)** To prepare junior leaders for this BCT environment, the top one or two lieutenants from each Basic Officer Leader's Course with a follow-on assignment to a maneuver battalion will participate in a right-seat ride at the National Training Center, Fort Irwin, California, before reporting to their new unit. The Directorate of Training and Leader Development is currently working with the Mission Command Training Program to update exercise products to reflect current CWMD doctrine, rules of allocation, and scenario/inject builds to reflect the current operating environment.
- **(L)** The Regiment is working closely with Tufts University, Medford, Maine, and Emory University, Atlanta, Georgia, to establish dedicated fellowships for CBRN officers. Once established, two officers in the rank of captain or major will be chosen to participate in the CBRN fellowships at these schools. The course of study will center on diplomacy, counter-proliferation, and the development of enterprise-based solutions to complex problems. The program begins its pilot year in the fall of 2017, and selection is ongoing. Interested officers should contact their U.S. Army Human Resources Command assignments officer for more information.
- **(Personnel, D, M)** USACBRNS is currently guiding, facilitating, and integrating learning for Army missions in support of homeland defense and defense support to civil authorities (DSCA) requirements. These efforts support required capabilities integration into capability development across all functions of support to homeland operations and lead capability development of the Maneuver Support Center of Excellence equities within homeland operations. We have partnerships with the operating and generating forces to best address critical homeland defense and DSCA challenges and enhance the operating force ability to perform the mission. Some of the major initiatives in support of Army Warfighting Challenge No. 6 (Homeland Defense Operations) are defining the operating environment, theater security cooperation, leader development, and training capabilities that support homeland defense and DSCA; leveraging cyberspace information collection and analytics, network authentication, and interoperability of systems; providing a common operational picture; and using intelligence capabilities in homeland defense and DSCA operations, ballistic missile defense, medical policy impediments, and resourcing constraints. These are ongoing efforts that are integrated within the capabilities needs analysis framework.
- **(F)** The toxic training transformation initiative of the Chemical Defense Training Facility is being undertaken for the sole purpose of expanding and enhancing the quality of CWMD training for U.S. 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, or GB, nerve agent and venomous agent X [XV]) to include select biosafety Level 2 biological materials and a select list of toxic industrial chemical and toxic industrial material hazards.
- **(Policy)** I was honored to represent the USACBRNS at the 11th CBRN International Commandant and Commanders Conference (ICCC), held in the United Kingdom. Participating nations included the Czech Republic, Denmark, France, Germany, Italy, Japan, Norway, Poland, Singapore, and the United Kingdom. The focus of the ICCC discussions was on current and future decontamination capabilities. While in the United Kingdom, I met with Brigadier Ian Gibb, British Army Staff, Head of Combat Capability at the Army Headquarters in Anover. I offered support during the United Kingdom transition of lead service for CBRN from the Royal Air Force to the British Army, to include training course seats and doctrinal and training subject matter expert exchanges.

These initiatives are in keeping with my strategic vision of providing our Nation with trained and ready Dragon Soldiers to serve as America's CBRN counterforce—world leader in countering weapons of mass destruction defense, guarding the force, and protecting the homeland. My promise to the Regiment's past and present members: The Regiment's excellent reputation is well-known, and together we will continue that fine tradition by preparing ourselves to meet any challenge our Nation requires of us. I am immensely proud and honored to be your commandant.

Reference:

ATP 3-90.40, *Combined Arms Countering Weapons of Mass Destruction*, to be published.

Elementis regamus proelium!

Regimental Command Sergeant Major

Greetings to all Dragon Soldiers, Civilians, Retirees, and Families of the Regiment!

It is truly an honor and a privilege to serve as your 14th Regimental Command Sergeant Major. Thanks for the warm welcome that my Family and I received as we transitioned to Fort Leonard Wood. This achievement would not have been possible without the expert training, coaching, and mentoring that I received over the years. I would also like to thank former Regimental Command Sergeant Major Kenneth J. Kraus for his leadership and untiring service to our Corps and Army.

Command Sergeant Major Henney M. Hodgkins

My mission and vision are aligned with the Chemical Corps Regimental Strategy 2025, and they support our campaign plan.[1] Leaders and Soldiers at all echelons need to fully understand the five lines of effort (LOEs) to ensure that the force is trained and ready for operations across the full spectrum of countering weapons of mass destruction (CWMD). I intend to communicate consistently and remain transparent as we collaborate with our joint warfighting communities and various Army commands to ensure the best possible outcomes while taking an integrated approach to building capability and capacity across all doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) functions.

There is no better time to be a chemical, biological, radiological, and nuclear (CBRN) Soldier! Our career management field offers numerous opportunities for growth and advancement:

- (LOE 1, LOE 2) *U.S. Army Training and Doctrine Command (TRADOC) Pamphlet (Pam) 525-3.1, The U.S. Army Operating Concept—Win in a Complex World*, indicates that our noncommissioned officers (NCOs) need to be agile and adaptive to combat the growing threats around the world.[2] I recently attended the TRADOC Sergeants Major Workshop, where we discussed the reintroduction of common core into the NCO professional military education and talked about how to optimize Soldier and squad performance. The resounding message within these sessions was about how we can apply leadership, training, and technology across the Soldiers' lifecycle to improve readiness and combat effectiveness. We are currently in the process of analyzing our Advanced Leader Course and Senior Leader Course programs of instruction to ensure that we are meeting TRADOC's intent for common core and leader development. A thorough understanding of the professional development model available on the Army Career Tracker Web site is required to leverage broadening opportunities to become a better leader.[3]
- (LOE 1, LOE 2) The CBRN enlisted branch is dedicated to the professional growth of the enlisted force. In March 2016, a pilot program was initiated to fill NCO assignments with a method similar to that of officers. Under this new program, NCOs are notified via e-mail that they are potential candidates for the program, which provides NCOs with an opportunity to participate in the assignment process. The CBRN Branch team reviews the NCO's file to determine which position he or she needs for growth, combines this information with the Soldier's desired career path, and collaborates to determine the best assignment available for the NCO. The NCO certainly doesn't always receive the assignment that he or she wanted, but the team tries hard to position the NCO for growth. In the past 8 months, the CBRN Branch has opened new assistant inspector general positions for master sergeants and sergeants first class and, for the first time, assigned a female Military Occupational Series (MOS) 74D Soldier to the U.S. Army Military Academy as a tactical NCO.
- (LOE 3) To meet the growing needs for nuclear, biological, and radiological reconnaissance vehicle Stryker crew certification, a phased approach to support the training requirements of Reserve Component Soldiers was instituted. Beginning in fiscal year (FY) 2017, the additional skill identifier L6 course will be offered in two phases.
- (LOE 4) The U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS) just completed an American Council on Education accreditation review. The following courses were reviewed for college credit: Basic Officer Leader's Course, Captain's Career Course, Analytical Laboratory System Operator Course, Unified Command Suite Operator Course, Dismounted Reconnaissance Course, and CBRN Reconnaissance for Brigade Combat Teams Course. Reviews of MOS 74D and MOS 740A were conducted to determine college credit recommendations. The American Council on Education has proposed an increase in credit hours for most of the courses reviewed. The results are now posted on the Joint Services Transcript Web site.[4]
- (LOE 4) Department of the Army (DA) Pam 600-25, *U.S. Army Noncommissioned Officer Professional Development Guide*, was updated to define guidance on NCO professional development programs, which supports our Corps direction of developing professional warriors.[5]

- (LOE 4) Collective training updates for FY 17 are as follows:
  - Combined Arms Training Strategy (CATS) has been published.
  - CATS updates were published to the Digital Training Management System in FY 16.
  - CATS for the CBRN company (hazard response), headquarters and headquarters company, CBRN battalion, CBRN company (area support), CBRN company (biological), CBRN-coordination element, CBRN reconnaissance detachment (special forces), CBRNE company (technical escort), CBRN brigade, CBRNE operational headquarters, nuclear disablement team, and weapons of mass destruction coordination element are out for staffing and currently under review. Once comments are received, they will be published to the Digital Training Management System and the Army Training Network.

In keeping with the Chief of Staff's efforts to inculcate professional reading into the NCO Corps, I implore all leaders to counsel their peers and subordinates on the benefits gained from a profound understanding of our heritage. By learning from our past, we posture ourselves for success in future conflicts. In additional to the Commandant's reading program, I recommend the following:

- Stanley A. McChrystal et al., *Team of Teams: New Rules of Engagement for a Complex World,* Portfolio/Penguin, New York, 2015.
- Michael A. Levi, *On Nuclear Terrorism*, Harvard University Press, Cambridge, Massachusetts, 2007.

As a Corps, we must remain vigilant and ready to respond when our Nation calls. To accomplish this, we must ensure that we are properly manned, equipped, trained, and ready. I look forward to working with all leaders to identify capability gaps to better position ourselves to counter CBRN treats around the globe.

Endnotes:

[1]USACBRNS Web site, <http://www.wood.army.mil/newweb/chemical/index.htm>, accessed on 9 November 2016.

[2]TRADOC Pam 525-3-1, *The U.S. Army Operating Concept—Win in a Complex World*, 31 October 2014.

[3]Army Career Tracker Web site, <http://actnow.army.mil/>, accessed on 17 October 2016.

[4]Joint Services Transcript Web site, <https://jst.doded.mil/smart/signln.do>, accessed on 17 October 2016.

[5]DA Pam 600-25, *U.S. Army Noncommissioned Officer Professional Development Guide*, 28 July 2008.

References:

Field Manual 6-22, *Leader Development*, 30 June 2015.

Force 2025 and Beyond, <http://www.arcic.army.mil/app_Documents/tradoc_ausa_force2025andbeyond-unifiedlandoperations-wininacomplexword_07oct2014.pdf>, accessed on 17 October 2016.

Elementis regamus proelium!

Regimental Chief Warrant Officer

Greetings Dragon Soldiers!

It is an honor and a privilege to serve as your Regimental Chief Warrant Officer. When I say "your" Regimental Chief Warrant Officer, I mean that with all sincerity. You are my sole purpose for serving in this position. I look forward to serving you and your Families with great humility and enthusiasm. Secondly, I would like to thank Chief Warrant Officer Two Matthew D. Chrisman for blazing the trail for the chemical, biological, radiological, and nuclear (CBRN) warrant officer cohort. His leadership was instrumental in laying the foundation for CBRN warrant officer accessions, professional military education, and future growth of the CBRN Warrant Officer Program.

Chief Warrant Officer Two Jesse S. Deberry

Throughout history, Dragon Soldiers have been described as diverse, adaptive, and agile enablers. The complexity of the future operational environment calls for CBRN Soldiers to sharpen these attributes now more than ever. The CBRN Warrant Officer Program is approaching its 6th year of existence, and it is steadily evolving. As the CBRN Warrant Officer Program matures, so does the Chemical Corps, into a more robust technical and tactical force. *The Army Warrant Officer 2025 Strategy in Support of Force 2025 and Beyond* defines warrant officers as the Army's premier land force technical expert and system integrator.[1] Along with serving as expert technicians and systems integrators, CBRN warrant officers must be beacons of ingenuity, possess the ability to network with outside agencies and organizations, and have an in-depth understanding of the contemporary and future operational environments. These attributes will assist CBRN warrant officers when enabling their commanders to support the warfighter, increase the readiness of their units, and build capability and capacity.

My mission is to ensure that—

- The best-qualified warrant officer applicants are selected.
- Warrant officer professional military education prepares warrant officers to enable their commanders.
- Warrant officers are placed in the right positions to foster career progression.

My mission is nested with *The Army Warrant Officer 2025 Strategy in Support of Force 2025 and Beyond* Line of Effort (LOE) 1, Accessions; LOE 2, Development; LOE 3, Talent Management; and LOE 4, Army Profession and the Commandant's Chemical Corps Regimental Strategy 2025.[2] I will explain my initiatives through the lens of Chemical Corps Regimental Strategy LOEs and doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF):

- (LOE 4, Doctrine) An update to Department of the Army (DA) Pamphlet (Pam) 600-3, *Commissioned Officer Professional Development and Career Management*, will be published to clearly define roles and responsibilities of CBRN warrant officers serving within company to corps level positions.[3]
- (LOE 1, LOE 2, Leadership/Education) On 12 September 2016, the USCBRNS completed its second iteration of the CBRN Warrant Officer Basic Course (WOBC). The CBRN WOBC is on a glide path to prepare warrant officers to enable commanders through in-depth technical and tactical knowledge. The goal of future iterations of CBRN WOBC is to increase the technical rigor, including teaching WOBC students the science behind sensor technology and emerging CBRN technology. In addition, the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS) is working to establish a technical phase for Warrant Officer Intermediate Level Education in line with *The Army Warrant Officer 2025 Strategy in Support of Force 2025 and Beyond* LOE 2.[4] The purpose of the technical phase of Warrant Officer Intermediate Level Education will be to ensure that intermediate- and senior-level warrant officers receive the latest technical and functional updates within their career field. The Nuclear Weapons Orientation Course (NWOC) and the Theater Nuclear Operations Course (TNOC) are now open to CBRN warrant officers. The completion of NWOC and TNOC grants the 5H skill identifier. Corps CBRN warrant officer positions will be coded 5H. Lastly, the USACBRNS has partnered with the American Counsel of Education to review CBRN warrant officer professional military education to determine college credit recommendations for associate's and bachelor's degrees for WOBC and Warrant Officer Advanced Course graduates. The results are posted on the Joint Services Transcript Web site.[5]
- (LOE 3, Personnel) The first chief warrant officer three promotion board for CBRN warrant officers will be held in 2d quarter 2017. As CBRN warrant officers are promoted to chief warrant officers three, CBRN warrant officer positions

at the corps level will transition to chief warrant officer four positions. Division CBRN warrant officer positions will remain at the level of chief warrant officer three. The USACBRNS will submit a military occupational classification and structure proposal to solidify chief warrant officer four positions. This proposal will provide occupational classification and structural guidance to standardize the classification of chief warrant officer four positions for CBRN warrant officers.

- (LOE 2, Personnel) USACBRNS is broadening assignment opportunities (with the Joint Program Executive Office, the Edgewood Chemical Biological Center, and the Oakridge Laboratory) for chief warrant officer three ranks. Training With Industry selectees will serve 1 year of training with industry and 2 years as material developers on the Requirements Determination Division staff. This effort is in line with Warrant Officer Strategy 2025 LOE 2.[6]

I recommend the following as suggested reading for warrant officers:

- Dean C. Ludwig and Clinton O. Longenecker, "The Bathsheba Syndrome: The Ethical Failure of Successful Leaders," *Journal of Business Ethics*, 1993.
- Molly Young, Center for Army Lessons Learned, "J36 Force Protection: CBRNE Assessment," *News From the Front*, February 2016, <http://usacac.army.mil/sites/default/files/publications/CBRNE-Augmentation.pdf>, accessed on 18 October 2016.
- *The Army Warrant Officer 2025 Strategy in Support of Force 2025 and Beyond*, 2016, <http://www.tradoc.army.mil/tpubs/misc/WO2025_Strategy_20160329.pdf>, accessed on 18 October 2016.
- Travis Bradberry and Jean Greaves, *Emotional Intelligence 2.0*, TalentSmart, California, 2009.

In closing, I vow to always support the Commandant, Regimental Command Sergeant Major, and all Dragon Soldiers of our great Regiment. I look forward to visiting your installations and sharing fellowship with you in the near future.

Endnotes:

[1]*The Army Warrant Officer 2025 Strategy in Support of Force 2025 and Beyond*, 2016, <http://www.tradoc.army.mil/tpubs/misc/WO2025_Strategy_20160329.pdf>, accessed on 18 October 2016.

[2]Ibid.

[3]DA Pam 600-3, *Commissioned Officer Professional Development and Career Management*, to be published.

[4]*The Army Warrant Officer 2025 Strategy in Support of Force 2025 and Beyond.*

[5]Joint Services Transcript Web site, <https://jst.doded.mil/smart/signln.do>, accessed on 17 October 2016.

[6]*The Army Warrant Officer 2025 Strategy in Support of Force 2025 and Beyond.*

References:

U.S. Army Training and Doctrine Command Pam 525-3-1, *The U.S. Army Operating Concept—Win in a Complex World*, 31 October 2014.

U.S. Army Training and Doctrine Command Regulation 71-20, *Concept Development, Capabilities Determination, and Capabilities Integration*, 28 June 2013.

Training Challenges 2025

By Mr. James M. "Mike" Cress and Mr. Bruce A. Baldwin

Consequences of Change

There are many historical examples of armies that have lost battles due to their failure to grasp the best or most effective strategies and operational techniques. One example involves the French forces in early World War II. The French automotive industry was the second-most-prolific producer of armor during the prewar period, exceeded only by the Soviet Union. The premier French tank, the 37-millimeter-equipped SOMUA S35, was of a superior design. In comparison to French armored tanks, German tanks of that time were under-gunned, equipped primarily with twin machine guns and weak, 20-millimeter cannons. In addition, about 80 percent of the French tanks lacked radios due to the French battle doctrine of the day. Yet, the Germans defeated the French. The French failed to grasp the potential of armored vehicles in a combined arms team. Their tactics were in deliberate and slow support of the infantry. The German advantage was not superior equipment, but superior doctrine, organization, training, and integration of material support and aggressive leadership. In early 1940, the balance was tipped in favor of the French and their allies but a well-trained, well-led, and adequately supplied, yet undergunned, German armored force swept the field and astounded observers from around the world. This could happen to the U.S. Army. Our equipment is equal or superior to any force in the world, but we could lose if we fail to modernize our training, doctrine, and equipment.

"As the Army makes adjustments to its doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) to meet the needs of the 2025 battlefield, it must develop a balance between cognitive, physical, and moral development on one hand and the procurement of new weapons and associated capabilities on the other."

Challenge of the Human Dimension

U.S. Army Training and Doctrine Command (TRADOC) Pamphlet 525-3-7, *The U.S. Army Human Dimension Concept*, is a must-read document for all leaders. It paints a picture of the complex challenges that the Army will face in the future. As mentioned in Chapter 2, "The future operational environment will present Army leaders with complexity. Threats will manifest themselves in combinations of regular, irregular, terrorist, and criminal elements. These threats will have access to sophisticated technologies such as robots, unmanned vehicles (aerial and ground), and possibly weapons of mass destruction. They will merge cyber and electronic warfare capabilities to enable them to operate from disparate locations. Additionally, they may hide among the people in complex terrain to thwart the Army's conventional combat overmatch. Adding to this complexity is continued urbanization and affordable access to social media. The resulting 'rising velocity of human interaction' will make it more difficult to completely understand events or to predict the aftermath of any incident. Army leaders may become overwhelmed with information and face multiple dilemmas in shorter periods. This complex environment will therefore require future Army professionals to perform at a higher level."[1]

According to a recent Columbia Broadcasting System (CBS) article, the U.S. education system is failing to prepare young Americans for the future. An estimated 75 percent of the U.S. youth population (age 17–24) is ineligible for military service based on today's standards. Many potential recruits lack basic skills in math, reading, and writing, despite having a high school diploma. In some school districts, as many as 80 percent of high school graduates require remedial work to perform successfully in college.[2] This means that the competition for capable high school graduates will be intense in an environment where Soldiers must work with increasingly complex, technology-rich weapons and information management systems to compete on the future battlefield.

As the Army makes adjustments to its doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) to meet the needs of the 2025 battlefield, it must develop a balance between cognitive, physical, and moral development on one hand and the

procurement of new weapons and associated capabilities on the other. In future conflicts, all sides will have advanced capabilities and they will be able to efficiently employ those capabilities to their best advantage. This places a premium upon the capacity to achieve the highest capability from each system. To succeed, we need a well-trained force.

The Army will face an increasingly difficult challenge in recruiting and retaining qualified personnel. Recruits must successfully learn complex subjects with limited time available. Unlike with many civilian jobs, there is a very narrow margin for failure in the Army.

Historical Perspective of Training

Approaches to Army training have changed significantly over the years. Following the end of World War II, Army training was highly structured and Service-unique. At the end of the Vietnam War, the Army concentrated on mass exercises such as the Return of Forces to Germany (REFORGER), where large numbers of troops deployed to training areas inside and outside of the United States and participated in force-on-force exercises. In the 1980s, instrumented training tools were introduced. An example is the Multiple Integrated Laser Engagement System (MILES), which when mounted upon weapons and used with blank ammunition, allows realistic, yet safe, force-on-force mock battles with the capability for casualty assessment. In the post-Desert Storm era, decentralized multimedia simulation and wargaming became possible with the integration of joint forces. While always desirable, live exercises are increasingly difficult and expensive to conduct. The challenge is to train and educate the force to operate in the more complex and challenging operational environment of 2025.

While the Army has trained the conventional force well, the focus has shifted over the past few years from one critical area: weapons of mass destruction (WMD). As we review future force requirements and the possibility of a full range of potential conflicts, we are forced to consider that we may engage peer or near-peer competitors on the 2025 battlefield. Those competitors and smaller antagonists will seek to overcome our advantages and will have the capability to use WMD against our forces in an effort to gain advantage. It is no longer necessary to amass delivery systems or stockpile huge quantities of ammunition. Delivery systems have become more agile and more accurate, with a longer range than those of only a few years ago. The nature of modern information and technology exchange means that sophisticated, highly technical tools will be available for use by threats against our forces and our homeland. Yet, over the past 20 years, more than a dozen investigations, studies, and analyses (from various sources, including the General Accounting Office and the Department of Defense) have identified serious deficiencies in the chemical, biological, radiological, and nuclear (CBRN) readiness of the force. These assessments have cited missing or improperly maintained equipment; a lack of leadership; the atrophy of common CBRN skills; and the inability to train in a realistic, meaningful environment. Candid comments from seasoned noncommissioned officers have reinforced those observations.

Title 50, *War and National Defense*, U.S. Code, Chapter 32, *Chemical and Biological Warfare Program*, Section 1522, *Conduct of Chemical and Biological Defense Program*, specifies that "The Secretary of Defense shall consolidate all chemical and biological warfare defense training activities of the Department of Defense at the United States Army Chemical, [Biological, Radiological, and Nuclear] School [USACBRNS]."[3] Initial and advanced training is conducted at USACBRNS, but institutional training is only a small component of Army readiness. Once Soldiers leave the school environment, the tasks that they learned must be sustained. As depicted in Figure 1, the way the Army trains has changed dramatically over the years. Large live exercises involving thousands of Soldiers are mostly a thing of the past. While live training is still important, other tools have been introduced. Furthermore, training technology improves constantly. The advent of the Internet-enabled smartphone has introduced an entirely new dimension to learning, making information readily available worldwide.

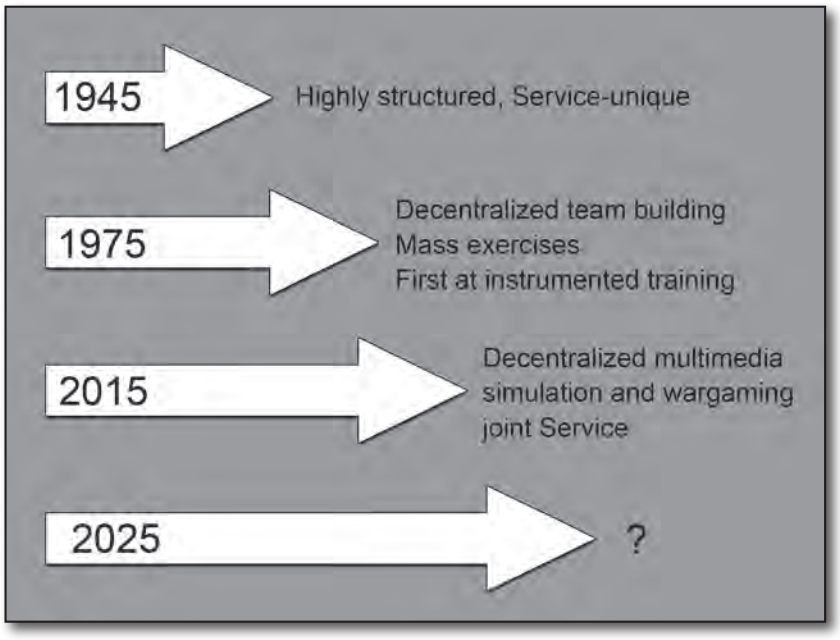

Figure 1. How Army training has changed

Future Methods

A variety of training tools and methods will be needed to train and sustain Soldiers and leaders in the 21st century. These tools must be live, virtual, and constructive in design to train in a resource-constrained environment. According to TRADOC Pamphlet 525-3-7, ". . . researchers predict continuing difficulty with a recruit-age population lacking basic skills (mathematics, reading, and writing at or below the

8th-grade level). Army leaders will therefore need to adopt different training and education methods to ensure that future Soldiers achieve at least a minimum baseline skill level."[4] The focus is on technologies and methods to accelerate learning, experience, emotional maturity, and judgment across training domains while reducing time and expense.

Simulation of Combat

Live training in the field using troops and equipment continues to be highly desirable, but extremely expensive and resource-intensive. Computers and electronic devices have introduced capabilities that require training the categories of live, virtual, constructive, and gaming (LVC-G) environments.

Live

Live training is executed using assigned equipment; real people operate real systems. Live training may be enhanced by training aids, devices, simulators, and simulations (TADSS) and tactical engagement simulations to further simulate combat conditions. Live training can operate in a stand-alone environment or be integrated with virtual and constructive environments as part of the integrated training environment (ITE).

Virtual

A virtual environment is a computer-generated 3-D environment that displays geo-specific or geo-typical terrain. It is interactive, allowing participants to move, navigate, and act within the environment. Usually, a stereoscopic display provides the participant with a perception of depth and a 360-degree total field view. The environment provides realistic characteristics and the form, fit, and function of simulated personnel, equipment, aircraft, vehicles, and objects. Virtual training will be capable of stimulating current and future mission command systems at home station, which will further enhance its role within the ITE. It will eventually be capable of being networked with combat training centers.

Constructive

Constructive training uses computer models, tools, interfaces, and simulations to exercise mission command and staff functions. It involves simulated people and equipment operating simulated systems in computer-generated environments. Real people provide input into the simulations, but are not involved in determining the outcomes. When used as part of the ITE, constructive training is a critical component of expanding the operational environment. Constructive training can be conducted by units at levels from platoon through echelons above corps and in joint or combined operations.

Gaming

Army gaming is the use of commercial and government, off-the-shelf products and technology with multiple types of interactive computer-based applications. These products are low in cost, have low overhead, and establish "good enough" conditions for individual, leader, and unit level training, education, and mission rehearsal, while emphasizing the development and application of cognitive skills. The Army gaming spectrum of condition-setting applications ranges from avatars and personas representing real people operating simulated systems, to real people managing simulated people (individuals and/or formations), to real people engaging with simulated people and objects to achieve a specific purpose—all in a semi-immersive gaming environment. Where appropriate, Army gaming and the attendant gaming environment provide information for after action reviews, mission planning, connectivity to mission command systems, interoperability with other TADSS, and the ITE.[5]

Management of Training

The Army continues to identify common and military occupational specialty tasks by skill levels. Army Doctrine Reference Publication (ADRP) 1-03, *The Army Universal Task List*, lists Army universal tasks by mission area.[6] Many of those tasks are CBRN tasks. Historically, unit commanders examined their mission space and issued guidance on the formulation of a yearly training plan to the staff. This plan identified training activities that, in the commander's judgment, were necessary to ensure that the unit could effectively perform the mission. Subordinate leaders identified unit and individual tasks that required training in order to qualify Soldiers or sustain skill training that may become stale. Units sometimes did this very well; but when planning was substandard or nonexistent, unit readiness suffered. The penalty for "getting it wrong" in a CBRN environment is severe—and it would be a game-changer. Moreover, it is important for high-level unit planners to know that units are well-trained and can survive and fight in the CBRN environment. A standardized planning capability that does not leave technically solvent training to chance is required. The LVC-G unit training plan should prepare the unit to perform the wartime mission in a technically uniform manner through rehearsal of staff and unit collective tasks, from company down to platoon, squad, and crew level battle drills. The LVC-G unit training plan should provide for training in the unit classroom, the motor pool, or a live-training area. It should be designed to present training challenges using a crawl-walk-run methodology, while providing the capability to conduct repetitions to maximize training opportunity and master skills. The tools should allow the staff to conduct course-of-action development and wargaming by changing critical simulated battlefield variables.

Interoperability

The LVC-G unit training plan is a combination of models, simulations, and planning tools that facilitate learning by creating an ITE during live events (such as mounted and dismounted reconnaissance operations by small-team elements in support of home station and combat training center rotations). The LVC-G ITE will provide intuitive, adaptive mission command and situational awareness capabilities for the command post and maneuver commander, thereby enabling commanders and leaders at all levels to be more effective, agile, and decisive in mission execution.

(Continued on page 13)

Multi-Domain Cognitive Analysis Sensor Environment

By Mr. Frank D. Chapman

The Army requires a capability to capture all information generated on the battlefield throughout history and to provide improved situational awareness and early warnings to Soldiers on the ground, in the air, and at sea. All military forces around the world have used some type of sensor (beginning with men) and method of dissemination network (beginning with couriers) to alert leaders and Soldiers of incoming threats and hazards. The advent of radar and radios significantly changed the dynamics of warfare across conflict areas during World War II.[1] These technological wonders provided a key edge for the military by improving the ability to warn against incoming threats and focusing the limited combat assets on defeating or limiting threat abilities (primarily aerial) to destroy critical resources and facilities. After World War II, rapid advances in technology placed new sensors (night vision gear, infrared detectors, chemical sniffers, computing equipment, data transmission networks) across the battlespace.

Many Army proponents have invested in sensors to track, identify, analyze, and target threats for the last 6 decades, but these sensors represent organic capabilities with limited situational awareness of local forces only. More advanced situational awareness and targeting capabilities were envisioned with the Future Combat System (FCS), which consists of separate sensors that report singular, separate types of information (separate analyzing and processing) for the common operating picture, but provides limited capabilities.[2] The idea of integrating sensors and intelligence to synchronize data to the common operating picture is not new; what is new is how we integrate sensors and other information gathering and weapon systems and how the data that is collected is shared, processed, analyzed, disseminated, and transmitted back to other sensors and weapons on the battlefield. This integration provides commanders and Soldiers with real-time warning, planning, and engagement capabilities within the command operating environment.

Cognitive analytics refers to the application of these technologies to enhance human decisions. This application takes advantage of the vast data-processing power of cognitive computing and adds channels for data collection (such as sensing applications) and the environmental context to provide business insights. If cognitive computing changed the way in which information is processed, cognitive analytics is changing the way information is applied.[3] As envisioned, this new capability—called the Multi-Domain Cognitive Analysis Sensor Environment (MD CASE)—will involve more than traditional intelligence, surveillance, and reconnaissance; singular mission command; and intelligence enterprises. It will truly prompt a rethinking of how the Army fights, alone or with joint or coalition forces. Cognitive analytics is also linked to U.S. Army Training and Doctrine Command (TRADOC) Pamphlet (Pam) 525-3-1, *The U.S. Army Operating Concept—Win a Complex World 2020–2040*; the Army Big 6+1 capabilities (future vertical lift, combat vehicles, cross-domain fires, advanced protection, expeditionary mission command/cyber electromagnetic, robotics and autonomous systems [RAS], and Soldier/team performance and overmatch); and each TRADOC center of excellence science and technology requirement.[4, 5]

MD CASE is a multilayered, intelligent, self-healing network of smart, disparate sensors (active and passive) and weapon systems connected to a cognitive computing system. The cognitive computing system processes, amalgamates, and analyzes data to provide commanders with contextual insights that enable real-time early warning, planning, execution, and mission command while providing multidomain, 3-D situational awareness at the tactical through strategic levels. Due to the scope of its operational capabilities, MD CASE is available for commanders to use from Phase 0 through Phase 5 of operations at multiple locations across the globe and throughout space. MD CASE promulgates the tenants of cross-domain maneuver and fires from theater to Soldier level.

When MD CASE is fully implemented, it will provide the Army and joint Services with superior overmatching capabilities in the critical areas where peers strive to have

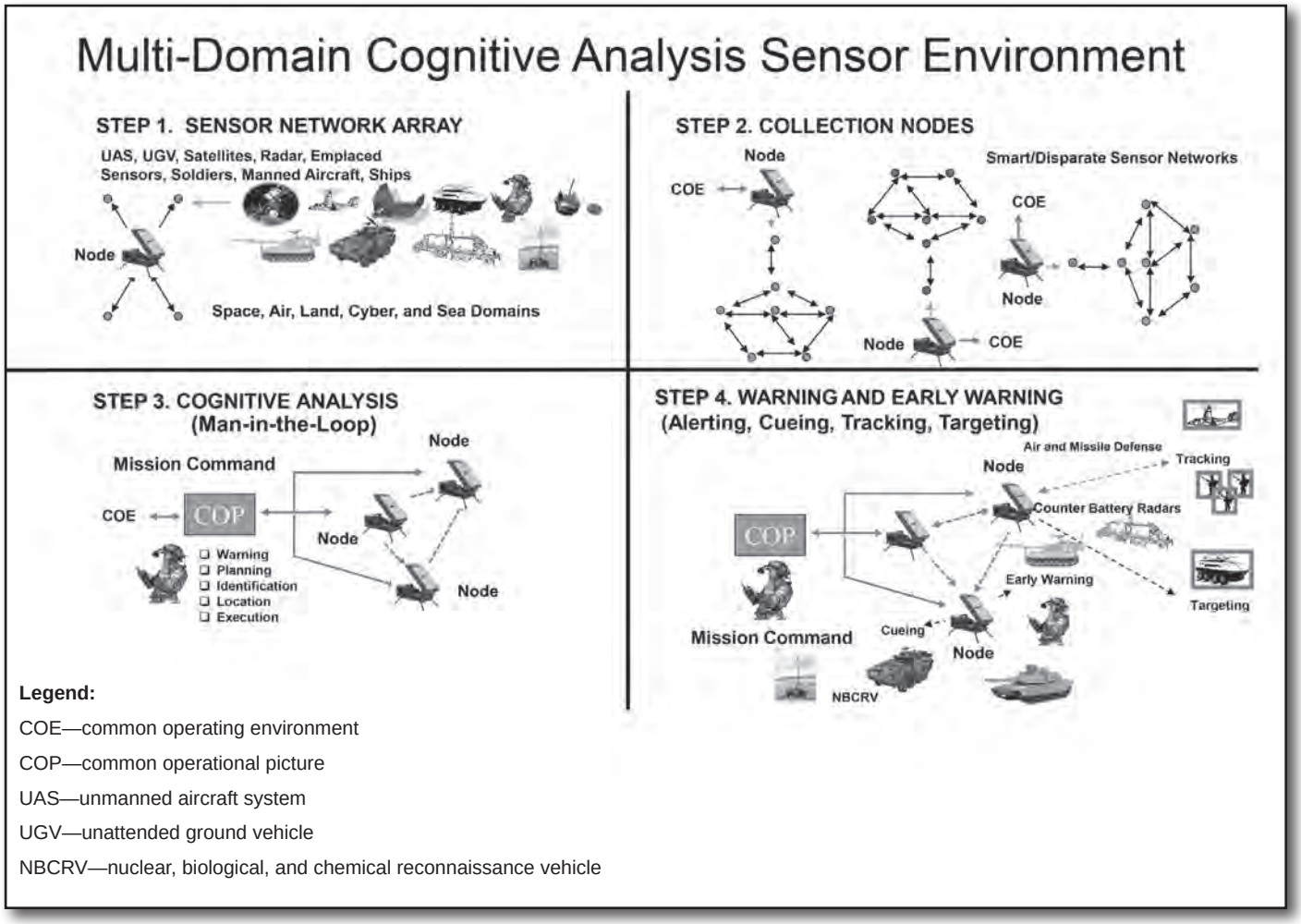

Figure 1. Four steps of MD CASE implementation

situational, tactical, and operational overmatch before and during all phases of military operations. There are four steps required for the implementation of MD CASE (see Figure 1):

Step 1. Sensor network array. Regardless of their location within the multidomains (space, air, land, sea, and cyberspace), smart/disparate sensors operate as passive detectors and active emitters. Their primary function is to map real-time geospatial terrain; detect, locate, identify, target, and track individuals, ground and aerial vehicles, ballistic or cruise missiles, rockets, artillery or mortars, ground-based hazards (chemical, biological, and radiological; obstacles; minefields), radar, directed energy, and radio frequency; and locate those assets using stealth, camouflage, and concealment decoy-enabled capabilities.

Step 2. Collection nodes. Collection nodes are transreceivers that are self-powered or integrated into other platforms. These nodes can stream data to and from other collection nodes and smart/disparate sensors to several cognitive-analysis terminals at specific levels of command (theater, corps, division, and brigade) and locations (continental United States, rear areas, forward-deployed areas) based on preauthorization authority. These nodes comprise a self-healing recognition network that uses government organization networks, joint networks, node assets, and Army network capabilities.

Step 3. Cognitive analysis. Cognitive analysis—the heart and soul of the sensor environment—uses software algorithms to fuse and analyze data and to determine the relevance, accuracy, and validity of the data while prioritizing the required information. The information is transmitted to selected applications that are integrated into the common operating picture, where the information is processed. This leads to recommendations for automated and manual command decisions. The software then turns key information into visual and actionable machine and human language to enhance situational understanding.

Step 4. Warning and early warning. Warnings and early warnings are critical components for data processing within MD CASE. An internal process alerts commanders and Soldiers of immediate threats and hazards (protection) and cues other systems for the specific execution of predefined actions without human intervention. It can also alert commanders and Soldiers of the threat and prompt for acknowledgement and action.

The intent of this article is to energize combat developers and program managers to broaden the horizon and encourage Soldiers, Department of Defense civilians, and contractors to envision and improve cognitive analytics ideas. The defense capability allows for smaller, more agile, expeditionary staff and forces to be infused with an improved blue force tracker capability. MD CASE improves intelligence, surveillance, and reconnaissance knowledge management that is tied directly into targeting and cueing of the threat with specific detailed information. The span of systems that use sensors is provided with the unparalleled ability to focus operations from direct actions (fight) to the front, rear, and side areas with enhanced situational understanding and security without syphoning combat forces or limiting capabilities. Wide area security, critical rear area facilities, and mobility corridors receive a level of protection and survivability through the ability to focus forces and resources when needed. Bypassed areas (areas that can become sanctuaries and marshaling positions to threat forces) and areas where no joint forces or U.S. forces are located can be monitored, and the threat can be tracked and targeted before it can control or attack from those areas of relative safety. Warnings and early warnings increase the alert time of incoming threats, and information about the severity (hazard, type of threat) and current location are provided to commanders. This critical information enables protection and allows countermeasures to limit the effect from the threat to friendly forces.

Endnotes:

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[4]TRADOC Pam 525-3-1, *The U.S. Army Operating Concept—Win a Complex World 2020–2040*, 31 October 2014.

[5]Daniel Wasserbly, "U.S. Army to Get Senior Leaders More Involved in Equipment Development," *IHS Jane's Defense Weekly*, 27 September 2016, <http://www.janes.com/article/64126/us-army-to-get-senior-leaders-more-involved-in-equipment-development>, accessed on 5 October 2016.

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("Training Challenges 2025," continued from page 10)

Alternatively, when required, the LVC-G unit training plan may work separately to train and sustain operations or maintenance tasks with levels of induced stress while minimizing the cost of actual equipment use.

Conclusion

Simulations can never completely replace live training, but they have the potential to train and sustain to high levels of proficiency without great expense and risk. Training deficiencies can be quickly identified, and shortcomings can be immediately addressed with rapid follow-on training or identified as future training requirements. A comprehensive LVC-G strategy should be developed to leverage the explosion of technology to meet the needs of the 2025 battlefield.

Acknowledgement: *Special thanks to Ms. Joan M. Lenahan-Bernard, Capabilities Needs Analysis Technician, Capabilities Development Integration Directorate, Fort Leonard Wood, Missouri, for her contributions to the development of this article.*

Endnotes:

[1]TRADOC Pamphlet 525-3-7, *The U.S. Army Human Dimension Concept*, 21 May 2014, p. 7, <http://www.tradoc.army.mil/tpubs/pams/tp525-3-7.pdf>, accessed on 16 September 2016. A portion of the quoted material (in single quotes) is attributed to the U.S. Army, the U.S. Marine Corps, and the U.S. Special Operations Command, "Strategic Landpower: Winning the Clash of Wills," <http://www.tradoc.army.mil/FrontPageContent/Docs/Strategic%20Landpower%20White%20Paper.pdf>, accessed on 4 October 2016.

[2]CBS New York, "Officials: Most NYC High School Grads Need Remedial Help Before Entering CUNY Community Colleges," 7 March 2013, <http://newyork.cbslocal.com/2013/03/07/officials-most-nyc-high-school-grads-need-remedial-help-before-entering-cuny-community-colleges/>, accessed on 4 October 2016.

[3]Title 50, *War and National Defense*, U.S. Code, Chapter 32, *Chemical and Biological Warfare Program*, Section 1522, *Conduct of Chemical and Biological Defense Program*, 1994.

[4]TRADOC Pamphlet 525-3-7, p. 13.

[5]TRADOC Pamphlet 350-70-13, *System Training Integration*, 27 October 2014.

[6]ADRP 1-03, *The Army Universal Task List*, 2 October 2015.

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7th Italian CBRN Regiment Cremona

By Lieutenant Colonel Cristiano Giudice

The aim of Italy's chemical, biological, radiological, and nuclear (CBRN) protection has changed considerably in the last few years, switching from a passive stance (research of equipment, skills, and systems aimed at managing and restraining CBRN events) to an active stance (aimed at developing new procedures and acquiring tools and equipment useful to preventing a CBRN event before it happens).

The main task for the 7th Italian CBRN Regiment (the only regiment of the Italian armed forces specializing in CBRN threats) is to adherently support the units on the ground dealing with direct and indirect CBRN incidents (such as toxic industrial material [TIM] events) and terrorist threats.

The 7th Italian CBRN Regiment accomplishes its mission by—

- Applying specific technical and tactical assistance to the forces on the ground to enhance protection capabilities in the event that the environment is contaminated by CBRN agents.
- Implementing CBRN surveillance activities in areas where national units operate in order to preserve personnel safety.
- Supporting national civil authorities during CBRN events and terrorist attacks.

Other specific tasks of the 7th Italian CBRN Regiment include—

- Spreading immediate warnings concerning CBRN attacks and low-level radiation events.
- Identifying and locating chemical warfare agents and TIMs.
- Identifying, isolating, and reporting contaminated equipment, tools, and supplies that need decontamination.
- Collecting samples of possible CBRN contamination. (The regiment conducts a first-level analysis for confirmation. If confirmed, samples are sent to higher national or international specialized laboratories in accordance with guidance from sampling and identification of biological, chemical, and radiological agents [SIBCRA] and North Atlantic Treating Organization [NATO] procedures.)

A 7th Italian CBRN Regiment soldier evaluates contamination.

- Cordoning contaminated areas and evacuating any involved personnel.
- Conducting CBRN detection missions to check areas or routes.
- Decontaminating limited infrastructure and surfaces.
- Supporting explosive ordnance disposal/improvised explosive device disposal units when dealing with nonconventional devices.
- Supporting and advising commanders of task forces, brigades, divisions, and corps about—
  - CBRN threats.
  - Emergency procedures for managing victims of CBRN attacks.
- Preparing transportable CBRN collective protection systems that use smoke-proof filter overpressure.
- Preparing deep decontamination stages for personnel, equipment, and vehicles contaminated by a CBRN event.

The 7th Italian CBRN Regiment is a gemstone of the Italian Army. Its unique capabilities and skills make it an irreplaceable pillar for the Italian and NATO defense structure.

Lieutenant Colonel Giudice is the Italian Army liaison officer for the Maneuver Support Center of Excellence, Fort Leonard Wood, Missouri.

Taking the Fight to the Enemy: Why Innovation Leads to Success in a Complex Environment

By Colonel Andrew L. Miltner

The attacks on 11 September 2001 and the decade and a half that followed represent a period of American military history when Army professionals were forced to innovate to defend the homeland and effectively take the fight to the enemy. A crisis served as the catalyst for innovation, but developing and executing untested and unproven plans were the tasks of bold Army leaders. Some of the plans worked, and some did not—but our Army learned how to be successful as a result of these efforts. The next generation of Soldiers will undoubtedly be required to respond to an equally challenging set of complex circumstances. Future Soldiers will need to set aside previous assumptions and boldly risk failure to continue to take the fight to the enemy. By its very design, our Army is averse to innovation, but innovation and adaptation to the changing environment will be as essential in the future as they have been to every generation of American Soldier.

"Future Soldiers will need to set aside previous assumptions and boldly risk failure to continue to take the fight to the enemy."

If we overlay an average 18-month Army training and readiness cycle with an average 24-month unit leadership turnover rate, we see the effect that operational and administrative limitations have on unit level innovation. Additionally, if we assess how the Army measures success within this continuous cycle, we begin to understand how, and potentially why, Army culture has institutionalized a way of thinking that protects and reinforces established systems and guards against disruptive agents. The medical community might refer to these disrupters as "free radicals." Steve N. Zeisler, a renowned innovation author and business advisor, describes this way of thinking as *inside-the-system* thinking in his continuum of innovation. Inside-the-system thinking focuses on strengthening existing systems or capabilities through reductive or renovative actions.[1] Although creative thinking and creative problem solving have roles in this model, the results are more often limited to evolutionary improvements of existing capabilities.[2] On the opposite end of the innovation continuum, Zeisler describes *outside-the-system* thinking as thinking that challenges existing capabilities and systems that form institutional paradigms.[3] For the Army, outside-the-system thinking might challenge such traditional methods as best practices, lessons learned, Army doctrine, the Defense Readiness Review System, and even the Army acquisition process. Blasphemy!

Rolf Smith established an innovation model that he refers to as the 7 Levels of Change.[4] Smith's model proposes that, in order for an organization to operate well in a dynamic and complex environment, the organization cannot simply continue to strive to achieve benchmark standards. Benchmarks reinforce known or projected variables, or what the Army might describe as planning assumptions. Smith explains that change is often associated with doing things differently, even though the outcome is similar. He argues that true change involves doing the "impossible"—things that are often unrelated to current assumptions or established operating parameters.

Former Secretary of Defense Donald H. Rumsfeld was much maligned for referring to *unknown-unknowns* when describing threat variables during a Department of Defense news conference on 12 February 2002.[5] In fact, he was referring to a self-awareness methodology developed in 1955 by psychologists Joseph Luft and Harrington Ingham.[6] The special operations and intelligence communities adopted this methodology decades ago as part of their mission analysis procedures to assess information gaps. Changing the Army culture that dismisses or undervalues outside-the-box thinking as irrelevant or disassociated will be an important first step toward force readiness in the next decade and beyond. This ability to quickly depart from established planning assumptions, or what Luft and Harrington refer to as *known-knowns and known-unknowns*, is essential for identifying innovations that will help us to get inside the enemy decision cycle of observe, orient, decide, and act (or the OODA Loop). Crises commonly act as environmental

catalysts for innovation, but the effectiveness of reactive innovation is often limited. Bold leaders implement innovation before a crisis occurs when planning factors are still unknown-unknowns and when outside-the-box thinking is still outside the box. In this way, leaders instill a culture of trying new ideas from all corners of an organization and accepting failure as an essential aspect of learning.

The average Army leader operates primarily in a noncrisis or normative environment, constrained by various annual, biannual, quarterly, and monthly training, certification, maintenance, and medical readiness requirements. Additionally, Army regulations, doctrine, quantitative assessments, fiscal limitations, and force reductions contribute to a culture of reductive and renovative thinking. The sheer volume of requirements placed on leaders and their units has arguably created a culture where simply achieving the standards represents a huge success.

In Smith's model, the first five levels of change—effectiveness, efficiency, continuous improvement, elimination, and benchmarking—are described as doing the right things, doing things right, doing things better, doing away with things, and doing things others are doing, respectively.[7] The similarities between Smith's model and the structured pathway to success for Army leaders is undeniable. But the Army does not achieve this mindset simply through casual inculcation. Smith's levels closely mirror the criteria by which Army leaders and units are evaluated. In fact, in my experience, Smith's benchmarking level of *doing things others are doing* is the standard with which too many Army leaders measure success.

A study on Army mandatory training, published by the Army War College Strategic Studies Institute, sheds some light on the severity of the Army challenge.[8] The study found that company commanders were required to perform 297 days of mandatory training per year, despite the availability of only 256 training days. Given this reality and the fact that mandatory training requirements are closely tracked, too many Army leaders are simply incapable of moving beyond Smith's first levels of effectiveness without assuming some degree of risk. Ironically, responsible Army leaders faced with limited time and resources often assume risk by deliberately failing to meet Army standards to achieve more immediate mission readiness objectives. Conversely, leaders who choose to adhere strictly to Army requirements may arguably do so at the expense of mission readiness. Deliberate nonadherence to administrative requirements has become the Army standard and an example of Zeisler's inside-the-system thinking. An outside-the-system approach would consider significantly reducing the number of requirements on unit commanders. Groundbreaking!

Risk-taking in the Army is commonly viewed as unnecessary, a sign of poor judgment, or a poor use of resources, which explains why it's so often discouraged and so rarely employed. Neither competition among leaders nor a desire to have a lasting impact have waned over the years, but improving upon existing capabilities is far more common than the implementation of real innovation. Junior leaders who grow up in a culture that focuses only on developing improvements to existing systems are less likely to be able to think innovatively as senior leaders. Thus, inside-the-system thinkers beget inside-the-system thinkers. This is important to realize when assessing the future of the Army.

Bill Zipp describes inside-the-system leaders as stabilizers and outside-the-system leaders as innovators.[9] *Stabilizers* are those who focus on maintaining the status quo—not disrupting current systems or creating unnecessary crises. Stabilizers have a tendency to be system and procedural experts and rarely deviate from those known points of reference. *Innovators* are often no less knowledgeable about systems and processes, but view them as a point of departure rather than as a destination or objective unto themselves. Innovators are always looking for ways to break new ground; they are not necessarily concerned with personal ridicule, and they don't really care if they tip the boat over as long as everyone knows how to swim. Zipp implies that innovators are often not concerned with maintaining a particular organizational structure, whereas stabilizers serve an important role as the guardians of organizational standards, procedures, processes, and systems. These organizational aspects are designed to manage information flow, reinforce hierarchy, improve efficiency, and enforce traditions, which is why stabilizers are often highly valued in military organizations and innovators are often seen as disruptive outsiders.

Army leaders who act as stabilizers are only one impediment to innovation. Far more impactful are the tools by which readiness is measured and leaders are evaluated. In short, innovation is often not immediately identified, measured, or valued because it does not fall in line with known standards. Furthermore, if innovation fails to quickly create a new normal and gain the support of its own stabilizer leaders, it often does not endure beyond the implementation phase. The professional risks associated with failed innovation are very high for an Army professional, which is why innovation is so uncommon in a noncrisis environment. On the other hand, a crisis scenario can change many known factors in a way that requires innovation for survival.

A crisis or other situation that radically changes planning assumptions, normative factors, or paradigms can be a powerful catalyst for innovation and can encourage outside-the-system risk taking, but there's no guarantee of support or success. Innovative leaders often do not limit their search for innovation to their inner circle or the senior leaders of an organization. Zeisler suggests that innovators solicit and encourage innovative ideas from everyone. In doing so, they challenge the norm, teach a new way of thinking from the four corners of their organizations, and empower exponentially more thought on any given topic. This is often essential in a crisis, where unanticipated factors are common and previous assumptions or ways of thinking are not the path to a solution. Zeisler suggests that, after a crisis has passed, there's often a race back to previous norms. He also claims that this will absolutely lead to stagnation, as suggested in Smith's model.[10] The Army faces a challenge in

its current environment: A lack of resources is discouraging innovation; and despite new fights in Iraq and elsewhere, looking back is already becoming a potential way forward.

Richard Farson and Ralph Keyes address an aspect of leadership that is particularly important for fostering an innovative atmosphere within any organization in their *Harvard Business Review* article, "The Failure-Tolerant Leader."[11] As previously mentioned, an aversion to risk taking can be an intended consequence of inside-the-system thinking. What often emerges is a culture in which much time is spent focusing on avoiding bad decisions rather than on striving to make good ones. The difference is subtle, but the former is clearly associated with an air of defensiveness, while the latter displays more confidence and aggression. Defensive positions traditionally involve deliberate activities, often chosen based on known and favorable terrain. In contrast, offensive operations tend to involve more unknown variables, but are more flexible in execution. Defensive operations are often limited to a single course of action, whereas offensive operations tend to be associated with a greater number of choices. According to Farson and Keyes, a failure-tolerant leader is one who allows his or her workforce to make mistakes in search of better solutions or innovations because mistakes are valued as part of the problem-solving process.[12] A leader's acceptance of failure, whether during a crisis or noncrisis situation, is critically important. A tolerance of failure allows problem solvers to test previously unaccepted variables and planning assumptions that so often dominate a crisis environment. Conversely, a climate of blame, accusation, or threat of reprisal can create an aversion to risk and lead to a paralysis of action. Without the ability to learn from failure, organizations faced with a crisis will continue to focus on invalid variables and planning assumptions in the headlong pursuit of unattainable solutions. As with conventional Army units in Afghanistan in the months following 11 September 2001, commanders who fail to accept innovative solutions based on newly attained variables will ultimately lead their units to a standstill.

"A leader's acceptance of failure, whether during a crisis or noncrisis situation, is critically important. A tolerance of failure allows problem solvers to test previously unaccepted variables and planning assumptions that so often dominate a crisis environment."

Conclusion

Rolf Smith's model of Seven Levels of Change provides some insight as to why Army organizations have difficulty innovating. Furthermore, his model provides a sobering indictment of a culture that establishes unattainable standards and defines success as meeting those standards, but discourages innovation that might establish new and attainable standards. Crises and leadership play different but essential roles as change agents for innovation. As catalysts for innovation, crises offer unanticipated variables that invalidate planning assumptions and can significantly reduce the effectiveness of existing plans and capabilities. Leaders provide a means to implement innovation, but only if they are capable of accepting failure as part of the process of finding new solutions. Risk-averse leaders who condemn failure and reinforce system thinking discourage Soldiers at all levels from being part of a solution for fear of being wrong. A crisis can serve as the perfect acid test for an organization that talks about innovation, but fails to build a culture that supports innovators. An organization that fears failure and worries about making mistakes will have difficulty in a crisis, when many of the previously held assumptions are proven invalid. Only an organization that values mistakes as educational and solicits innovative ideas from every level will be flexible enough to find solutions in a crisis, where ambiguity is the norm.

Endnotes:

[1]Steve N. Zeisler, USACW Creative Leadership Lecture, Carlisle, Pennsylvania, 26 May 2016, <www.zeislerassociates.com>, accessed on 14 September 2016.

[2]Ibid.

[3]Ibid.

[4]Rolf Smith, *7 Levels of Change at Work*, Office of Strategic Innovation Incorporated, 1991, <http://www.amcreativityassoc.org/Resources/Documents/7LevelsWork.pdf>, accessed on 15 September 2016.

[5]Donald H. Rumsfeld, Department of Defense News Briefing, 12 February 2002, <http://archive.defense.gov/Transcripts/Transcript.aspx?TranscriptID=2636>, accessed on 15 September 2016.

[6]Joseph Luft and Harrington Ingham, *Johari Window*, 1955, <https://www.mindtools.com/CommSkll/JohariWindow.htm>, accessed on 15 September 2016.

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[8]Leonard Wong, *Stifling Innovation: Developing Tomorrow's Leaders Today*, Strategic Studies Institute, U.S. Army War College, Carlisle, Pennsylvania, 2002.

[9]Bill Zipp, *Five Leadership Styles: Which Style Are You?*, <www.billzipponbuisiness.com>, accessed on 20 September 2016.

[10]Zeisler, 2016.

[11]Richard Farson and Ralph Keyes, "The Failure-Tolerant Leader," *Harvard Business Review*, Cambridge, Maine, August 2002, <https://hbr.org/2002/08/the-failure-tolerant-leader>, accessed on 14 September 2016.

[12]Ibid.

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Protective Partners:

Army Teams, FEMA, and Communities Practice Preparedness

By Ms. Angela L. Hurst

The Chemical Stockpile Emergency Preparedness Program (CSEPP) is a key component of the Blue Grass Chemical Activity (BGCA), Richmond, Kentucky, mission to safely secure, store, and monitor the chemical stockpile to protect the workforce, the public, and the environment. "This program was created in 1985 when the U.S. Congress directed the destruction of the Army's chemical weapons inventory," said Mr. John D. Eggum, CSEPP manager for BGCA. "Since the beginning, the program goal has been to educate communities surrounding chemical stockpile sites on ways to protect themselves and their property in the unlikely event of a chemical agent accident."

The BGCA, part of the U.S. Army Chemical Materials Activity, Aberdeen Proving Ground, Maryland, partners with the Federal Emergency Management Agency (FEMA), the commonwealth of Kentucky, and 10 counties in central Kentucky that are located near the chemical stockpile. These agencies work together to increase public knowledge of protective actions, improve public warning capabilities, train emergency managers, and educate school and hospital personnel. The agencies also hold joint, full-scale exercises to improve response actions.

"The CSEPP exercise is a great opportunity to test our response capabilities," said Lieutenant Colonel Scott D. Gould, BGCA commander. "Every year, this exercise presents a chance for the CSEPP community to pull together to provide an in-depth assessment of our abilities to protect the public."

Chemical Accident–Incident Response Assistance (CAIRA) exercises and CSEPP exercises are conducted on a regular basis. Quarterly CAIRA exercises focus on the installation response to a chemical accident or incident. The annual CSEPP exercise involves the entire CSEPP community, including FEMA, the commonwealth of Kentucky, and the 10 central Kentucky counties.

"Exercises are extremely important to prepare BGCA response teams as well as the local community," Eggum said. "We hold quarterly CAIRA exercises and annual CSEPP exercises to test our response capabilities. Each time we exercise, our response community refines its skills and learns new ways to improve established processes and procedures."

The BGCA community participates in the annual, comprehensive CSEPP exercise each September. Several teams make up the CSEPP exercise community, including exercise planning, simulation cell, exercise responder, and evaluation teams. The teams establish a primary operating location in central Kentucky and gather a few days before the exercise starts to finalize the details and consider any issues that could impact exercise effectiveness.

The process starts with a planning team that considers possible events and the best scenario to involve all aspects of the CSEPP community, including schools, hospitals, emergency response personnel, and emergency management agencies. "Most people do not realize the incredible amount of work that is done behind the scenes to plan, execute, and evaluate the CSEPP exercise," said Mr. Robert Sharp, the CSEPP program liaison with Argonne National Laboratory. "We have very experienced people with a wealth of knowledge who are doing all they can to ensure a realistic, practical exercise is developed so that each CSEPP community can protect their residents if there is a chemical accident on the installation."

To start, the planning team determines the scenario. What type of accident or incident will occur? How many and what types of injuries should be simulated? Should complicating factors with weather or other interference be planned? Should an off-post incident be added to make the situation more complex? How many and what kind of inputs should be planned at various points in the simulation?

"The great thing about this planning process is that it brings all aspects of the CSEPP community together to test various facets of response capabilities, both on and off the Army installation," said Sharp. "We are able to create scenarios that test not only the Army's internal processes, but also the schools' capabilities to shelter in place, the hospitals' ability to respond to casualties with chemical agent injuries, and each county's ability to inform and protect the community."

Once the plan is in place, the simulation cell is recruited. The simulation cell is typically made up of 50 people who play multiple roles, including media personnel, elected officials, community and Family members, environmental

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Leveraging Experimentation to Inform the Requirements Process

By Mr. James M. "Mike" Cress and Mr. William A. Lake

The U.S. Army Maneuver Support Center of Excellence (MSCoE) recently took a novel approach to requirements development that integrated U.S. Army Research, Development, and Engineering Command (RDECOM) Forward Area Science and Technology (FAST) personnel; joint Service laboratory scientists and engineers; program management office personnel; rapid prototyping personnel; experimentation personnel; requirements writers; training developers; and concept personnel to analyze an emerging operational need and craft a requirements document. What made this effort novel was that all parties were involved in the planning, execution, and analysis of activities that are typically not integrated through interagency involvement.

The problem that was addressed by these interagency personnel was the issue of improvised explosive devices (IEDs). This threat has become a significant problem during current contingency operations. Insurgents have been particularly adept at leveraging readily available commercial products for use as components of fabricated explosive devices. The insurgents take advantage of a long regional history of tribal trade alliances and commercial networks that complicate the intelligence collection process by making it difficult to obtain human intelligence. In the contingency area of operations, the homemade explosive-based IED fabrication process often relies on those closed tribal networks.

While the nuances of a closed, tribal-based insurgent process may make it very difficult to collect human intelligence for a specific network, a wider process view can be useful in identifying the activities that are required when fabricating IEDs. Understanding the elements of that process can be useful in addressing current and future threats.

IED use has become prolific, largely because, in effect, it provides the insurgent force with a capability similar to that of precision-guided munitions without a significant investment in force structure. While historically an economy-of-force issue, IEDs have become an enduring challenge with ever increasing levels of technical and operational sophistication. Indeed, the threat has implications that extend farther than the current area of operations.

The IED threat varies from devices designed using a kit to purely homemade devices. In the current theater, IEDs have generated a business; some players even offer a package deal that can include videotaping an IED event to ensure that the event receives maximum media exposure.

A fabricated explosive device is composed of a main charge, an initiating or booster charge, a container (which can also produce fragmentation effects), and an actuating mechanism. There is a process and timeline associated with the collection of the components and assembly of the device. An element of the insurgency typically provides guidance and financial resources. In a traditional insurgency, this element is termed the *underground*. An *auxiliary* is formed and assigned the responsibility of collecting component parts and intelligence. Finally, indigenous or itinerant specialty personnel assemble the device from the collected components in several discrete steps. This entire process exists within a network, and attacking that network is key to addressing the IED threat. The scope of these threats is so widespread that interdiction cannot be focused purely upon the fabricated device.

As this problem began to manifest, it became clear that there was a need to study explosive signatures in general—and specifically, homemade explosives. Starting in 2009, the U.S. Army Edgewood Chemical Biological Center (ECBC), Maryland, led an Army technology objective (Detection of Unknown Bulk Explosives) designed to identify signatures of unknown bulk explosives and determine core detection technologies suitable for the screening, presumptive detection, and identification of explosives and explosive precursors. This was a collaborative effort among several Service laboratories and academic communities, and it addressed many topics, including specific identification technologies, the environmental fate of homemade explosive materials, typical presentations in the field, and test methods for the preparation and presentation of challenges ranging from bulk materials to trace residue on various surfaces.

Massive quantities of ammonia nitrate were being transported on road networks, and it became clear that there was a need to interdict the network as early as possible within

the theater. In conjunction with combatant command and functional expert input, RDECOM FAST scientists reported trends to the community of interest while on tour in-theater. In 2009, ammonia nitrate was declared contraband in one host country, but ammonia nitrate was replaced with other fertilizers. This drove an effort to identify bulk fertilizer to determine if it was ammonium nitrate or another type of fertilizer. Faced with large bags of unknown, off-white powder, Soldiers often destroyed the bags, which negatively impacted the farmers who depended on the fertilizer. While there was a significant number of explosive ordnance disposal (EOD) personnel in-theater, the ammonium nitrate problem was far too extensive to be addressed by the assets available. The in-theater science and technology team issued an early recommendation for a simple screening capability to empower the dismounted patrol as it performed search and control point missions. That recommendation was mirrored by a concurrent in-theater procurement action with the goal of providing a commercial, off-the-shelf (COTS) screening capability to dismounted infantrymen who encountered bulk precursor materials during routine searches. EOD units in-theater were very experienced with COTS colorimetric kits. The ECBC liaison officer to MSCoE obtained various COTS kits, and requirements writers and training developers jointly reviewed them.

A colorimetric working group from the Army technology objective team had considered three different approaches to a colorimetric capability. Those approaches were the subject of the first in-process review of the Army technology objective (Detection of Unknown Bulk Explosives). At the meeting, U.S. Navy research laboratory personnel briefed one COTS approach; the U.S. Army Armaments Research, Development, and Engineering Center personnel briefed another COTS approach; and ECBC personnel briefed a developmental prototype approach that leveraged the design principles of the M256 Chemical Agent Detection Kit, which is commonly used as an unmasking tool. Joint Improvised–Threat Defeat Organization personnel briefed a project characterizing the performance of the various COTS colorimetric kits used in the theater.

Responding to a joint urgent operational needs statement, MSCoE, with the support of ECBC, prepared a concept of operation/concept of employment for the COTS product that was procured to meet the operational need. The concept of operation/concept of employment addressed the capabilities and limitations of the specific COTS solution, provided some specific health and safety recommendations, and recommended a technique for taking a sample and conducting field screening. A user survey was prepared and forwarded to the RDECOM FAST member on tour with the combatant command with the intent to learn about user perceptions of the COTS kit. Using the input from the combatant command, information from the survey was prepared to support the requirements investigation. At this point, there was no agreement that an enduring requirement was needed or if this was a requirement solely limited to the current theater of operations.

During this period, the subject matter experts at MSCoE were attending weekly updates on the counter IED problem. This included worldwide threat briefs. There was significant worldwide activity, but it seemed clear that it was not going to be a localized problem.

The U.S. Army Maneuver Center of Excellence (MCoE) and MSCoE—leveraging the Natick Soldier Center, MCoE, and the U.S. Special Operations Command liaison officers—administered a survey to noncommissioned officers attending professional development courses in the combat engineer, military police, CBRN, and infantry career fields. The goal of the survey was to determine attributes for an enduring solution. The survey participants were all recent combat veterans who had experienced the IED problem in the field, and many had experience with COTS products. The results of the surveys revealed that human factors, the training burden, the weight and size of the colorimetric kits, and the ability to quickly change the kit in response to a change in threat were key considerations.

The design approaches briefed during the Army technology objective (Detection of Unknown Bulk Explosives) in-process review, plus lessons learned from the deployment of various COTS design approaches, were the basis for the design of a series of two battle laboratory experiments intended to promote understanding of an enduring requirement by hands-on manipulation of the ideas for a material approach. In-house chemical engineering and rapid prototyping capabilities were used to fabricate a prototype kit design. The first prototype was based on input from the field, experience with COTS kits, and guidance from MCoE and MSCoE. Military Utility Assessment (MUA) I was a tabletop event conducted in controlled (indoor) conditions, building upon the results of the surveys conducted at Fort Benning, Georgia, and Fort Leonard Wood, Missouri. Actual explosives and explosive precursors were used with the intent of understanding human interface and training requirements. Both COTS and developmental prototypes were employed. Results from that experiment populated a straw man requirements document and provided input for a cost-benefit analysis process.

Input from Soldier operators optimized the design approach. In addition, ECBC chemists quickly designed a training device that would show similar results on a colorimetric kit as homemade explosive material, but was safe enough to store in a supply room and transport by common carrier. MUA II was conducted in the context of two scenarios. One was a search scenario to identify unknown bulk materials and was conducted at a remote notional field laboratory under ambient (cold) temperature conditions. The other was a screening scenario to look for explosive residue (near trace) on exterior vehicle surfaces at an infantry control point.

While not stated, one goal for the experimentation process was to identify, develop, and demonstrate technology applications that informed personnel of the requirements process and enabled effective and affordable capabilities for the Soldier. Another key intent was to drive down the development risk for an enduring solution.

The experiment was unique in that the liaison officers from two Army laboratories and a Navy laboratory were instrumental in the design and execution of the experiment. Scientists, engineers, and laboratory technicians were used as data collectors under the supervision of the MSCoE Maneuver Support Battle Laboratory. An excursion under controlled conditions (MUA I location) was conducted to examine a prototype training capability that was identified as a need during MUA I. The field experiment included participants from the MCoE (infantry) and the MSCoE (engineers, military police, and CBRN personnel). The train-up included a revised training package and concept of operation/concept of employment that was developed to leverage the earlier joint urgent operational needs effort and lessons learned from MUA I.

The results of the surveys, MUA I, and MUA II were used to compile a list of desirable attributes for an enduring solution. Subject matter experts were then surveyed to rank order the Soldier-selected attributes. This data was used to conduct the cost-benefit analysis and to craft the requirements document. The cost-benefit analysis considered four alternative courses of action (COAs). MSCoE looked at several COTS alternatives, including the one that was purchased for the field. The COTS item fielded to support infantry screening was selected as COA 1. COA 2 was a full-scale engineering development of a prototype based upon the principles of the M256A1 Chemical Detection Kit. The M256A1 had a 30-year history, and its operation was a Skill Level 2 common task. The Soldier surveys revealed that low training burden was extremely important to any enduring solution. COA 3 was an electronic solution that used two of the detection components of the dismounted reconnaissance sets, kits, and outfits. This was driven by a Joint Improvised–Threat Defeat Organization recommendation. The dismounted reconnaissance sets, kits, and outfits was undergoing development as a program of record, and much was known about it. COA 4 was a tailored variant of COA 2. Each of the four COAs was then assessed based on the weighted attributes from experimentation, Soldier surveys, market research, and input from project managers. Sensitivity analysis was performed to determine the extent that the COAs were sensitive to training, adaptability (ease of addressing a new threat), burden, ease of use, and cost. This unique collaborative approach facilitated the rapid development of a draft requirements document and cost-benefit analysis while addressing many programmatic issues to reduce risk and offer programmatic options for what is now a program of record.

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Mr. Lake is the chief of the Engineering Support Division, Engineering Directorate, U.S. Army Edgewood Chemical Biological Center. He holds a bachelor's degree in electronic engineering from West Virginia University.

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interest groups, and higher-headquarters personnel. Scripted narratives are injected at specific times throughout the exercises. Simulation cell members record responses and the required follow-up actions that are needed to help the evaluators determine the effectiveness of the response teams.

"Working in the simulation cell was a very eye-opening and rewarding experience for me," said Ms. Susan K. Kinmon, administrative assistant for the BGCA project management office. "I had several roles to fill as a [simulation cell] member. I role-played as higher-headquarters leadership, elected officials, media, and Family members of missing and injured personnel. It was great to be able to help the CSEPP community get a taste of possible real-world responses under the pressure of a crisis situation."

Once the exercise starts, the BGCA emergency operations center is activated. Military and civilian leaders assess the situation and have their subject matter experts recommend community protective actions based on computer modeling of possible chemical agent dispersion. Personnel report to the emergency operations center and begin crisis response procedures for their respective areas (public affairs, accountability, environmental, medical, legal, field chemical operations, security, safety, logistics, and hazard analysis).

The exercise typically includes shelter-in-place actions for the school system; over-pressure system tests for key community buildings (schools, hospitals); ambulance response; decontamination procedures; simulated medical treatment of chemical injuries; media interviews; and a joint press conference with Army, FEMA, and local community leaders.

The teams responding to the exercise scenario are evaluated from the time the simulated accident or incident occurs until the end of the exercise. Nearly 200 trained evaluators report to central Kentucky to assess the skills and abilities of Army and CSEPP community personnel. All evaluators have experience in their respective areas and have been trained in exercise evaluation procedures to ensure a fair and accurate assessment of the responders. Evaluators include personnel from FEMA, Army organizations, and Argonne National Laboratory; contract personnel; and Pueblo Chemical Depot CSEPP community members.

The final step in the CSEPP exercise is to gather all of the documents and comments from the evaluators for a final report. The final report outlines successes and identifies areas that need to be fine-tuned. Senior evaluation team personnel gather with BGCA and CSEPP community leaders to discuss the report and lessons learned. The BGCA and CSEPP communities receive this feedback and use it to reinforce high-performance areas, establish new training, and improve processes as needed.

Ms. Hurst is the public affairs officer for BGCA. She is responsible for communications with stakeholders, elected officials, and the CSEPP community. She holds a master's degree in military operational arts and science from the Air Command and Staff College, Air University, Maxwell Air Force Base, Alabama.

FILLING THE VOID, PART II: THE TACTICAL VOID

By Captain Kenneth M. Coleman

For the Winter 2014 issue of *Army Chemical Review*, I submitted an article entitled "Filling the Void," which addressed the capabilities that chemical, biological, radiological, and nuclear (CBRN) officers needed to contribute to maneuver elements to be considered combat multipliers.[1] Since the completion of that article, I have served as an armored brigade combat team CBRN officer and gained new perspectives on what to bring to the fight. It is vital that we execute specific tasks to enhance CBRN technical proficiency in our formations.

Disciplined Initiative Trumps Initiative

According to ADP 6-0, *Mission Command*, *disciplined initiative* is defined as "action in the absence of orders, when existing orders no longer fit situations, or when unforeseen opportunities or threats arise."[2] The *Merriam-Webster Dictionary* defines the word *initiative* as "the power or opportunity to do something before others do."[3] Our failure to execute disciplined initiative can result in seizing a battle and simultaneously winning the war for opposing forces. However, it has been stated in the past that, for every minute spent planning, 10 minutes of work can be saved.

As CBRN professionals, both of these definitions pertain to our ability to gain an advantage to ensure the protection of our formations. However, one definition requires disciplined action and the other does not. Today's Army faces a rapidly evolving enemy that requires consistent adjustments to counter threats and mitigate risk. Some Soldiers have become comfortable with the Army of old—so much so that they haven't realized that the acronym changed from nuclear, biological, and chemical (NBC) to CBRN.

The CBRN Soldier requires disciplined initiative every day. Every action from CBRN intelligence, surveillance, and reconnaissance collection methods to decontamination must be deliberate. Critical thinking should be so close to the CBRN Soldier's heart that it could be considered an inspectable item on his or her uniform. A Military Occupational Specialty 74 Soldier in a non-CBRN organization is highly likely to be the only CBRN officer in the unit. His or her critical thinking skills will enable the commander's ability to exercise the science of control during decisive-action operations.

Condition Setting is Critical

"Don't move—not until I give the signal!" This phrase has been used to define tactical patience and condition setting time and time again. Staffs support the commander by conducting the operations process, which consists of planning, preparing, executing, and continuously assessing scenarios. According to Army Doctrine Reference Publication (ADRP) 3-37, *Protection*, CBRN Soldiers conduct the operations process to counter CBRN threats and hazards through weapons of mass destruction proliferation prevention, weapons of mass destruction counterforce, CBRN defense, and consequence management activities.[4] Conditions must be set to ensure that countermeasures are in place for every measure that enemy forces could implement.

The battlefield should be approached like a game of chess. Every movement triggers another move. However, we must force the enemy decision-making cycle. With effective integration into the staff, it is easier to identify where assets should be placed on the battlefield.[5] The data required to make effective decisions consists of the—

- Maximum effective range of weapon systems (fires warfighting function).
- Location of toxic industrial material and toxic industrial chemical facilities (intelligence warfighting function).
- Time required to conduct water resupply to decontaminate sites (sustainment warfighting function).
- Amount of water required to decontaminate every type of vehicle in the footprint (sustainment/mission command/movement and maneuver warfighting function).

This information is critical to setting conditions to transition from a passive to an active CBRN defensive posture to divert, neutralize, or destroy CBRN weapons or delivery systems en route to a target. It can also be used to identify the priority of decontamination or alternate routes to decontamination sites when water resupply is unavailable. CBRN officers play an intricate role in setting the conditions that allow friendly freedom of action. Get after it!

Knowledge Saves Lives

I don't want to be the smartest guy in the room because if I'm smartest guy in the room, then we're all in trouble. This phrase isn't meant to demean anyone's intelligence. As

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DECONTAMINATING A STRYKER BRIGADE COMBAT TEAM

By Captain Michael T. Lindsay

Operational decontamination is a brigade combat team organic capability. When executed, it can reduce the effects and spread of contamination across the battlefield and provide temporary relief from an elevated chemical mission-oriented protective posture. It serves as an option for ground commanders to continue the fight while surviving in a chemical, biological, radiological, and nuclear (CBRN) environment. However, decontamination systems are often underutilized and poorly maintained and units often fail to train and certify internal decontamination teams. These become significant problems when units deploy to combat training centers, where they will be expected to operate under CBRN conditions.

> "Decontamination is a key component of the overarching concept of contamination control and supports the postattack restoration of forces and operations to a near-normal capability."
>
> –Field Manual 3-11, *Multi-Service Doctrine for Chemical, Biological, Radiological, and Nuclear Operations*[1]

Soldiers of the 2d Stryker Brigade Combat Team (SBCT), 2d Brigade Support Battalion, 2d Infantry Division, Joint Base Lewis–McChord, Washington, learned how important equipment readiness and CBRN training are following an early-morning simulated chemical strike during the force-on-force period of Rotation 16-03 at the National Training Center, Fort Irwin, California. As 2-chlorobenzalmalononilrile (CS) gas and yellow smoke (used to simulate a chemical strike) filled the bridge support area, Soldiers donned protective masks and items of chemical gear that were within reach. Medics within the support area began treating contaminated casualties.

As the initial chaos of the event seemed to settle, leaders in the company and battalion command posts populated their CBRN 1 reports using the 2-2 SBCT tactical standard operating procedure. Once relayed to the brigade CBRN cell, further analysis, along with hazard plots constructed on mission command systems for dissemination through the CBRN Warning and Reporting System, were prepared for the commander. What seemed to be a moderately well-executed response to a chemical attack in the bridge support area, unfortunately came to a halt when the unit could not locate immediate decontamination supplies or operable M17 or M26 decontamination systems. This complicated operations on the ground and at higher echelons. What should have been an internal unit capability immediately became a problem set for commanders. After an observer controller/trainer-led hot wash, Soldiers and vehicles from the contaminated unit were sent for a decontamination linkup with the 63d Hazard Response Company, Fort Campbell, Kentucky, which was pre-positioned a few kilometers away for decontamination support to the SBCT.

Soldiers set up a decontamination area after a simulated chemical strike on 2-2 SBCT.

When ground units are capable of timely self-decontamination (immediate and operational), they can rapidly return to the fight without the elongated and degradational effects of elevated protective posture. However, when this capability is neglected, either by a lack of training

Soldiers decontaminate other Soldiers after a chemical strike on 2-2 SBCT.

emphasis or the failure to perform disciplined maintenance, it becomes a problem for CBRN staff to resolve for their commander at the time of the incident. As was true for 2-2 SBCT, this can force the early commitment of available decontamination support assets during an operation. Division level assets, such as hazard response companies, may not be available for each brigade combat team commander. If unavailable, contaminated units that are incapable of self-decontamination may need to remain in extended Mission-Oriented Protective Posture Level 4 until CBRN agents dissipate or additional resources arrive.

Future conflicts will likely put ground commanders face to face with an enemy that can and may employ CBRN weapons or use toxic industrial materials to disrupt, degrade, and shape the battlefield. Commanders are presented with these operational scenarios at the National Training Center and the Joint Readiness Training Center, Fort Polk, Louisiana. Operators who are trained and licensed on fully mission-capable decontamination systems will mitigate the effects that CBRN weapons can have across our Army.

Endnote:

[1]Field Manual 3-11, *Multi-Service Doctrine for Chemical, Biological, Radiological, and Nuclear Operations*, 1 July 2011.

Captain Lindsay is the brigade CBRN officer for 2-2 SBCT at Joint Base Lewis–McChord. He is a graduate of the CBRN Captain's Career Course and Technical Escort (L3) Course. He holds a bachelor's degree in biochemistry from Brigham Young University, Provo, Utah, and a master's degree in environmental management from Webster University.

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subject matter experts in their respective fields, it is the responsibility of staff members to bring expertise to the table that would enable the battalion to complete its assigned mission. This leads to my next point: CBRN officers must constantly seek out methods to make themselves disposable as leaders. I suggest this not to make the Branch irrelevant, but to make the Branch so relevant in the formation that CBRN officers become disposable. CBRN officers should impart as much knowledge to the formation as possible to ensure that the unit is never set up for failure.

Bullets aren't associated with a particular duty position; anyone, from the commander to the CBRN officer, can go down. I propose a question: If you were killed in action today and a CBRN strike occurred, would the unit be able to carry on without you or would it be lost?

Conclusion

Disciplined initiative is essential to our success as a Corps. Every action is deliberate, with a clear and concise end state to maximize our ability to enable the protection warfighting function. Condition setting is critical to the success of every unit in the Army. We utilize disciplined initiative to set conditions for future operations. Condition setting allows the creation of triggers for quick reaction to incidents as they occur. However, it does CBRN professionals no good to be the only wealth of CBRN knowledge in the organization. We must consistently strive to build CBRN experts who, in turn, build CBRN experts. But until that's done, we'll just continue "filling the void."

Endnotes:

[1]Kenneth M. Coleman, "Filling the Void," *Army Chemical Review*, Winter 2014, pp. 38–39.

[2]ADRP 6-0, *Mission Command*, 17 May 2012.

[3]*Merriam-Webster Dictionary*, <http://www.merriam-webster.com/dictionary/initiative>, accessed on 4 October 2016.

[4]ADRP 3-37, *Protection*, 31 August 2012.

[5]Coleman.

Reference:

FM 3-11, *Multi-Service Doctrine for Chemical, Biological, Radiological, and Nuclear Operations*, 1 July 2011.

Captain Coleman is the company commander of the 44th Hazard Response Company, 22d Chemical, Biological, Radiological, Nuclear, and Explosives Battalion, Fort Bliss, Texas.

Applying the UN Mission to Syria

By Captain Ross W. Hussmann

The Syrian civil war, in its 6th year, has shown the darker side of modern warfare with shifting alliances and ethos and outside players. The world watches mass death and destruction in a period of history when stability and peaceful conflict resolution are expected to be the norm. The ancient and destructive method of waging total war has only been augmented by modernity and all of its devastating efficiency, including the use of chemical weapons. These devastating attacks have provided the international chemical, biological, radiological, and nuclear (CBRN) and counter weapons of mass destruction communities with real-world chemical case studies of a scope not seen since World War I. These incidents represent an unprecedented opportunity. This article provides a brief review of the 2013 report of the United Nations (UN) mission to investigate allegations of chemical weapons being used in the Syrian Arab Republic and the independent report of the August Ghouta attacks.[1, 2] The intent is to highlight potential discussion points on the developments of CBRN defense made in the 100 years between the trenches of the western front and the Arab Spring.[3] Such discussions include Soldier recognition of a CBRN release, the rise of urban targeting and the 360-degree threat, civilian first responder training, and effective forensic techniques.

Following an international outcry, beginning in early 2013, the Secretary General of the UN established a UN mission to investigate allegations of the use of chemical weapons in the Syrian Arab Republic. The mission members were tasked "to ascertain the facts related to the allegations of the use of chemical weapons and to gather relevant data and to undertake the necessary analyses for this purpose . . .."[4] The head of the mission was Professor Ake Sellstrom from Sweden. Sellstrom was augmented with members of the World Health Organization and the Organization for the Prohibition of Chemical Weapons. Ground investigations began on 19 August 2013. The Syrian Arab Republic government initially authorized 14 days for the team to conduct site assessments, casualty interviews, and sampling.

The initial investigation focused on the credible allegations of attacks in Khan Al Asal, Saraqueb, and Sheik Maqsood. The team was authorized to visit other suspected sites if time allowed. This changed in the wake of the Ghouta attacks on 21 August 2013. According to cease-fire terms, the UN mission was redirected into the Ghouta sites and access was granted for 5 hours a day from 26 to 29 August. The team left Syria on 31 August 2013 and returned in September for five additional days. Team members expanded their site list to include the Martyr Yusuf Al Azmah Military Hospital, Jobar, Bahhariyeh, and Ashrafiah Sahnya.[5] The findings were based almost exclusively on the evidence directly collected by the mission and were published in December 2013. No outside forensic samples were accepted, and all witnesses were independently corroborated by investigating personnel. The report does cite the final reports of other entities, including the Syrian government, but only where they corroborate UN findings. A more in-depth report of the Ghouta attacks was submitted on 13 September 2013. Both reports provided narratives of the incidents and the forensic results. It is important to point out that the task was to identify the use of chemical warfare agents (CWAs); therefore, there is no conjecture about the responsible parties. The investigated attacks were in government-held or contested areas, and all sampling and interviews were done in the presence of Syrian government officials. In view of these investigative constraints, this article adheres to issues involving conventional military and civilian populations. The following text discusses the emerging themes of the investigation.

The narratives of the events do not mention the CBRN detection equipment used by military or civilian forces. Whether this is due to a lack of equipment or training by the Syrian regime is beyond the intent of this article. Our own troops need to understand the importance of effective, upwind, on-site detection and nontechnological solutions. Consistent reports of foul-smelling odors and audible releases indicate that the victims were aware of a change in their immediate operational environment. The delays in response indicate that the average Soldier was unaware of the proper response or even that there was a risk of contamination until after a significant exposure occurred. The incident report for Ashrafiah Sahnaya indicates that there was a 45-minute delay in evacuating casualties.[6] At Bahhariyeh, personal protective equipment was issued 20 minutes after severe symptoms occured.[7] The lack of intensive CBRN defense training and education is rather surprising given the appearance of CWAs on the battlefield before both incidents. Part of the apparent lack of preparedness by the Syrian troops could be due to a belief that they were not operating in an area vulnerable to CWA attacks based on outdated doctrine and training materials.

Surveying the sketches contained in modern doctrinal publications indicates that there are few depictions of troops working on a contaminated military operations in urban terrain (MOUT) site despite increased awareness of the vulnerability of dense populations and urban centers. The gas attacks of World War I, like most of the conventional fighting, were largely away from major urban centers. CBRN Soldiers of today are still taught about large gas clouds moving over fields and forests and how to set up decontamination lines in the forest. We are not unaware of the risk, but CBRN training remains technically focused in its own environment without integration into modern warfare.

Without correlating the Syrian and U.S. training doctrines, we can still see where gaps arise. MOUT is inherently

complex, and commanders may loathe adding another requirement to training scenarios already clouded with tactics, techniques, and procedures; standard operating procedures; and tertiary objectives. Serious thought and emphasis needs to be put into identifying and propagating practical techniques for avoiding contamination in urban environments. Taking advantage of containment techniques and materials that are readily available for decontamination could have helped provide solutions for several of these events. CBRN subject matter experts must ensure that they are also taking a holistic view of threats and hazards. Responding to near and far threats from all directions improves survivability. In order to do this, non-CBRN Soldiers need to be educated in all types of threats and hasty protective measures that arise in MOUT scenarios. The days of large, air-bursting munitions that slowly drift toward friendly lines are gone. Modern threats are small, surgical releases that emphasize tactical advantages and rely on surprise and subterfuge.[8] Although the defense community needs to take a hard look at how CBRN scenarios are incorporated into training, it is not alone. However, several of the attacks on civilian populations indicate that first responders also presented with the same symptoms as the victims. The same patterns of missed indicators and a lack of mitigation efforts were present in these incidents, as well as those found in the military forces.[9] The civilian populace should expect more confusion and disorder than military units; however, these attacks occurred after other documented attacks. There should be discussions among incident response professionals in this country about how to educate the public on indicators of chemical attacks. Furthermore, there is the problem of the first responders not recognizing the risks to themselves. While it may be suspected that Syrian emergency services are less equipped with personal protective equipment, emergency response planners in the United States need to heed this warning and reinventory their organizations. Emergency response planners should ensure that they have applicable training in threat recognition and the appropriate equipment for dedicated hazmat units and first responders.

While military and civilian responders should ponder these discussion points, the reports provide concrete evidence of forensic sampling. UN mission sampling and interview techniques, standard operating procedures, and analysis resources are extremely well documented.[10] While positive environmental samples were obtained, their reliability was difficult to ascertain due to the disruption of sites before the sampling teams could access them. Biomedical sampling of alleged victims provided the most consistent evidence-gathering technique, especially when coupled with eye witnesses. The reports also cite the professionalism and quality of training that technicians had received as key factors in gathering solid evidence. A strict chain of custody was also followed. It is clear that, at the technician level, a large array of skills and situational awareness are necessary to extract the usable data. The highly technical world of CBRN forensics calls for individuals with highly specialized knowledge and a unique set of skills. It is imperative that they use their experience and knowledge to prioritize evidence and link it together. This ability contributed greatly to the success of the UN mission and serves as a great teaching point for the CBRN forensics community.

The tragedies of the Syrian civil war must be considered by the modern defense community as an example by which our CBRN defense techniques can be evaluated. Since the introduction of chemical weapons on the battlefield, we have seen few uses with which to compare our modern suppositions. This scarcity of examples must not be used to fuel complacency. Nearly every military process or system calls for continuous assessment and perhaps none more so than CBRN tactics, techniques, and procedures. In the introduction of the anthology, *War in the Age of Technology: Myriad Faces of Modern Armed Conflict*, the authors observe that "modern technology has made armies, wars, and their effects increasingly complicated and unpredictable . . ."[11] Perhaps the CBRN community can use these historical examples to remove some of the unpredictability.

Endnotes:

[1]"United Nations Mission to Investigate Allegations of the Use of Chemical Weapons in the Syrian Arab Republic," Final Report, 13 December 2013, <http://unoda-web.s3.amazonaws.com/wp-content/uploads/2013/12/report.pdf>, accessed on 12 October 2016.

[2]United Nations General Assembly Security Council, "Report of the United Nations Mission to Investigate Allegations on the Use of Chemical Weapons in the Syrian Arab Republic on the Alleged Use of Chemical Weapons in the Ghouta Area of Damascus on 21 August 2013," 16 September 2013.

[3]There were other uses of dedicated CWA agents during declared combat in the 20th century, notably the German bombing of Warsaw in 1939 and the Japanese use of lewisite in China. These events are not as thoroughly documented by modern scientific standards, nor do they represent as common a tactic as was seen in Syria between 2012 and 2015.

[4]"United Nations Mission to Investigate Allegations of the Use of Chemical Weapons in the Syrian Arab Republic," p. 6.

[5]Ibid, pp. 7–8.

[6]Ibid, p. 71.

[7]Ibid, p. 52.

[8]Several of the attacks involved rocket-borne CWAs that were fired following rocket barrages to disguise the attacks and soften intended targets for maximum exposure of occupants. Improvised explosive devices and air-dropped munitions were also used on specific pieces of key terrain. There were several reports of canisters being flung into an area by catapults during one incident. This demonstrates a small sliver of the delivery means to which a military force is vulnerable in urban terrain.

[9]United Nations General Assembly Security Council.

[10]"United Nations Mission to Investigate Allegations of the Use of Chemical Weapons in the Syrian Arab Republic," pp. 22–27.

[11]Geoffrey Jensen and Andrew Wiest, *War in the Age of Technology: Myriad Faces of Modern Armed Conflict*, New York University Press, New York 2001, p. 14.

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48TH CHEMICAL BRIGADE CAPABILITY AND CAPACITY

By Brigadier General William E. King IV

The global security environment is becoming increasingly more volatile and unstable. The use of chemical weapons by state and nonstate actors is increasing at a pace not seen during the previous 70 years. In fact, in November 2013, a U.S. official told Reuters that the use of chemical weapons in Syria is routine.[1] This expanded use of chemical, biological, radiological, nuclear, and explosives (CBRNE) weapons threatens U.S. and allied interests around the world. The 20th CBRNE Command must adapt training and partnerships to face the challenges of operating in this dynamic environment and combating these threats. A CBRNE environment is a complex environment in which to operate; and as recent history has shown, we no longer conduct operations alone. This necessitates training that brings together agencies and organizations with which the Army will deploy and operate.

Firefighters discuss ways to approach a contaminated area of the subway during their Reconnaissance Sustainment Training with the New York City Fire Department at Pennsylvania Station in New York City. Photograph by Staff Sergeant Angel D. Martinez.

Based on the unique 20th CBRNE Command mission, capabilities, and requirements, the command is actively engaged with the military, state, and local first responders of CBRNE partners in the homeland. The command also remains globally responsive and regionally engaged abroad. These partnerships are critical in developing a layered defense against CBRNE threats. On average, the command operates in five countries around the world at any one time. Unlike other equivalent Army commands that are centrally focused on one or two places, this command, when requested through the combatant commander or state department, will send forces of various sizes anywhere, anytime.

This is why the 20th CBRNE Command is fully committed to working with its partners at all levels of government and across the world to break down stovepipes and develop a unified approach to countering CBRNE threats. Today's CBRNE environment is diffuse and ambiguous, which is why it is critical that the CBRNE enterprise strengthen its interoperability. No single organization can handle an event alone; rather, in this interconnected world, effective prevention and response depends upon a whole-of-government approach and cooperation between CBRNE organizations to identify best practices and improve the relationship between each organization.

Building Capability and Capacity Abroad

In building a unified approach to countering CBRNE threats, the 20th CBRNE Command is focused on building capability and capacity around the globe. Specifically, the 48th Chemical Brigade operates with III Corps in Europe, Africa, and the Middle East. During this past year, the 48th Chemical Brigade worked to strengthen the interoperability with the German Bundeswehr Chemical, Biological, Radiological, and Nuclear (CBRN) Defence Command and other North Atlantic Treaty Organization (NATO) allies through NATO exercises Iron Mask and Precise Response.

During the Iron Mask Exercise—a NATO multinational, 11-day readiness exercise—CBRN teams from Denmark,

A German soldier and a U.S. Soldier discuss the safest way to approach a potential chemical mortar firing point during the Iron Mask Exercise. Photograph by Staff Sergeant Angel D. Martinez.

Germany, the Netherlands, and the United States focused their training on improving CBRN interoperability between NATO allies. The chemical, biological, radiological, nuclear, and explosive response team (CRT) from the 110th CBRN Battalion was directed to accomplish diverse problem sets outside the scope of traditional CRT operations. The CRT conducted an assessment of an active chemical plant to form future hazard predictions; responded to a train derailment with a suspected chemical agent; conducted a combined area reconnaissance with a German reconnaissance team and American explosive ordnance disposal assets for a suspected chemical mortar firing point; and conducted an assessment of a building containing multiple improvised explosive devices (IEDs) for clandestine homemade explosives, radiological dispersal devices, mustard gas, and evidence of ongoing biological research.

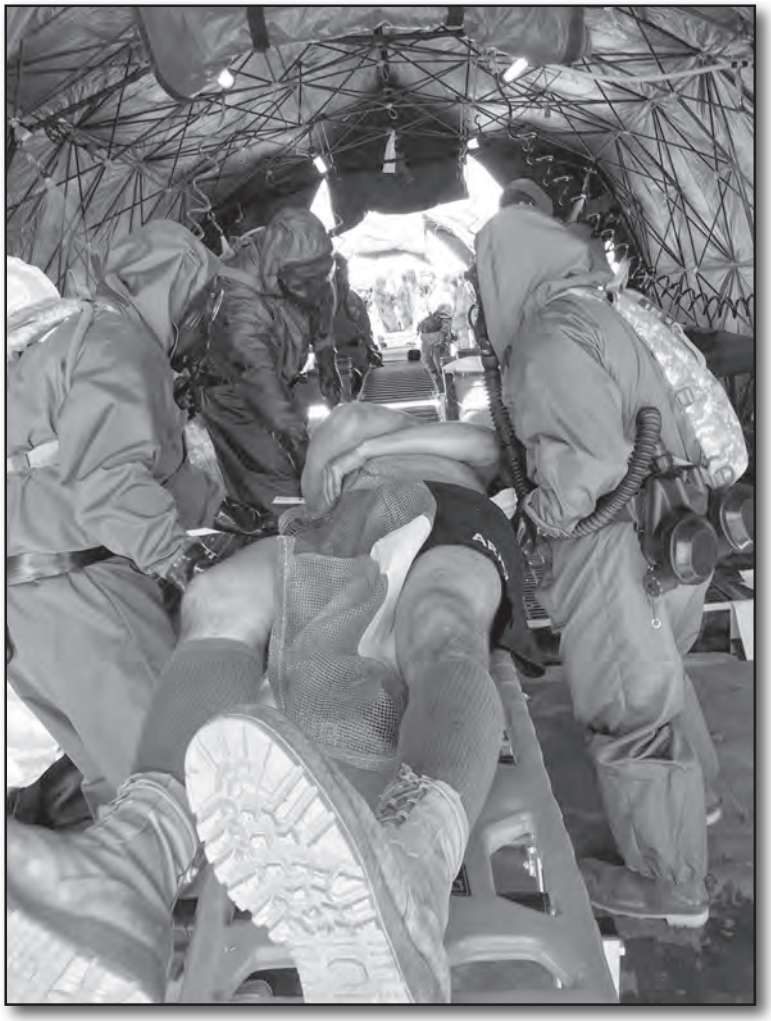
While this training is critical, it doesn't replicate training with live agents. For the Precise Response Exercise, the 110th CBRN Battalion sent a different CRT to Defence Research and Development Canada, Suffield Research Center, which is colocated with Canadian Forces Base Suffield. During this exercise, the CRT operated alongside 350 other CBRN and explosive ordnance disposal teams and trained together as part of the NATO reactionary force. The CRT trained in situations using live agents in a controlled environment. Participants not only had the opportunity to operate in a CBRNE environment, but also to operate in multinational teams, building trust and confidence in each other. The Precise Response Exercise series is critical because it offers NATO members the invaluable CBRN training experience of using live agents at a safe and secure site.

This past summer, the 48th Chemical Brigade participated in the Ulchi Freedom Guardian Exercise. This exercise along with the annual Key Resolve exercise remain critical to building capabilities and capacities. This is why the 48th Chemical Brigade is committed to improving its relationship with the Republic of Korea Chemical, Biological, and Radiological Defense Command. These bilateral training opportunities enhance our collaboration and integration with our Republic of Korea partners in advance of an actual crisis.

Partnership in the Homeland

In the homeland, our CBRN units are also on a very short prepare-to-deploy window in support of homeland defense consequence management. In February, almost 400 Soldiers from the 21st CBRN Company, Fort Bragg, North Carolina; the 59th CBRN Company, Fort Drum, New York; the 172d CBRN Company, Fort Riley, Kansas; and the 181st CBRN Company, Fort Hood, Texas, participated in the Defense Chemical, Biological, Radiological, Nuclear, and Explosives Response Force rotation at the Joint Readiness Training Center (JRTC), Fort Polk, Louisiana, to assume the mission over the summer. During the rotation, they trained with members from the Department of Defense, the Federal Emergency Management Agency, and numerous other agencies.

A German soldier gives a capabilities briefing to U.S. Soldiers during the Iron Mask Exercise. Photograph by Staff Sergeant Angel D. Martinez.



Soldiers from the 48th Chemical Brigade conduct mass decontamination during the the Defense CBRNE Reactionary Force mission at Fort Polk, Louisiana.

The 48th Chemical Brigade also recently activated two hazard response companies—the 10th Hazard Response Company, Fort Carson, Colorado, and the 45th Hazard Response Company, Joint Base Lewis–McChord, Washington. These companies will provide the Army with additional mass decontamination, CBRN reconnaissance, and site characterization capabilities. JRTC training and other Defense CBRNE Response Force-related exercises, such as Vibrant Response and Prominent Hunt, enable more integration across the CBRN enterprise and increase the readiness of first responders.

The 59th CBRN Company recently completed Vigilant Guard 2016. This exercise is an example of how the 20th CBRNE Command is executing the Army Forces Command Total Force Partnership Program. Vigilant Guard allowed the Vermont Army National Guard to leverage the capabilities and capacities of the 59th CBRN Company during this national-level emergency response exercise. The Soldiers of the 59th CBRN Company were among 5,000 exercise participants from the Vermont Army National Guard; state government; and other local, state, and federal agencies. The exercise stressed the responders' abilities under emergency circumstances across 50 locations in Vermont.

The 59th CBRN Company was also the first Army active duty CBRN unit to train with the New York Fire Department Hazardous Material Team. In May, the company and the fire department exercised a combined reconnaissance and sampling mission at Pennsylvania Station in New York City. Hopefully, this was the first of many training opportunities with the New York City Fire Department and first responder communities.

Finally, any discussion about CRTs must include the 20th CBRNE Command nuclear disablement teams (NDTs). NDTs and CRTs are on a short recall window for their National Technical Nuclear Forensics Ground Collection Task Force mission in support of the Federal Bureau of Investigation and Department of Energy. In February, they trained in Philadelphia to exercise the U.S. capability to collect radioactive evidence in the immediate aftermath of a nuclear detonation. The NDT mission set requires sensitive training at sites across the United States, such as the Oak Ridge National Laboratory, the Savannah River site, and the Nevada National Security site. These locations offer the NDTs the opportunity to train with live radiation and to gain an understanding of the challenges and requirements of the nuclear fuel cycle assessment and characterization operations. The sensitive training areas also allow the NDTs to become familiar with nuclear facilities, which have not previously been considered potential targets since sensitive training areas are located deep in the homeland. Possible cyber attacks provide a means for terrorists and lone wolves to gain access to CBRN facilities and use them as potential weapon sites.

Whether engaged in the homeland, working alongside our interagency or multinational partners, or deployed overseas, working with our Korean or NATO allies, our forces are globally responsive and remain regionally engaged on a daily basis.

Endnote:

[1]Anthony Deutsch, "U.S. Official Says Use of Chemical Weapons is 'Routine' in Syria," Reuters, 23 November 2015, <http://uk.reuters.com/article/uk-syria-crisis-chemicalweapons-idUKKBN0TC1E920151123>, accessed on 18 October 2016.

Liberty We Defend!

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Common Mistakes Using the Decision Support Matrix

By Captain Jonathan J. Schropfer

During the fifth step of the military decision-making process, staff members compare courses of action (COAs) in order to recommend a preferred COA.[1] One tool commonly used is a decision support matrix. A common mistake, the improper weighting of criteria, often reduces the value of the results of the decision support matrix by yielding incorrect results. This article addresses the issue by briefly discussing the concept behind decision support matrices and then identifying and correcting common problems in weighting criteria.

The purpose of a decision support matrix is to quantify the advantages of different COA options. COAs are ranked based on various criteria and for each criterion are assigned numerical "places" of 1 through the number of COAs that exist, with 1 being assigned to the most desirable COA for a particular criterion.[2] The criteria are developed by the staff and approved by the commander. The purpose of the decision support matrix is to measure the deviation of each COA from the ideal. Because lower numbers are assigned to the most desirable COA, smaller values within the matrix represent smaller deviations from the ideal. For this reason, smaller values represent better choices.

To reflect the relative importance of one criterion compared to others, weighted values are assigned to the criteria.[3] Assigning larger weighted values to the least-desired criteria keeps the number assigned to the more important criteria smaller; however, the proper weighting of individual criterion is actually counter-intuitive to the general rule that smaller is better. For a nonweighted criterion, the deviation between two COAs is equal to the difference in the values of their criterion rankings. By assigning a weight multiplier to a criterion, we increase the deviation range for that criterion.

The deviation between a COA that has been ranked as a 1 for a particular criterion and a COA that has been ranked as a 2 is equal to 1. The deviation for a weighted criterion is increased by multiples of the weighting value. For a criterion that is assigned a weight of 2, the COA with a rank of 1 would now have a value of 2 (1 x 2) and the COA with a rank of 2 would now have a value of 4 (2 x 2) for a deviation of 2. Weighting a criterion increases the penalty for deviating from the ideal within that criterion.

In Table 1, the most important criterion has been weighted higher. The nonweighted totals for each COA are equal; but when weighted, COA B deviates more from the ideal in the most important criterion and is therefore penalized more heavily. As shown in Table 2, more heavily weighting the least important criterion would cause the recommendation of the less favorable COA in our most important criterion.

Another facet of improperly weighting criteria when using the decision support matrix is over-weighting the criteria. The assignment of an excessively large value to the most important criterion causes the effect of any other criteria to be negated, and no matter how COAs rank in other criteria, the COA ranking most favorably in the highest-weighted criterion will be recommended. Table 3 shows that, even though COA B ranks more favorably in all other criteria, COA A is still recommended because the most important criterion is weighted too heavily.

To avoid this mistake, the highest weighting value used must be at least 1 less than the total of all other weighting values. In the Table 3 example, the highest weighting value is 6, and the total of all other weighting values is also 6. This weighting scheme returns a total value of 18 for both COAs, and the staff will recommend the COA that ranks better in the most important criterion. A weighting value of 5 for the most important criterion would have returned a total of 17 for COA A and 16 for COA B; COA B would be recommended.

Over-weighting is most commonly encountered when COAs are compared by three or fewer criteria. When any of the three criteria are weighted, the maximum valid weighting value is exceeded.

Commanders and staffs cannot rely simply on the results of the decision support matrix to reach a decision; inputs into the matrix are largely subjective evaluations and subject to change.[4] However, if staff officers understand the function of the matrix, it can be a very useful tool to help make informed decisions. A properly utilized matrix can assist staff officers in making recommendations in their commodity areas or in assisting in any decision that must be judged against multiple criteria.[5]

Criterion	COA A	COA B
Most important criterion (weighted times 2)	1(2)	1(2)
Least important criterion	2(2)	1(1)
Total	3(4)	3(5)
Note: The value in parentheses is the weighted total of each criterion.		
Legend:		
COA—course of action		

Table 1. Correct Weighting of Criteria

Criterion	COA A	COA B
Most important criterion	1	2
Least important criterion (weighted times 2)	2(4)	1(2)
Total	3(5)	3(4)
Note: The value in parentheses is the weighted total of each criterion.		
Legend:		
COA—course of action		

Table 2. Weighting of Criteria Reversed

Criterion	COA A	COA B
Most important criterion (weighted times 6)	1(6)	2(12)
More important criterion (weighted times 3)	2(6)	1(3)
Less important criterion (weighted times 2)	2(4)	1(2)
Least important criterion	2	1
Total	7(18)	5(18)
Note: The value in parentheses is the weighted total of each criterion.		
Legend:		
COA—course of action		

Table 3. Most Important Criteria Over Weighted

Endnotes:

[1]Field Manual 6-0, *Commander and Staff Organization and Operations*, 5 May 2014, pp. 9-40–9-41.

[2]Ibid.

[3]Ibid.

[4]Ibid, p. 9-41.

[5]Ibid.

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Bilateral Leader Interoperability Planning

By Captain Philip J. Cline

On 23 July 2016, personnel from the 48th Chemical Brigade, Fort Hood, Texas, and the U.S. Army Nuclear and Countering Weapons of Mass Destruction Agency conducted a mission development and mission planning conference with the German Bundeswehr Chemical, Biological, Radiological, and Nuclear (CBRN) Defence Command staff. The goal of the conference was to discuss practical ways to create a combined staff at battalion and brigade levels to address the complex nature of countering weapons of mass destruction operations during the Dragon Fire Exercise that is scheduled for March 2017.

The exercise is designed to be a joint exercise with the 48th Chemical Brigade; German Bundeswehr CBRN Defence Command staff; and a variety of national, international, and interagency elements. Participants will conduct missions related to five objectives during the Dragon Fire Exercise. Each mission is designed to challenge the different unit elements by stressing the need to integrate the staffs into a cohesive organization that understands the mission as well as the various unit standard operating procedures and tactics, techniques, and procedures—whether tactical or technical in nature. This requires U.S. and German commanders to build and implement task organization, tactical movement plans to and from objectives, actions on target, logistics, and the integration of combined staffs.

To achieve this shared knowledge and cooperation, a template was designed to use a joint division level task organization and to determine the required capabilities at battalion and brigade levels. The immediate challenge was to build a staff that ensured situational awareness, visibility, and understanding of the common operating picture and to maintain mission command through a 24-hour staff rotation during operations. As courses of actions were produced, daily briefings were held in the presence of battalion and brigade staff working groups and with the staffs of participating nations.

At the conclusion of this conference, the template could be used for future multinational operations regardless of the size of the elements participating. This would enable all nation staffs to interoperate during the planning and execution phases of operations. The template will be validated during the Dragon Fire Exercise.

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Microbial Forensics and Biological Terrorism

By Staff Sergeant James M. Benecke

Introduction

Most Americans and European adults are familiar with the anthrax letters that were sent through the U.S. Postal System shortly after the attacks of 11 September 2001. The investigation into those letters was code-named *Amerithrax*. More than 25 full-time investigators from multiple agencies logged hundreds of thousands of hours during Amerithrax. The investigation resulted in the suicide of a person of interest who worked for the U.S. Army and was about to be charged in connection with the incidents.[1] It also led to the development of new techniques that allowed the scientists to determine the strain of anthrax and to pinpoint the exact laboratory from which the anthrax had been cultivated.[2] This arguably represented the birth of microbial forensics and is most definitely the commencement of its use as a tool in biological terrorism investigations.

Microbial Forensics

Humans die with more than 45 times as many genes as they had when they were born. This is due to the accumulation of microscopic organisms over the normal course of human development and life. Most of these microscopic organisms are transmissible, and the makeup of this portion of additional life varies to a degree from person to person.[3] Given that this microbial community varies from one individual to another, we can assume that the microbial community is able to, or will at some point be able to, be individualized. Additionally, given that most of this microbial community is transmissible, we can assume, based on Locard's exchange principle, that some of this entity will be transferred whenever contact is made with another surface.

Think about your family tree: Your cousins, many times removed, who live in Europe and whom you have never met, can be definitively identified as your genetic relatives even though your genetic connection dates back dozens of generations. This same principle can be applied to the microorganisms that are living as a part of you. When a person touches a surface, a portion of that microbial community is transferred to that surface. The microbial sample continues to grow and change because being biological, by definition, means being alive. The "microbial aura" that surrounds each individual is always growing and changing; however, following the same principles that connect you to your European cousins, the transferred microbial sample can be connected to the microbial sample currently living in the individual who transferred it—and it can be matched through genetics as a microbial fingerprint. To illustrate the uniqueness of the microbial aura, one research paper, "Microbial Forensics: The Biggest Thing Since DNA?" notes that "the palm surface of any two individuals share only 13 [percent] of the same bacterial phylotypes."[4]

During the Amerithrax investigation, it became clear that simply knowing which biological substance was used was not going to be enough to discover the source of the material or the perpetrators of the attacks. Therefore, forensic analysis was applied in such a way that the needed information could be gleaned. The BioSciences Division, Research and Technology Directorate, Edgewood Chemical Biological Center, Edgewood, Maryland, determined that "In the emerging subfield of microbial forensics, these principles [acquisition, analysis, and interpretation of evidence] are now being applied to the analysis of microbial materials, including potential and actual biocrime agents."[5] The identification of the biological agent required a deeper examination into the exact strain that was used; more specificity was required. As stated by the codirector, Center for the Deterrence of Biowarfare and Bioterrorism, microbial forensics provides "much greater detail to determine the precise strain and substrain."[6] Using a greater level of detail, the source of the anthrax was eventually traced to a vat at the U.S. Army Medical Research Institute for Infectious Diseases laboratory and a person of interest was identified.[7] This biological terrorism event is probably the most well-known to Americans today, but was far from the first or only biological terrorism event.

Biological Terrorism

The Centers for Disease Control defines a bioterrorism attack as "the deliberate release of viruses, bacteria, or other germs (agents) used to cause illness or death in people, animals, or plants."[8] However, different agencies use different definitions and for the purpose of this article, that definition is augmented by specifying that the goal of the deliberate release is to push an agenda by instilling fear or terror into the population. Biological "weaponry" has been in use (though not widely accepted) in one form or another since the 14th century.

Aum Shinrikyo, a terrorist organization most commonly known for its sarin nerve agent attack in Japan, had an anthrax program and was very interested in more thoroughly pursuing biological weapons.[9] Terrorist organizations around the world would like to develop a biological weapon capability. Biological attacks can go undetected until symptoms start to manifest in multiple individuals, likely causing panic and fear throughout the population and affecting everything from the amount of time the average person spends outside their home to national commerce.

In responding to a biological terrorism event, the level of preparedness depends on where the event occurs and how far it spreads. Different regions and different countries have different capabilities, funding, resources, and interest in preparing for a biological terrorism event. A 2015 study that took place in Colorado, published by Homeland Security and Emergency Management, cited many difficulties that local assets may face in a biological terrorism event; two of these difficulties seemed to be due to lack of familiarity. The study

stated that local and government officials and incident responders did not know much about hazards or mitigation capabilities of biological terrorism and that lack of knowledge led to a diminished ability to make appropriate choices in a biological terrorism attack situation.[10] The results of this study can be seen throughout the world.

A great deal of money is spent on nuclear weapons and defense; and chemical defense receives a great deal of attention, given the widespread use of chemical weapons during World War II, events such as the sarin attacks on the Tokyo subway, and industrial accidents that occur more frequently than anyone would like. However, according to a paper published by the Military Institute of Preventive Medicine in Belgrade, Serbia, "Biological weapons are nearly as easy to develop, far more lethal, and easier to deliver than chemical weapons; and unlike nuclear weapons, they are inexpensive to produce and the risk of detection is low. Progress in molecular biology has made fast and easy biotoxin production possible."[11] Unfortunately, the information is too easily available through the Internet; all that is needed is a little source material cultivation. Many developed nations initiated biological weapons programs in the late 1920s and continued until the creation of the Biological and Toxin Weapons Convention in 1972. Some even continued beyond that.[12] This means that many developed nations had the source material needed to create biological weapons. Although those programs should have been dismantled and the source material safety destroyed or transferred to less nefarious programs, they may not have. With the know-how and the availability of the material, it is only a matter of time before another biological terrorism event occurs.

Microbial Forensics in Bioterrorism Investigations

When another biological terrorism event occurs, microbial forensics will play a much more important role than it has in the past. With the lessons from the Amerithrax investigation, we now know how important microbial forensics will be in identifying the source of material and a suspect. Simply identifying the type of biological material will do little to narrow the suspected source of the material. The identification of a particular strain or substrain will be vital in discovering the origins of the biological material. The goal of the investigation will be to identify the biological material at a level of scrutiny that will allow for this type of characterization. Earlier identification of the source material narrows the scope of the investigation sooner, which will hopefully result in the earlier identification of a perpetrator or perpetrators. This chain of events can counter the proliferation of the know-how and material required to carry out a successful biological terrorism attack.

Conclusion

This article discusses microbial forensics as a tool for use in the investigation of biological terrorism. There may be a plethora of uses for microbial forensics in the future; but for now, it fills a niche in biological attack incidents that no other technique is capable of filling.

Endnotes:

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[8]Centers for Disease Control and Prevention, "Emergency Preparedness and Response: Bioterrorism Overview," <https://emergency.cdc.gov/bioterrorism/overview.asp>, accessed on 20 September 2016.

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[11]B. Jakovljevic and V. Radosavljevic, "Bioterrorism—Types of Epidemics, New Epidemiological Paradigm and Levels of Prevention," *Journal of the Royal Institute of Public Health*, Military Institute of Preventive Medicine, Belgrade, Serbia, 2005, pp. 549–557.

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Reference:

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Staff Sergeant Benecke is the noncommissioned officer in charge of the CBRN Preparedness Support Europe, Defense Threat Reduction Agency. He is currently working in Europe to build partner nation capacity in preparedness and response to CBRN and weapons of mass destruction events.

CBRN Warrant Officer Roles and Responsibilities: Lessons Learned From the 23d CBRNE Battalion

By Chief Warrant Officer Two Oliver A. Pottinger and Lieutenant Colonel Adam W. Hilburgh

Warrant officers are the technical foundation of the U.S. Army. Their roles and responsibilities revolve around their ability to serve as subject matter experts in their respective fields or disciplines. The creation of the chemical, biological, radiological, and nuclear (CBRN) warrant officer in the Chemical Corps institutionalized this needed capability, and the recent Force Design Update (FDU) ensured that these experts will now reside in the chemical, biological, radiological, nuclear, and explosives response team (CRT); company; and battalion echelons of our Corps. The purpose of this article is to share lessons learned on the roles and responsibilities of CBRN warrant officers that resulted from the FDU implementation in the 23d Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) Battalion, Republic of Korea.

23d CBRNE Soldiers review a chemical process during Mobile Training Team Advanced Chemistry and Biology Training.

The FDU allowed CBRN warrant officers to have a more prominent role in the critical areas of combat readiness. The appropriate employment of warrant officers in these critical areas is vital for their growth and for unit readiness. CBRN warrant officers are technical experts; but with the number of requirements potentially assigned, their responsibilities must be narrowed. In the 23d CBRNE Battalion, the CBRN warrant officers held responsibility in several technical areas: nuclear, biological, and chemical reconnaissance vehicle (NBCRV) suite maintenance and gunnery; dismounted reconnaissance sets, kits, and outfits (DRSKO) maintenance; the toxic physical program; the unit consumables program; and CBRN tasks master trainer. Each of these responsibilities in itself is daunting, but warrant officers must complete them within the commander's intent, within the chain of command. Battalion CBRN warrant officers also have seven to 10 fellow CBRN warrant officers who assist them in the battalions. A warrant officer's role as a mentor and role model for enlisted Soldiers and junior officers is as important as his or her technical responsibility.

In order for CBRN warrant officers to accomplish these defined responsibilities and perform their natural role as mentors, administrative burdens must be reduced. The battalion learned that companies require an executive officer to perform the day-to-day operations of the company—even at the cost of a vacant platoon leader position. CBRN warrant officers should not be raters or senior raters of subordinate Soldiers within the unit; executive officers and operations sergeants should retain this important role within the company operations section. CBRN warrant officers and their units will benefit greatly in terms of readiness and morale by defining roles and responsibilities and refraining from unnecessary encumbrances.

Battalion CBRN Warrant Officer

The battalion CBRN warrant officer is the senior CBRN warrant officer in the battalion, and he or she has broader roles and responsibilities than those at the team and company levels. He or she should transition from a technical expert who directly spends time with unit Soldiers on the equipment to an operational expert who develops systems

Soldiers prepare a sample to be tested during a mission.

Soldiers decontaminate a helicopter while on a mission.

and plans to benefit the battalion as a whole. This requires working directly for the battalion operations officer by synchronizing training and operations, assisting the battalion executive officer with CBRN sustainment and maintenance systems, and advising the battalion commander on force employment. Additionally, the battalion CBRN warrant officer assists with the integration and training of company CBRN warrant officers. The battalion CBRN warrant officer is also directly responsible for planning, resourcing, and facilitating battalion gunnery operations in a CBRNE battalion. The role further entails coordinating technical support force training for the battalion, facilitating the maintenance and requisition of CBRNE technical equipment, and serving as an observer controller/trainer for execution evaluations and certification exercises.

Unlike maneuver units, CBRN battalions are required to establish a basic gunnery program, which includes gunnery skill tests on the weapon systems and sensor suite. The warrant officer's ability to understand weapon systems and sensors is pivotal in establishing a comprehensive gunnery program. The gunnery program should include a minimum of two components: qualification on Table VI (Basic Gunnery) and advanced gunnery.[1] Approximately 20 individual tasks are listed on the Army Training Network under Combined Arms Training Strategies. These tasks represent a baseline for the development of gunnery skill tests for NBCRV platforms. Advanced gunnery tasks should include, but not be limited to, shoot, move, and communicate while executing core competencies.

Technical support force training for the battalion requires the battalion CBRN warrant officer to be knowledgeable on all technical skill sets and functions within the unit. This knowledge is needed in the anticipation of technical training requirements within the organization. Mobile training teams are instrumental in providing training and bridging the institutional training gaps that exist within the formation. Training subjects include advanced chemistry and biology, hazmat technician, and Advanced Radiography I and II. The battalion CBRN warrant officer needs to observe training and provide recommendations to the battalion commander on improving technical skill sets of Soldiers across the formation. The battalion CBRN warrant officer also facilitates the maintenance and requisition of CBRNE technical equipment, including the establishment of a consumable program for DRSKO, NBCRVs, and decontamination systems. The battalion warrant officer manages the consumable program at the company and battalion levels. The consumable manager tracks shortages and enforces ordering to ensure that there are enough consumables to conduct contingency operations. The ability to work in an atmosphere that is immediately dangerous to life or health requires close monitoring of the DRSKO compressor air quality. The battalion CBRN warrant officer tracks battalion DRSKO compressor maintenance and air samples to ensure compliance with the Defense Air Testing Program.

Company CBRN Warrant Officer

The company CBRN warrant officer serves as the master trainer and technical advisor to the company commander. He or she provides oversight on technical equipment maintenance and serves as the authority for the battalion CBRN warrant officer in the execution of functional tasks. As master trainers, CBRN warrant officers are heavily involved in the planning, preparation, and execution of unit training. They are responsible for developing sensitive-site targets and serving as the site lead by synchronizing the decisive training effort between maneuver and maneuver support

forces during the execution of countering weapons of mass destruction operations. Additionally, they serve as observer controller/trainers during certification of organic elements, which include mounted reconnaissance platoons, hazards assessment platoons, and CRTs. They are critical to the execution of gunnery Tables I, II, and III.[2] Their responsibilities extend to tracking gunnery skill tests for weapon systems and sensors suite systems.

The need for DRSKO maintenance and consumables tracking requires the warrant officer to have oversight on technical equipment maintenance. Maintenance oversight and consumable management allow the warrant officer to communicate the operational impact of inoperable equipment to the commander and provide feedback on readiness in relation to training on consumable and contingency stock. Additionally, he or she is responsible for tracking the compressor maintenance. The compressor is critical to the hazard assessment platoon or CRT conducting operations within an unknown toxic industrial chemical/toxic industrial material environment. The criticality is predicated on the fact that each DRSKO comes with one compressor and air samples are required every 90 days to achieve compliance with the Defense Air Testing Program. Therefore, warrant officers either train personnel within the units or conduct the sampling themselves before sending it to a contractor for testing. The toxic physical program is another key area for which the company CBRN warrant officer provides oversight. The toxic physical program requires several steps that involve prior coordination to ensure that Service members are in compliance.

Another critical area for the CBRN warrant officer is serving as the radiation safety officer, specifically for CRTs. The radiation safety officer provides oversight of radiation sources that are used to conduct specialized training. These sources require special storage and licensing by organic units to prevent fines to the unit. The CBRN warrant officer's oversight ensures that sublicensing is extended to units such as the 23d CBRNE Battalion, which is located in a remote area.

Assistant Team Leader

The CBRN warrant officer who serves as an assistant team leader is critical to increasing CRT readiness. The FDU changed the call for first lieutenants to serve as team leaders and assistant team leaders; warrant officers now serve as assistant team leaders. This change places the technical experts at the point of impact within the CRTs. The warrant officer is responsible for the coordination of CRT sustainability, simultaneously conducting parallel planning with the team leader on the execution of sensitive-site exploitation. The execution of the mission requires that warrant officers work alongside the team leader and provide technical expertise at the command post. This empowers the team leader to concentrate on commanding and controlling the mission while the CBRN warrant officer develops the complete operating picture, which enables the team leader to make decisions. Additionally, the team CBRN warrant officer manages team consumables, serves as the master trainer on new-equipment fielding, and exercises responsibility for the readiness and accountability of team equipment.

The 23d CBRNE Battalion conducts consolidated military all-terrain vehicle and Stryker gunnery at Rodriguez Live-Fire Range, South Korea.

Closing

The FDU has changed the way CBRN units plan, instruct and, ultimately, fight. The CBRN warrant officer serves as an enabler for the commander at company and battalion levels by providing technical and tactical expertise on CBRN operations. Based on the lessons learned by the 23d CBRNE Battalion, the presence of a warrant officer whose sole purpose in the formation is to manage and remedy the unique challenges that exist is invaluable. CBRN warrant officers serve as technical experts, and they alternate between that and serving as experts in the operational employment of CBRN forces. They are members of the command team. In the 23d CBRNE Battalion, CBRN warrant officers have been commended for their expertise and professionalism as well as the critical role they played in mission success by every level of command through the Eighth U.S. Army Commander.

Endnote:

[1]Field Manual 3-20.21, *Heavy Brigade Combat Team (HBCT) Gunnery*, 3 September 2009.

[2]Ibid.

Chief Warrant Officer Two Pottinger is an assistant team leader, 68th CBRNE Company, Fort Hood, Texas. He is the former battalion CBRN warrant officer for the 23d CBRNE Battalion, Camp Stanley, South Korea. He holds a bachelor of science degree in criminal justice–homeland security from Liberty University, Lynchburg, Virginia.

Lieutenant Colonel Hilburgh is the former commander of the 23d CBRNE Battalion and is currently a U.S. Army War College student. He is a Ph.D. candidate from the University of Kansas and holds master's degrees from the School of Advanced Military Studies, the Naval War College, and Webster University.

2016 Honorees of the U.S. Army Chemical Corps

Compiled by Ms. Christy Lindberg

Hall of Fame Inductees

The U.S. Army Chemical Corps Hall of Fame award is the highest form of recognition offered by the Regiment. This coveted award honors those who have made landmark contributions to the overall history and traditions of the Chemical Corps. These individuals have distinguished themselves through advances in science and technology, a lifetime of service and devotion to the Corps, or gallantry in battle. Two individuals were inducted to the Hall of Fame on 23 June 2016.

Colonel Harold C. Kinne Jr. (Retired)

Harold C. Kinne Jr. was born in Pawtucket, Rhode Island, on 28 December 1924. He enlisted in the Army, attended Officer Candidate School, and received a commission as a second lieutenant in the tank destroyer branch, later converting to infantry. He served in combat in Europe as an infantry platoon leader in the 359th Infantry Regiment, 90th Infantry Division, during the Ardennes: Battle of the Bulge campaign. He was awarded the Combat Infantryman Badge, Bronze Star, Army Commendation Medal, and European Theater service ribbon with three battle stars. He served the Army of Occupation in Germany and returned to civilian life in 1946.

In 1949, Kinne graduated from Brown University, Providence, Rhode Island, with a bachelor of science degree in chemistry. In June 1949, he returned to active duty as a first lieutenant in the Chemical Corps.

First Lieutenant Kinne attended the Chemical Corps Basic Course and Radiation Defense Course. His expertise, special technical knowledge, and abilities were recognized early; and he was one of a select group of young officers chosen for assignment to the Armed Forces Special Weapons Project to replace the civilian scientists of the Manhattan Project who had developed the atomic bomb. His outstanding talents led to his assignment as a briefing officer of very important persons (VIPs) and troops participating in atomic tests at Camp Desert Rock, Nevada. He was the voice of the atomic age; he introduced VIPs and thousands of troops to the effects of nuclear weapons and served as master of ceremonies for nuclear tests. He traveled to Korea and Europe as part of the first overseas nuclear weapons briefing team, receiving many written commendations from senior officers of the United States, foreign forces, and foreign governments for his effective presentations. He also gave presentations to the assistant director and staff, Office of National Estimates of the Central Intelligence Agency.

In 1957, Kinne received a master of science degree in physics from the Naval Postgraduate School, Monterey, California. He then went on to the U.S. Army Chemical Research and Development Command, Aberdeen Proving Ground, Maryland, as a nuclear effects engineer. As a captain, he was recognized for his maturity and high degree of diplomacy and tact as well as exceptional scientific and technical competence in representing the U.S. government in preparing agreements for sharing key scientific and technical data. These qualities were instrumental in improving relations between the United States and foreign governments.

Captain Kinne was then assigned to the Combined Arms School of the 7th Army Training Center, Germany. He prepared and presented briefings to high-level U.S. industry personnel who were visiting Germany and to representatives of the Federal Republic of Germany who provided information for use in the Mutual Weapons Development Program, and he was a host escort for senior German officials who visited the United States. He also prepared a course of instruction and organized and trained troops in the use of the Davy Crockett Weapons System.

Kinne served as the chemical officer of the 1st Armored Division at Fort Hood, Texas, where he developed and implemented a training program that increased the potential and possibilities for chemical, biological, and radiological operations in the division.

In 1963, Kinne attended the Air Command and Staff College, Montgomery, Alabama, where he was a distinguished graduate and received a master of business administration degree from George Washington University, Washington, D.C. After attending the U.S. Army War College, Carlisle, Pennsylvania, Colonel Kinne served on the general staff of the U.S. Army Pacific as an action officer and later as chief of the Special Plans Branch, Plans Division. He was a key planner for political and military affairs throughout the U.S. Army Pacific Command, including a survey of the Trust Territories of the Pacific Islands, which was important in determining the political future of the trust territories.

From December 1969 to December 1970, Kinne served as chief of the Chemical Operations Division, Headquarters, Military Assistance Command, Vietnam, where he supervised herbicide spray operations for defoliation missions throughout the area of operations. He visited ground commands; flew frequent reconnaissance missions; and flew numerous spray missions as a technical advisor, during which he was often exposed to intense enemy ground fire. Following this, Colonel Kinne was assigned to the Office of the Joint Chiefs of Staff Nuclear, Chemical, and Biological Branch, where he was instrumental in developing strategic plans for U.S. armed forces.

From February 1971 to January 1975, Colonel Kinne served in the Office of the Secretary of Defense Advanced Research Projects Agency. He established and directed the Research and Development Field Office of the Defense Advanced Research Projects Agency, Tehran, Iran, which was critical to detecting and monitoring underground nuclear tests. He was recognized for his diplomacy, technical expertise, and leadership ability as he established solid contacts with the science attaché of the U.S. Embassy, officials of the Iranian scientific community, educators and professional personnel at Iranian technical institutes and universities, members of the U.S. industrial community, and various in-country corporations that were concerned with technical training.

Kinne's awards include the Legion of Merit with one oak-leaf cluster, Bronze Star Medal, Meritorious Service Medal, Air Medal with three oak-leaf clusters, Joint Services Commendation Medal, Army Commendation Medal with four oak-leaf clusters, and Air Force Commendation Medal.

Colonel Kinne (Retired) passed away earlier this year at the age of 91.

Lieutenant Colonel William Jennings Cribb Jr. (Retired)

William Jennings Cribb Jr. enlisted in the U.S. Army on 10 December 1942 at Fort McPherson, Georgia, having left the Alabama Polytechnic Institute (now Auburn University) in his third year of studies in chemical engineering. Following basic training, he was assigned to the Chemical Warfare Service (CWS). In August 1944, while serving as a corporal in the 2d Training Regiment, he was accepted for officer's training. Upon graduation from Officer Candidate School on 9 December 1944, he was commissioned as a second lieutenant, Army United States (the name given to the large, wartime, draftee-based Army), and reported for duty as a platoon leader with the 5th Chemical Mortar Company (the CWS School research, development, and demonstration company) at Edgewood Arsenal, Maryland. With the war ending, he was sent to the Far East Command, where as a replacement officer, he served as a platoon leader in the 109th Chemical Processing Company. As part of the occupation forces in Japan, Second Lieutenant Cribb later served as a platoon leader, executive officer, and company commander in the 82d Chemical Mortar Battalion.

With the end of World War II, the Army drew back to its normal strength, forcing a reduction in personnel, especially junior officers. Those who applied for retention in the Regular Army could only do so by accepting noncommissioned officer positions, at least until a suitable commissioned officer slot opened. On 16 November 1949, Cribb accepted a commission as a second lieutenant, Regular Army, Chemical Corps, with an effective date of 25 July 1948.

Between July 1948 and March 1950, Second Lieutenant Cribb served in various positions at the Army Chemical Center, Edgewood, Maryland. Those positions included U.S. Army Chemical School instructor in materiel and maintenance; property officer; administrative assistant; platoon leader in the 2d Chemical Mortar Battalion; and assistant operations staff officer for the Headquarters, Army Chemical Center.

In 1950, it was mandatory for new Chemical Corps officers to serve 1 year in a combat arms branch. First Lieutenant Cribb selected the Infantry Branch, and in March 1950, he was serving as assistant battalion operations staff officer, Headquarters,

3d Battalion, 29th Infantry Regiment, on occupation duty on Okinawa, Japan. When the North Korean Army invaded South Korea on 25 June 1950 and initiated the Korean War, the 29th Infantry was rushed to the scene of the fighting and thrown into a haphazard defense force, which desperately tried to halt the communist advance.

In an effort to bring the companies up to table of organization and equipment strength, on 17 July 1950, First Lieutenant Cribb was assigned as the executive officer of Company M, 3d Battalion, 29th Infantry. Within the week, the company commander was transferred to another company, and First Lieutenant Cribb took command of the company.

On 27 July 1950, near Hadong, Korea, in what would be called the *Hadong Ambush*, a numerically superior North Korean communist force attacked from high ground with heavy fire power, which destroyed the supporting weapons of Company M, and threatened to cut off the 3d Battalion. Quickly organizing a platoon of riflemen, First Lieutenant Cribb led the Soldiers to a vantage point from which they could effectively fire on the hostile forces, divert fire, and cover the withdrawal of the harassed company. Inspiring his men by his personal example of courage and determination, First Lieutenant Cribb maintained the position so that approximately 300 men could extricate themselves from the hazardous position.

The battalion had entered the fight with 757 Soldiers; records show that 307 men were killed in action and 132 men were wounded, indicating that First Lieutenant Cribb's quick actions were instrumental in preventing further causalities. On 19 September 1950, First Lieutenant Cribb was awarded the Silver Star Medal. Because of the extreme casualties, 3d Battalion was recognized as combat-ineffective and was dissolved and M Company was attached to the 27th Infantry Regiment, 25th Infantry Division.

On 17 August, less than a month later, First Lieutenant Cribb again distinguished himself by gallantry in action against an armed enemy near Tabu Dong, north of Taegu, known to the men who fought there as the "Bowling Alley." Company M was supporting the 27th Infantry Regiment in defensive positions astride the regimental main supply route. At 1500 hours, the outer boundary of the perimeter was subjected to heavy mortar concentrations, followed by a merciless hail of small-arms fire. Looking to the rear, First Lieutenant Cribb observed that a reinforced company of North Korean infantry had effected a partial breakthrough, grabbed key terrain, and attempted to cut off a vital supply route. Disregarding personal safety, Cribb moved about the fire-swept impact area, reorganized his command for maximum defense, and directed a holding action. He skillfully adjusted mortar fire to bear on the advancing foe and was instrumental in wiping out two hostile mortar positions and inflicting numerous casualties. As enemy action increased in volume and intensity, he ran across open ground and organized adjacent machine guns and directed fields of fire. He then organized and led a determined counterattack that routed the enemy away from key terrain, with approximately 100 enemy dead and wounded. For his actions, First Lieutenant Cribb later received his second Silver Star Medal award on 16 October 1956. On 4 September 1950, he was promoted to captain, Army United States.

Lieutenant Colonel Cribb served the rest of his career with the Chemical Corps. His duties included instructor, assistant chief, and chief of the Department of Military Science and Tactics, Chemical School, Fort McClellan, Alabama; assistant and chief of facilities, Headquarters, Army Chemical Center, Edgewood, Maryland; and chemical staff officer in Turkey.

In addition to the Silver Star Medal with oak-leaf cluster, Cribb received a Bronze Star Medal, Purple Heart with seven oak-leaf clusters, and Combat Infantry Badge. He held expert marksman qualifications with the rifle, carbine, and machine gun and sharpshooter qualification with the pistol.

He obtained a bachelor's degree in military science and a master of art degree in industrial management from the University of Maryland, College Park, and was a graduate of the Command and General Staff College, Fort Leavenworth, Kansas. In retirement, he served as principal at Benjamin Russell High School in Alexander City, Alabama, and as president of the Hillabee Brick Company and the Cribb Construction Company.

Lieutenant Colonel (Retired) Cribb passed away at the age of 49 on 13 August 1973.

Distinguished Members of the Chemical Corps Inductee

The award of the Distinguished Member of the Chemical Corps title signifies that an individual has not only contributed a lifetime of service in the Corps, but also supported the Chief of Chemical in implementing the Corps vision. One individual was inducted into the 2016 Distinguished Members of the Chemical Corps on 23 June 2016.

Command Sergeant Major Donald Moten (Retired)

Command Sergeant Major Donald Moten was born into an Army family in Santa Barbara, California. After receiving a bachelor of science degree in economics from the University of Oregon, Private First Class Moten entered into active Service at Fort Benning, Georgia, as an infantryman. He later received his master of arts degree from Webster University while assigned to the U.S. Army Sergeants Major Academy.

Moten has an extensive background in chemical, biological, radiological, nuclear, and explosives (CBRNE) defense. He served for 31 years in Army units designed to detect and protect Soldiers from the effects of chemical and biological agents. He held unique assignments, serving as the sergeant major for the U.S. Forces Korea Material Support Center and interim regimental command sergeant major. He also served as command sergeant major for the Technical Escort Unit Command and the Guardian Brigade, which later became the 20th CBRNE Command. Command Sergeant Major Moten was the Bravo Company commander for the U.S. Army Sergeants Major Academy. During his last assignment, he was the 48th Chemical Brigade Command Sergeant Major. It was here that he and former Commandant Colonel Vance (Phil) Visser (Retired) established the first Regular Army modified table of organization and equipment chemical brigade in the history of the U.S. Army. The 48th Chemical Brigade was recognized as the single headquarters responsible for consolidating the U.S. Army Forces Command chemical assets under one command for mission command as well as general and direct support to the warfighters in time of war. The 48th Chemical Brigade became the 0-6 level headquarters for the execution of CBRNE tasks across the Department of Defense spectrum and a subordinate unit to the 20th CBRNE Command.

After his active duty retirement and while working at T2S Solutions, Whiteford, Maryland, Moten continued his work in chemical and biological defense, focusing on equipping, fielding, and maintaining the equipment sets to the Defense Chemical, Biological, Radiological, Nuclear Response Force and Command and Control Chemical, Biological, Radiological, Nuclear Response Element–B (U.S. Army) forces as a field service representative in contract support to the Joint Program Executive Office. He moved to Veteran Corps of America as a division manager and became the program manager.

As an example of an extraordinary leader who remains a lifelong learner, Moten took and passed the Project Management Professional exam. He also spends time and his own funds to support the Boys and Girls Club of Santa Barbara, California, by sponsoring summer camp academic scholarships for less fortunate youths. He and his spouse, Karen, make annual donations for the future of today's young people. Command Sergeant Major (Retired) Moten also continues to develop the next generation of CBRNE leaders through his mentoring, coaching, and teaching of Chemical Corps leadership during the course of his duties as the division manager of Veteran Corps of America, as he touches each Soldier, senior noncommissioned officer, company commander, battalion commander, and brigade commander, including the senior staff officers at U.S. Army North, U.S. Northern Command, U.S. Army Forces Command, Department of the Army, and Office of the Secretary of Defense.

Command Sergeant Major Moten's awards include the Legion of Merit with one oak-leaf cluster, Meritorious Service Medal with six oak-leaf clusters, Army Commendation Medal with six oak-leaf clusters, and Army Achievement Medal with five oak-leaf clusters. Command Sergeant Major Donald Moten (Retired) continues to make his mark across the Chemical Corps and the Army.

Ms. Lindberg is the historian at the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS) History Office, Fort Leonard Wood, Missouri.

Stryker NBCRV No. 1 Comes Home

By Ms. Cynthia L. Riley

In May 2003, the first in the series of M1135 Stryker Nuclear, Biological, and Chemical Reconnaissance Vehicles (NBCRVs) were manufactured by General Dynamics Land Systems. According to U.S. Army TACOM Life Cycle Management Command (LCMC), there were four original prototype vehicles used for initial design and testing during the engineering, manufacturing, and development phases before full-rate model production began.

A full decade later in 2013, the commander of the 3d Chemical Brigade (Training), Fort Leonard Wood, Missouri, requested the placement of several historic vehicles adjacent to the 3d Chemical Brigade headquarters. In an effort to help the 3d Chemical Brigade reach this goal and inform Dragon Soldiers of technological advancements, U.S. Army Chemical Corps Museum, Fort Leonard Wood, staff members began researching the locations and condition of retired Chemical Corps-specific vehicles. Conversations with TACOM LCMC resulted in the location of two obsolete Stryker NBCRVs at the Anniston Army Depot in Alabama. The entire drive train; engine pack; transmission; other operational components; and petroleum, oil, and lubricant products were removed from the vehicle, leaving the shell of the original NBCRV. It was only after the demilitarization process was complete that museum personnel were notified that the sanitized vehicle was NBCRV Serial No. 1.

Where had NBCRV No. 1 spent the 10 years between manufacture and demilitarization? Conversations with instructors at Fort Leonard Wood revealed that this particular vehicle had been part of the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS) fleet of training vehicles from May 2008 until March 2011, when it was replaced with newer versions of the NBCRV. NBCRV No. 1 was then transported to Anniston to undergo static display processing.

The full vehicle history was not revealed until the fall of 2015, when staff members of the developing and deploying organizations helped to fill in information from the missing years. According to General Dynamics Land Systems and TACOM LCMC personnel, No. 1 (and prototypes No. 2, No. 3, and No. 4) were delivered to U.S. Army personnel in June 2003 at Dugway Proving Ground, Utah, and Yuma Proving Ground, Arizona, for the purpose of production qualification testing. These technical tests helped to ensure the effectiveness of the system before full-rate production. No. 1 underwent testing until December 2004, when it was sent to Sterling Heights, Michigan, for refurbishing (December 2004–December 2005) and ultimately returned to Dugway Proving Ground for additional testing. In October 2007, No. 1 was sent to the General Dynamics Sterling Heights Complex for upgrade. In May 2008, No. 1 was delivered to Fort Leonard Wood, where it supported Soldier training at USACBRNS until March 2011.[1, 2]

Over its lifetime, No. 1 opened the door for new technology and provided Dragon Soldiers with a realistic training platform. The move to Anniston may have been the last in active service to our Soldiers, but that was not to be the end of the story.

On 14 January 2015, Stryker NBCRV No. 1 returned home to Fort Leonard Wood as CHEM 6647, the Chemical Corps Museum artifact catalog number. Fulfilling the museum mission to retain key items of branch-specific technology for future research and development study, No. 1 now occupies a prominent place in Phoenix Park, near the 3d Brigade Headquarters. The final mission of No. 1 is to educate past, present, and future Dragon Soldiers and their visiting Families, demonstrating that the Chemical Corps, while ever moving forward, still maintains links to its past.

Endnotes:

[1]Robin L. Porter, "Strategic Planning and Business Development at General Dynamics Land Systems," e-mail message, 28 September 2015.

[2]Christopher Hewett, "Signed Approval for 4121-0001(2014)," e-mail message, 13 August 2014.

Ms. Riley is the collection curator with the Chemical Corps Museum. She served in the U.S. Army for 21 years and retired in 1998. She holds bachelor's degrees in philosophy and history from the University of Missouri–Rolla (now Missouri University of Science and Technology) and a master's degree in contemporary European history from the University of Missouri–St. Louis.

11th CBRNE Company Participates in Exercise Precise Response 2016

By Captain Derek Taylor

Each July, the Canadian Defense Research and Development Center (DRDC) hosts a large-scale, live-agent training exercise at the Counter Terrorism and Technology Center (CTTC), Suffield Base, Alberta, Canada. The 11th Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) Company (Technical Escort) provided two chemical, biological, radiological, nuclear, and explosives response teams (CRTs) and a small company headquarters element to represent U.S. CBRNE capabilities. Roughly 350 personnel from 10 North Atlantic Treaty Organization (NATO) nations worked together to share capabilities; test the interoperability of NATO chemical, biological, radiological, and nuclear (CBRN) forces; and validate assigned equipment and established procedures.

CTTC Facility

The facility at Suffield Base is one of the few in the world capable of providing such robust, outdoor, live-agent training scenarios. The 11th CBRNE Company Soldiers learned about the training opportunities available at the CTTC, attended capabilities briefings from each participating nation, and participated in basic facility-specific safety training during the 3-week exercise.

The CTTC is capable of providing units with live chemical agent and radiological training, very realistic biological-agent training, and robust explosives training. The several-acre training site contains dozens of replicated scenarios to simulate small, third-world villages; clandestine laboratories; research laboratories; automobile accidents; airplane and bus terminals; and various post-blast incidents. The facility staff can customize the scenarios to meet the training objectives of the participating units.

Exercise Precise Response provided a state-of-the-art venue for nations to learn of each other's capabilities and limitations. Each participating nation provided short briefings, and Soldiers were allowed an entire afternoon to visit equipment displays. These displays enabled Soldiers to interact with their counterparts at the subteam level to discuss differences in capabilities and techniques.

The week concluded with each participant conducting live-agent safety training. The training took place in a laboratory setting with live agent under a fume hood. Participants wore minimal personal protective equipment (laboratory coat, goggles, gloves, but no mask) during the demonstration. This also served as a validation that the unit organic equipment did indeed detect and identify live chemical agents.

Canadian SIBCRA team members discuss the equipment.

NATO CBRN Task Forces and Interoperability

For the last 2 weeks of training, participating nations split into three NATO CBRN task forces. The Netherlands, France, and Germany each led a task force, with the 11th CBRNE Company CRTs in support of the German task force. The CRTs are unique compared to other NATO CBRN forces in that they have explosive ordnance disposal (EOD), decontamination, reconnaissance, and sampling expertise organic to their elements. Most other nations have platoons

U.S. Soldiers on the site of a live-agent target

specializing in decontamination, reconnaissance, or sampling and no organic EOD capability resident in their CBRN units. For the purposes of task organization and interoperability, the task force commander separated the CRTs into subteams and counted each one separately. This meant that the German task force consisted of two reconnaissance teams; four EOD teams; five decontamination teams; one forensics team; and seven sample and identification of biological, chemical, and radiological agent (SIBCRA) teams.

The task force commander tested the interoperability of the nations by selecting subteams from different nations to work together on each scenario. For example, a German reconnaissance team might work with a U.S. EOD team that would hand over the site to a Spanish SIBCRA team, with everyone processing through a French decontamination line. Working so closely with other nations demonstrated the similarity of much of the equipment and many of the procedures. In a few cases, with personnel rotating off-site due to heat concerns, some nations augmented others' decontamination lines with little to no shortfall in throughput or capability. The CTTC indicated that it had never seen nations work so interchangeably as they had during this exercise.

EOD Soldiers receive a mission briefing before entering a radioactive area.

Although Exercise Precise Response helped break down previous interoperability barriers, the Soldiers worked hard to make sure that each mission concluded successfully. Due to exercise constraints, Soldiers were allowed limited time to complete each portion of the mission. Some Soldiers rehearsed tactics, techniques, and procedures in the evenings to save time on target. In addition, although most of the leaders from the participating nations spoke English, many of their Soldiers spoke little, if any. This led to the development of interesting methods of communicating tasks and marking hazards in the hot zone. In the end, each mission concluded successfully and each nation met its training objectives.

Validating Equipment and Procedures

Allowing CRTs to operate in a live-agent environment using organic equipment and their own unit standard operating procedures (SOPs) enabled the Soldiers to validate and gain confidence in the capabilities of the equipment and the accuracy of the techniques and procedures.

The CTTC provided an opportunity for participating nations to use their own protective equipment, detectors, and SOPs in a live-agent environment. The CTTC provided safety personnel to observe personnel in the hot zone, and those personnel allowed nations to operate freely, only interfering in case of serious safety concerns. At the conclusion of each mission, the safety personnel offered constructive feedback to the teams. After the teams processed their samples through the decontamination line, CTTC technicians provided analytical reports to leaders. The purpose of the reports was to validate that the contents of the samples matched what was suspected and to critique the packaging techniques, materials used, and chain-of-custody paperwork. Applicable NATO allied engineering publication handbooks were used as established standards for the critiques. This type of feedback is invaluable in helping nations validate equipment and revise SOPs.

Conclusion

Exercise Precise Response serves as a great venue for experienced CRTs to gain confidence in equipment and procedures. The opportunity to work with other NATO nations broadened Soldiers' perspectives of the CBRN task force concept and enabled the company to bring back valuable information that will lead to the refinement of current SOPs.

Photograph Credit: The photographs used in this article were taken by Canadian Forces Base Suffield Public Affairs Office, Alberta, Canada, and released to the United States for use.

Captain Taylor is the commander of the 11th CBRNE Company (Technical Escort), 110th CBRN Battalion, Joint Base Lewis–McChord, Washington. He holds a bachelor's degree in applied physics from Brigham Young University, Provo, Utah.

Navy and Coast Guard Test Their Nerves

By Mr. Stephen L. Standifird

Seeing Sailors or Coast Guardsmen in Missouri, let alone on an Army installation, is an unusual sight, given that their mission is mostly water-based. But the U.S. Navy and U.S. Coast Guard received unique training opportunities at the E. F. Bullene Chemical, Biological, Radiological, and Nuclear (CBRN) Defense Training Facility of the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS), Fort Leonard Wood, Missouri.

"This is the only place where the joint Services can do practical, hands-on, chemical-agent training," said the learning site director of the Navy Chemical, Biological and Radiological Defense School. "This is a vital part of our training for our Sailors."

Navy and Coast Guard enlisted damage controlmen, Navy officers serving in the damage control assistant position, and Coast Guard CBRN-explosive officers are the primary attendees of the 10-day Shipboard Chemical, Biological, and Radiological–Defense Operations and Training Specialist Course.

The course manager, a Navy chief, said that Sailors who attend the course are not training for a new job; they are training to expand job skills. Damage controlmen on a ship are primarily responsible for damage control; ship stability; firefighting; fire prevention; and chemical, biological, and radiological warfare defense. "Part of their job would be to assist and train the crew in proper donning and issue of equipment," the course manager said. "When they get to their ships, they will be the subject matter experts, even given the short amount of training they have completed here," the learning site director added. To include more hands-on training with equipment, five additional days are expected to be added to the course, which averages 150 students per year.

Using the CBRN Defense Training Facility for live-agent training is the final aspect of the course, and it gives the students an opportunity to put all of their training together and build confidence in their protective gear and detection equipment. For one Coast Guard Reserve lieutenant, the opportunity to "go live" with a toxic nerve agent was a little bit scary. "You definitely get amped up a little bit . . . when you know there is live agent sitting on the table in front of you," he said.

A damage controlman performs a practice run before entering the CBRN Defense Training Facility to test live nerve agents.

A damage controlman on the United States Ship (USS) Preble, Pearl Harbor, Hawaii, agreed. "It's nerve-wracking because that's a live nerve agent," he said. "You read about all the things that can happen from this, and they drop it . . . [near] you."

Getting the opportunity to go into the CBRN Defense Training Facility and train with live agents is an experience that the learning site director believes is the best way for Sailors and Coast Guardsmen to obtain realistic training and to get first-hand experience with effective techniques and equipment. "In my opinion, there is no replacement for that hands-on training. It is very valuable," he said.

Besides the experience of working with a live agent, one participant said he would take the confidence gained in using the equipment with him and try to pass that on to his crew. "My role is to glean what I can and take it back to develop a more robust training plan," he said. "My challenge now is to take that [knowledge] back with me and lead the training and make sure that my petty officers have that same confidence."

Mr. Standifird is the assistant editor of the Guidon *at the Public Affairs Office, Fort Leonard Wood, Missouri.*

To Collect, Preserve, Exhibit, and Interpret: A History of the Chemical Corps Museum

By Kip A. Lindberg

Among the missions of the U.S. Army Chemical Corps Museum is the mission to collect, preserve, exhibit, and interpret artifacts related to the history of chemical warfare. The museum uses these artifacts to educate and train our current chemical, biological, radiological, and nuclear (CBRN) Soldiers and the visiting public and to instill pride in the heritage and traditions of the Chemical Corps.

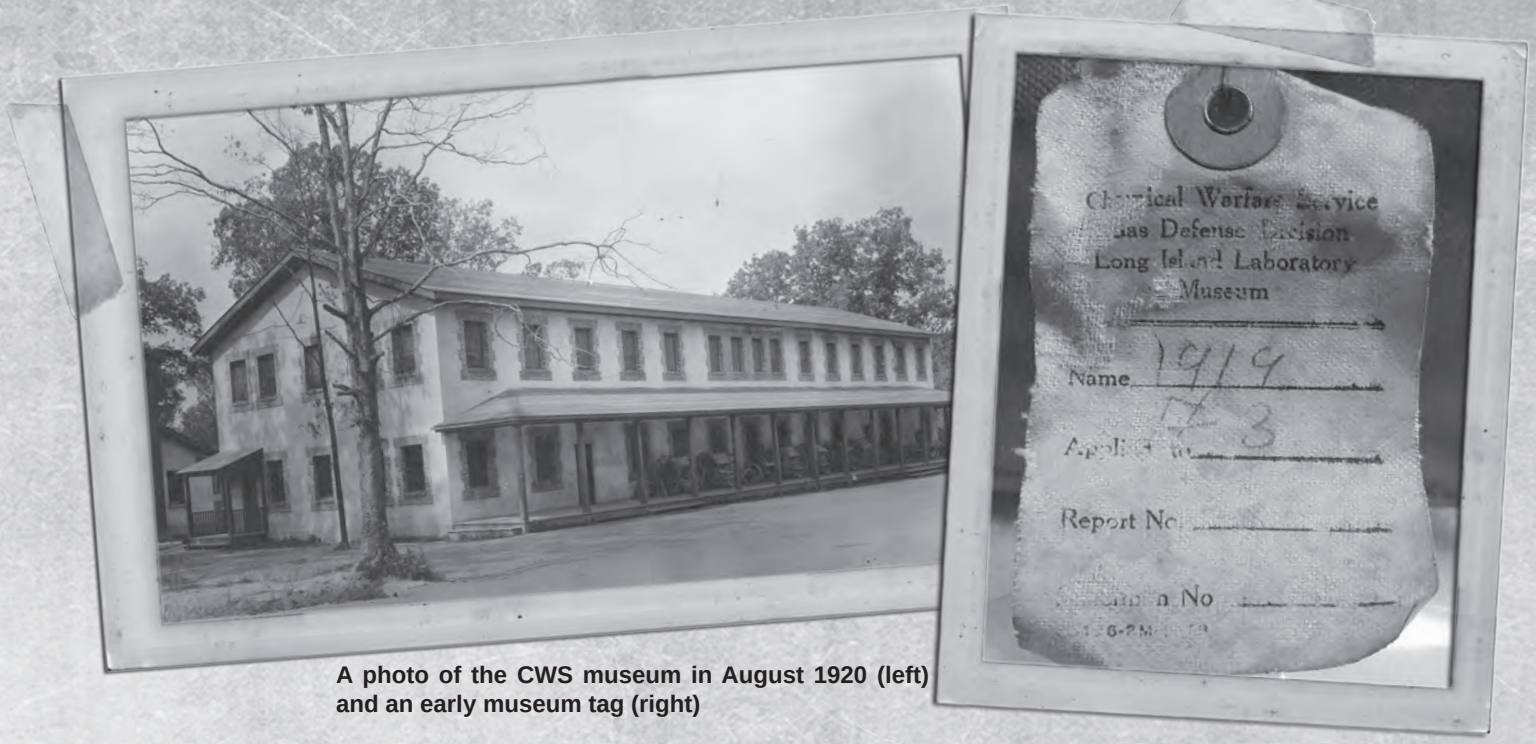
The precursor to our present museum was established at the Gas Defense Plant on Long Island, New York, in 1918, meaning that the museum is nearly as old as the Chemical Corps itself. Also known as the Long Island Laboratory Museum, its initial function was more in line with a clearinghouse activity than a museum. Objects were housed for research and development use rather than exhibited for public education. "Four specimens of every type of chemical warfare device used by our allies and the enemy were collected, catalogued, and sent home for [the] museum and technical study," reported the director of the Chemical Warfare Service (CWS), Brigadier General Amos A. Fries, in 1919.[1]

With the Armistice ending World War I, the Gas Defense Plant was closed and the museum and its collection moved to Edgewood Arsenal, Maryland.[2] A two-story, hollow-tile building, formerly used as a guardhouse, was renovated to serve as the new museum facility and was opened on 1 November 1919. As recorded in the CWS director's annual report to the War Department in 1920:

> *"The museum specimens, numbering approximately 1,750 [objects], have been placed in cases and on display boards in a manner best calculated to permit of their easy inspection by visitors. These include all types of gas masks, including experimental masks, the various processes of manufacture of the modern gas mask, sectioned shells and bombs showing all varieties, both enemy and allied, flame projectors, gas alarms and other equipment."*[3]

In addition to the holdings of the Gas Defense Plant museum, crates of gas warfare materiel recovered in England, France, and Italy (including American, French, British, Italian, Russian, German, and Austrian collections) were also shipped to Edgewood Arsenal. Less than 2 weeks later, the veterans of the 1st Gas Regiment listed the museum as a point of interest in their first regimental veterans' reunion at Edgewood Arsenal. These veterans were encouraged to visit the "… two-story building, 125 feet by 40 feet … taken over and fitted up as a museum, library, and record room."[4] Inside, the veterans could view "… the most complete collection of enemy and allied gas offense and defense equipment in the United States

Inside the CWS Museum in 1920



A photo of the CWS museum in August 1920 (left) and an early museum tag (right)

and probably in the world."[5] According to the CWS director's annual report, the second floor of this 10,000-square-foot building was "devoted to the housing of all records of the CWS–American Expeditionary Force and the duplicating (multigraphing and mimeographing) plant."[6]

By 1922, the museum was placed under the Property and Museum Branch of the Research Division, CWS, for administrative purposes. Mr. Laurence Phelps, a World War I veteran and civil service employee of Edgewood Arsenal, was made branch chief, beginning 3 decades of his involvement with the museum. Throughout the 1920s and 1930s, Mr. Phelps oversaw the museum administration and he appointed a succession of noncommissioned officers and warrant officers to serve as museum directors. The museum continued to collect gas warfare materiel. Despite severe budgetary restriction, especially during the Great Depression, the museum remained open by appointment, allowing "CWS School classes, the Technical Division, and all divisions of [Edgewood] Arsenal"[7] access to its research collection. During this period, the museum occupied various buildings on the arsenal grounds.

By 1942, the United States was again at war. Mr. Phelps, now dual-hatted as branch chief and museum director, was commissioned as a captain in the CWS, with the title of property officer and director of the CWS Museum. At that time, the museum collection consisted of approximately 3,000 objects and 15,000 technical books, with buildings and other property totaling $30 million dollars.

In 1946, with the end of World War II, the museum accessioned the captured collections of the German and Japanese gas schools, totaling more than 6,000 objects. The recently promoted Major Phelps was released from military service and resumed his duties as the civilian director of the museum. Now called the Chemical Corps Museum, it occupied four buildings with open storage and exhibit space of more than 21,000 square feet. By 1948, the museum boasted more than 9,000 objects and nine civilian employees and was open weekdays from 8:00 a.m. to 4:30 p.m. and by appointment on weekends.[8]

In July 1951, the U.S. Army Chemical School moved from Edgewood Arsenal to Fort McClellan, Alabama; however, the museum remained behind at Edgewood Arsenal, probably to retain its collection for the research and development programs of the Chemical Corps Engineering Command, which also remained at Edgewood. The end of the Korean

U.S. Air Force Reserve noncommissioned officers observe horse protection equipment inside the museum in 1952.

Exhibits in the Chemical Museum at Fort McClellan, Alabama, in 1995

War resulted in additional artifacts for the collection, but also coincided with the retirement of Mr. Phelps as director. For the next 20 years, the leadership of the museum involved a series of military and civilian appointees, although the artifact curator, Mr. William Nichols, hired in 1948, cared for the collection until 1972. The physical separation of the museum from the U.S. Army Chemical School led to its eventual renaming as the Edgewood Arsenal Museum.[9]

Finally, in 1972, the museum was relocated to Fort McClellan and the role of the museum as an instructional classroom for the Army Chemical Center School was reestablished. The museum, housed in Atkisson Hall (named for the commander of the 1st Gas Regiment in World War I), was officially opened by Major General John J. Hayes, Chief of Chemical, on 28 June 1972, the 54th anniversary of the Chemical Corps. Military manpower was used to oversee museum operations until a civilian curator was hired in October 1972.

Sadly, this iteration of the museum was short-lived. With the end of American involvement in the Vietnam War and the Army slated for a 33 percent drawdown in strength, the Chief of Staff of the Army, General Creighton Abrams, recommended the disestablishment of the Chemical Corps. This announcement, on 11 January 1973, less than 7 months after its opening, led to the closure of the museum. The artifacts were packed, crated, and shipped to the Ordnance Museum at Aberdeen Proving Ground, Maryland, for storage.

While the disestablishment never fully occurred, the decision had a devastating effect on the Corps and the museum. Although the museum had experienced two closures since its establishment, those were temporary; this closure lasted nearly a decade. While a small portion of the artifacts were exhibited at a much smaller Chemical Corps Museum established in a room within the Ordnance Museum in August 1976, the bulk of the collection remained crated and stored in a warehouse that lacked climate controls. Worse, in order to provide the Ordnance Museum with additional storage, a portion of the Chemical Corps collection was moved outdoors between 1979 and 1981. Without any overhead cover, the crates were fully exposed to the elements.

The U.S. Army Chemical School was reestablished at Fort McClellan in December 1979; and on 2 November 1981, commandant, Brigadier General Gerald Watson, requested permission from the Center of Military History to create a new Chemical Corps Museum. Permission was granted in January 1982; and within 6 months, the collection was shipped from Aberdeen to Fort McClellan. The museum was officially opened in Building 2299 by Brigadier General Alan Nord, Chemical School commandant, on 4 December 1982, and rededicated as Atkisson Hall a year later.[10, 11, 12]

The first of three civilian staff positions was filled in October 1982. The initial focus was on creating exhibits within the 4,000-square-foot building for upcoming veterans' reunions rather than on unpacking, sorting, and housing the collection; therefore, the artifacts remained in their crates until September 1984. Once the unpacking process finally began, the result of 10 years of neglect and nonaccountability became painfully obvious. Only 8,000 objects from a collection that once numbered more than 10,000 were present; and of the 8,000 artifacts shipped from Aberdeen, more than half had rotted, dissolved, or deteriorated beyond salvage or repair. Equally tragic was the fact that no records accompanied the artifacts, so all historic provenance regarding where and when the items were collected was lost.[13]

The museum operated at Atkinson Hall through 1999, with three civilian employees, a noncommissioned officer in charge, and a detail of assigned Soldiers providing classroom instruction on the heritage and traditions of the Chemical Corps to Dragon Soldiers. The museum was open weekdays, from 9:00 a.m. to 3:00 p.m. In 1990, it was noted that annual visitation at the museum was about 3,000.[14, 15]

The Base Realignment and Closure Act of 1995, which mandated the closure of Fort McClellan and the relocation of the U.S. Army Chemical School to Fort Leonard Wood, Missouri, meant that the museum's collection would once again be packed and shipped halfway across the country.[16] A new facility, adjoining the Engineer Museum in Building 1607, was constructed to house the exhibit galleries and artifact storage areas for the Chemical Museum and the Military Police Museum, which had also been relocated from Fort McClellan. In the spirit of the center of excellence concept, common collection storage areas, exhibit construction, and artifact conservation areas were constructed for shared use by all three colocated museums, maximizing the use of space and eliminating redundant individual museum requirements.

The first portion of the new Chemical Corps Museum exhibit gallery was opened in 2002, with the rest opening the

Soldiers visit the gallery of the Chemical Corps Museum at Fort Leonard Wood, Missouri.

following year, totaling more than 9,000 square feet. The Regimental Gift Shop, first established at Fort McClellan in 1985, was operated by the Chemical Corps Regimental Association (which itself was first formed as the Chemical Corps Museum Foundation) as the museum's nonappropriated funding entity and soon after began conducting sales in support of CBRN Soldiers and their Families.

Visitors to the gallery follow a chronological path through immersion exhibits, taking them from the creation of the Chemical Corps in 1918 to present day. Artifacts, photographs, and interpretive text, combined with audio and visual programs, provide an education experience for its visitors, which average 50,000 Soldiers and civilians annually. The museum is fully integrated into the training program for CBRN Soldiers at Fort Leonard Wood. The museum is also used as a classroom for the historical study of CBRN warfare by Service members of other branches who are training on Fort Leonard Wood.

Today, the U.S Army Chemical Corps Museum houses and exhibits nearly 7,000 objects from our historic past. The museum is open to the public from 8:00 a.m. to 4:00 p.m. on weekdays and from 10:00 a.m. to 4:00 p.m. on Saturdays; it is closed on Sundays and federal holidays. The museum performs three missions: to serve as a classroom for the education of Dragon Soldiers on the heritage and traditions of the Chemical Corps; to function as the materiel culture depository for the Chemical Corps, retaining key items of Branch-specific technology for future research and development; and to serve as a conduit of education and information between the Army, specifically the Chemical Corps, and the American public.

Based on lessons learned from mistakes of the past, Army Regulation 870-20, *Museums and Historical Artifacts*, was first introduced in 1976. It outlines the functions of Army museums and the programs of conservation, preservation, and accountability required by federal statutes. It serves as the guiding regulation for the management of the Chemical Corps Museum and ensures that the tragic loss of irreplaceable artifacts that occurred through mismanagement and neglect in the 1970s will not be repeated.[17]

The year 2018 will mark not only the 100th Anniversary of the Chemical Corps, but also herald the centennial of the museum. In addition, it will signify the beginning of its mission of collecting, preserving, exhibiting, and interpreting artifacts for the Corps' next 100 years.

Endnotes:

[1]"Report of the Director of Chemical Warfare Service, 1919," Government Printing Office, Washington, D.C., 1920.

[2]The present museum retains a listing, dated 10 July 1919, of 409 objects from the "Museum of Gas Masks and Protective Equipment" readied for shipment in three crates to Edgewood Arsenal.

[3]"Report of the Director of Chemical Warfare Service, 1920," Government Printing Office, Washington, D.C., 1921.

[4]Ibid.

[5]Ibid.

[6]Ibid.

[7]Laurence M. Phelps, "A History of the Chemical Corps Museum Located at the Army Chemical Center, Edgewood, Maryland," memorandum, undated, circa 1953.

[8]Ibid.

[9]Zachary Jaquett, "ACC's Chemical Corps Museum Displays Large, Varied Collection," *Armed Forces Chemical Journal*, January 1953.

[10]Letter from Brigadier General Watson, Commandant, to the Chief of Military History, "Request to Establish a Museum," 2 November 1981.

[11]Letter from the Chief of Military History to Brigadier General Watson, "Request to Establish a Museum," approving the request to establish the museum, January 1982.

[12]"Chemical Corps Museum Rededicated," *Army Magazine*, February 1983.

[13]Thomas K. Miller, museum director, "Items Transferred From Ordnance Museum to Chemical Corps Museum, April 1982," memorandum for record, undated.

[14]Major Don W. Kilgore, "U.S. Army Chemical Corps Museum Standing Operating Procedures (SOP)," 20 August 1985.

[15]Michaelle Chapman, "Museum Puts You in Battlefield Trenches," *Post-Herald*, Birmingham, Alabama, 22 October 1990.

[16]*The Base Realignment and Closure Act of 1995*, 1 July 1995, <http://archive.defense.gov/brac/docs/1995com.pdf>, accessed on 30 September 2016.

[17]Army Regulation 870-20, *Museums and Historical Artifacts*, 11 January 1999.

Mr. Lindberg is the director of the U.S. Army Chemical Corps Museum.

THE MAKING OF A 74D CBRN WARRIOR

By Captain Timothy A. Evans

Company C, 84th Chemical Battalion, Fort Leonard Wood, Missouri, produces extraordinary and resilient chemical, biological, radiological, and nuclear (CBRN) Soldiers by employing challenging situational training exercises that incorporate program of instruction requirements, warrior tasks, and battle drills. All CBRN Soldiers depart advanced individual training (AIT) at Company C with the technical and tactical expertise required to be an immediate force multiplier for their assigned units. The students experience 10 weeks of intense classroom and field training exercises in order to become experts in their field. Most CBRN Soldiers are the only subject matter experts in their Branch-specific job—Military Occupational Specialty (MOS) 74D, CBRN Specialist—at their gaining unit.

Chemical and Biological Defense Training

One of the first blocks of instruction on which Dragon Soldiers train is Chemical and Biological Defense. The critical areas that are trained in the Chemical and Biological Defense block are—

- Improved Chemical Agent Monitor.
- Chemical agent detectors.
- M4 Series Joint Chemical Agent Detector.
- Technical advice on chemical agents and compounds.
- Protection with Joint Service, Lightweight, Integrated Suit Technology.
- First aid for a nerve agent casualty.
- Chemical operation field training.

Students receive classroom instruction and scenario-based practical exercises to reinforce and apply terminal learning objectives. At the end of the Chemical and Biological Defense block, a chemical operations test is administered.

Biological Operations Training

The next block of instruction on which Company C AIT students train to become extraordinary technical and tactical professionals is Biological Operations. This block consists of a blend of classroom instruction; crawl, walk, and run practical exercises; and a field training simulation to put students' expert skills to use. The critical areas that are trained in the Biological Operations block are—

- Basic biological concepts and human anatomy.
- Biological warfare.
- Biological agent dissemination.
- Effects of weather and terrain on biological agents.
- Biological defense fundamentals.
- Biological sampling with the Department of Defense biological sampling kit.

At the end of the Biological Operations block, the students are tested on all material and must pass each section to move on to the next block of instruction. The students are trained, tested, and developed into technical and tactical subject matter experts who become force multipliers at their gaining units.

Radiological Training

The next step in the MOS 74D AIT CBRN warrior development process involves 40 hours of Radiological Training, which consists of classroom training, practical exercises, and a field training exercise. The critical areas are—

- Radiation fundamentals and nuclear weapon effects.
- Radiological weapon terrorism.
- Radiological instruments.
- CBRN 1 and CBRN 4 radiological and nuclear reports.
- Simplified radiological and nuclear hazard area predictions.
- Radiological monitoring and survey.

A culminating test is administered at the end of the block of instruction. Upon successful completion of radiation training, students receive certificates of completion and are designated radiation safety experts. Successfully completing radiation safety allows these CBRN Soldiers to become subject matter experts and battalion and brigade staff advisers to senior leaders. In no other branch do enlisted Service members report directly to the commander or the senior leader on staff.

High-Physical-Demand Training

Another aspect of warrior training incorporated by Company C, 84th Chemical Battalion, is the implementation of the High-Physical-Demand Training. There are eight tasks on which AIT Soldiers train to further their tactical and technical expertise specific to their Branch. The tasks are—

- Continuously wear Mission-Oriented Protective Posture Level 4 for up to 3 hours during a mock operation.
- Perform CBRN operations in Mission-Oriented Protective Posture 4 in full combat load for an extended mission.
- Operate and perform preventive maintenance checks and services on the diesel water pump with a capacity of 125 gallons per minute.
- Operate the M12A1 diesel engine-driven decontamination apparatus.

- Lift and carry nonambulatory casualties with a combined weight of 270 pounds.
- Control contaminated waste water and fluids.
- Perform hazmat tasks at the operations level.
- Identify colors on CBRN detection and identification systems.

Company C AIT warriors perform these tasks to become more proficient in their technical jobs and to become better developed and well-rounded Soldiers who exhibit a team-of-teams mentality. Company C is developing the human potential that rests in all warriors, identifying the total Soldier concept, and capitalizing on every warrior's expertise to work together and get the mission done.

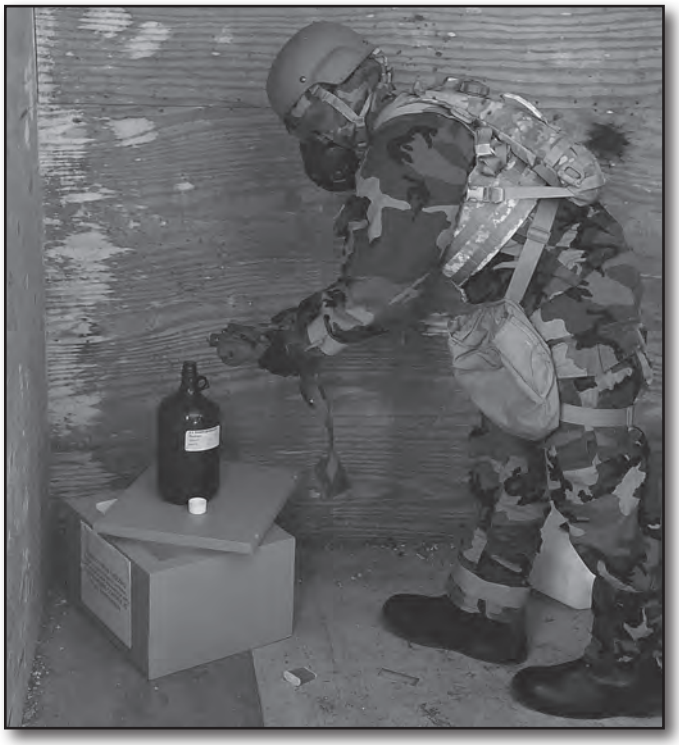
Feat of Strength

One crucial task that Company C CBRN AIT warriors conduct during each 10-week training cycle is the Feat of Strength. This event is conducted the week before graduation, and it is a tool that Company C uses to facilitate the team-of-teams concept to show these young warriors that they are truly extraordinary professionals who can complete any mission.

The Feat of Strength begins at 0400 hours with a 6-mile tactical foot march in full combat gear. Before the foot march, the warriors are given a fragmentary order that guides and directs them to the ending point of the tactical foot march. Within the fragmentary order, the warriors are instructed to recover fallen comrades at some point between the starting point and ending point of their tactical foot march; this incorporates some land navigation skills along the way. Once the warriors reach the fallen CBRN comrades, they recover two litters with two crates that contain the biographies and background information of all fallen CBRN warriors over the past two wars—Operation Enduring Freedom and Operation Iraqi Freedom. The ending point of the tactical foot march is Chemical Memorial Grove, which is a memorial to all fallen CBRN warriors since the Chemical Regiment was created. Once at Chemical Memorial Grove, the Soldiers lay the litters in the middle of the grove and retrieve the biographies of the fallen CBRN Soldiers. The sun has not yet risen; and while still twilight, each CBRN warrior reads the biography of the fallen—creating a link between the current CBRN warriors and the ones who have made the ultimate sacrifice for their Corps and their country. This also creates a connection between the current CBRN Soldiers and the CBRN Regiment. Once the reading of the biographies is complete, the warriors conduct a tactical foot march back to the barracks, resulting in a true team-of-teams concept and driving home the human development aspect of the event—each and every CBRN warrior—past and present—is an extraordinary professional, a true warrior.

Command Philosophy

There are three traits that are instilled in every CBRN warrior who comes through Company C, 84th Chemical Battalion. The first and most important trait is leading. CBRN warriors must learn to lead by example in everything that they do—on and off duty. There is only one standard—the U.S. Army standard. There are no selective standards among officers, noncommissioned officers, or Soldiers. Treating everyone with dignity and respect is the hallmark of all CBRN warriors. The next trait is training. Company C is an AIT company and the steward of developing Soldiers into CBRN warriors. Developing warriors into tactically and technically proficient CBRN Soldiers is the charge, and the mission always gets done. Training is always oriented to accomplish mission-essential tasks. The final trait is caring. Taking care of Soldiers means ensuring that they always know and perform their duties, they are always disciplined, and they have high standards. Soldiers are trained to accomplish the mission, and they develop into extraordinary professionals that embody the team-of-teams concept.



A CBRN Soldier conducts a test to determine contamination during AIT.

Summary

Training CBRN warriors in Company C, 84th Chemical Battalion, is complex and dynamic. Every class is different, and every class possesses unique skills and abilities that further develop each and every warrior. Ensuring that each and every CBRN warrior who comes through Company C is tactically and technically proficient is the mission.

Captain Evans is the commander of Company C, 84th Chemical Battalion, 3d Chemical Brigade. He holds an associate's degree from Diablo Valley College, Pleasant Hill, California; a bachelor's degree in psychology from Ashford University, Clinton, Iowa; and a master's degree in psychology with a specialization in health and wellness from the University of the Rockies, Colorado Springs, Colorado.

PRIORITIES OF READINESS

By Captain Edgar L. Upchurch and Chief Warrant Officer Two Michael E. White

Chemical, biological, radiological, and nuclear (CBRN) assets can be underutilized in some maneuver units, oftentimes leading to reduced readiness. We propose a reorganization of CBRN resources within this area. CBRN assets should be consolidated at the brigade or higher level to better utilize resources and enhance readiness across the force. The current structure, wherein CBRN officers and Soldiers are managed at the battalion level, has failed to meet the objective of preparing units to operate in a contaminated environment. With increasingly unstable, unconventional threats across the globe, there is no time for the U.S. Army or the U.S. Marine Corps to shy away from training for the very real threat of weapons of mass destruction (WMD). Moving CBRN away from the battalion level could be done in one of two ways: by consolidating assets at the brigade level under the control of the brigade commander or creating division/corps level CBRN units that would function as resources for lower commands.

Threats are constantly changing and evolving, and the likelihood of facing a CBRN WMD scenario is increasing. It is no longer a matter of *if* a rogue state or other group acquires the capability and seizes an opportunity, but *when*. The days of considering a chemical weapon attack to be nearly impossible are gone; such an attack occurred in Syria. Furthermore, concerns about the potential actions of North Korea have certainly not decreased. Iran is also developing nuclear weapons. The total number of terrorist groups and their potential resources is never a finite quantity. The United States has no shortage of enemies around the globe. It would be irresponsible of us not to be prepared for the worst-case scenario.

Are we ready? Unfortunately, no. Army and Marine Corps training requirements often exceed the available time on the training calendar. Commanders prioritize and focus on what they see as the most likely threats for the mission and the area of operations. Their formations must be ready to shoot, move, and communicate to engage and destroy the enemy. Soldiers and Marines are supposed to be prepared to do this in a CBRN environment.

We encounter similar issues in the U.S. Marine Corps. An infantry battalion has one CBRN officer (chief warrant officer) and two enlisted CBRN noncommissioned officers (NCOs). The CBRN readiness of a Marine Corps infantry battalion is a direct reflection of the work ethic of the CBRN officer and the relationship forged with the battalion operations officer. It takes perseverance and consistency to include CBRN training in a battalion campaign plan. The Defense Readiness Reporting System provides an honest and fair assessment of the CBRN readiness of the current battalion. Additionally, regiment and division CBRN officers are carefully working at each battalion to ensure that they are within standard. The battalion CBRN officer and CBRN Soldiers work diligently in other areas more often than in their own specialty.

Let's fix it. First, we need to take the sometimes underutilized CBRN assets away from the battalions. This would allow for better prioritization of training. We need to take CBRN resources and put them into a brigade level cell or a stand-alone unit owned at the division or corps level. In the former scenario, brigade commanders would retain closer control and have an internal asset to assist with training in garrison and the CBRN resources could be pushed where they were needed—in the operational environment. The latter would be tasked in garrison as a training resource to be scheduled and used much like a range or simulator facility. Downrange there would be a great deal of flexibility to put these specialized assets to work where they were needed most. Either way, the burden would still be on commanders to integrate CBRN onto the training calendar. However, viewing CBRN as an outside resource may be enough of a paradigm shift to increase the implementation of training. It would certainly increase the productive use of CBRN Soldiers and their specialized skills, and units would be more likely to conduct training when it had been scheduled on the calendar with an outside unit.

With the array of threats facing us now and in the foreseeable future, CBRN training needs to be a high priority for readiness. Our previous efforts to correct the issue as an Army and a Corps have not been successful. A new approach is required. Perhaps one of the approaches outlined here will be the answer; perhaps not. Look around your formations, and talk to your fellow leaders regarding a new way forward. Help is needed to create a more effective model that puts unit readiness where it needs to be—fully capable of meeting conventional and unconventional threats on today's battlefield.

Captain Upchurch is currently a student in the CBRN Captain's Career Course at Fort Leonard Wood, Missouri. He is to report to 1st Infantry Division, Fort Riley, Kansas, in November. He holds a bachelor's degree in English.

Chief Warrant Officer Two White is currently a student in the CBRN Captain's Career Course at Fort Leonard Wood, Missouri. He is assigned to the 3d Battalion, 5th Marines, 1st Marine Division, Camp Pendleton, California. He holds a bachelor's degree in agribusiness.

74A Recruitment in Cadet Command

By First Lieutenant Don Yoo

This past summer, I had the privilege of offering Chemical, Biological, Radiological, and Nuclear (CBRN) Branch briefings to initial-entry cadets at Fort Knox, Kentucky. The official U.S. Army Reserve Officers' Training Corps Cadet Summer Training Web site describes cadet initial-entry training (CIET) as "an intense four-week introduction to Army life and leadership training of the Reserve Officers' Training Corps."[1] After 3 weeks of grueling training, cadets have an opportunity to visit with personnel from branches in which they are interested as they begin to delve into their future Army careers. Although many of the cadets who visited the CBRN Branch tent were juniors, there were also freshmen and sophomores and even cadets enrolled in master's degree programs.

Improvements

After numerous visits from schools throughout the country, I noticed that the cadets lacked information about the Chemical Corps. Through static displays, videos, and briefings, that lack of knowledge was mitigated. Within the 30 minutes allotted for the CBRN Branch briefing, the cadets watched a video, viewed a Microsoft® PowerPoint presentation, and walked through a static display of equipment from the dismounted reconnaissance sets, kits, and outfits. I believe a more interactive briefing about the CBRN Branch would attract and ultimately recruit more well-balanced officer candidates.

Other Representatives

Because Army National Guard (ANG) and U.S. Army Reserve (USAR) prospects are briefed in addition to the Regular Army prospects, CBRN Branch representatives from the ANG and USAR would serve as assets in answering cadets' questions specific to those components. Portions of the Branch briefing cover civil support team platoon leader opportunities in the USAR. Cadets interested in joining ANG or USAR were only able to receive simple answers to these questions due to a lack of firsthand experience from briefers. Another advantage of adding ANG and USAR representatives would be their ability to provide answers for frequent questions about certifications received during the CBRN Basic Officer Leader's Course and their relevancy in the civilian sector. Reserve Component representatives who use these certifications in the civilian workforce would be a great asset for helping to answer these questions.

Static Displays with Operators

The static displays were a great way to explain the purpose of CBRN equipment and to describe how it works. It was exciting to see cadets in science-specific majors understand the explanations about how the nuclear, biological, and radiological reconnaissance vehicle and the Chemical Biological Mass Spectrometry System work. Realistically speaking, the cadets are exhausted toward the end of CIET and a PowerPoint presentation in a hot tent would only accelerate the sleep process. The presentation of a condensed briefing combined with a demonstration of Soldiers wearing self-contained breathing apparatus while demonstrating a site assessment would be a great way to better engage the cadets and to expose them to what CBRN units actually do.

Conclusion

Every briefing given provided lessons learned. My hope is that future briefers take note of the cadets' conditions and environment in order to provide a more engaging and informative briefing about the Chemical Corps. This is a great professional development opportunity for junior military officers to hone their public speaking skills and "sell" the Chemical Corps. Always keep in mind that the next generation of Chemical Corps officers is sitting in those seats listening to that briefing.

Endnote:

[1]Reserve Officers' Training Corps, Cadet Initial-Entry Training Page, <http://ciet.futurearmyofficers.com/about/>, accessed on 6 October 2016.

First Lieutenant Yoo is an executive officer for a CBRN advanced individual training company at Fort Leonard Wood, Missouri. He holds a bachelor's degree in life sciences from the U.S. Military Academy–West Point, New York.

CCRA Chapter of the Ozarks

By Mrs. Sharon M. McCann

The Chemical Corps Regimental Association (CCRA) was founded to promote the heritage, history, esprit de corps, and professionalism of the Chemical Corps. The Ozarks Chapter of CCRA was founded in 2008 at Fort Leonard Wood, Missouri, by a group of active and retired CBRN Soldiers and civilians (including the current chapter president, First Sergeant [Retired] Bobby Williams) to carry on that same legacy for all Dragon Soldiers in the heart of the Ozarks.

The Regimental Association System exists to instill a sense of the past and an appreciation of Soldiers who previously served. Membership in CCRA also reinforces a sense of the present, providing a means of preserving a legacy for those who will follow. This broad system manifests itself in small ways. For example, in looking at the symbolism of the regimental crest, we realize that Soldiers just like those of today are the ones who made those symbols important. And the symbol is more than just a unit crest worn over the right pocket; that hunk of metal was bought and paid for long ago. It instills in Soldiers something that will help them when times are tough and something that will endure for the rest of their lives—pride.[1]

During the last 8 years, the Ozarks Chapter has supported many events that have had a direct impact on CBRN Soldiers and their Families. The chapter has supported charities and Soldiers in times of emergency, and it is a critical contributor to membership of CCRA. A leader validation event, referred to as the Phoenix Challenge, is held by the 3d Chemical Brigade; and after the event, the Ozarks Chapter board members barbeque hamburgers and bratwursts at no cost to the participants.

The Ozarks Chapter of CCRA supports a number of annual events, including Regimental Week activities, a 5-kilometer run/walk, golf scrambles, chili cook-offs, barbeques, and the regimental birthday celebration. Events are open to all Soldiers, chapter members, Family members, and the local community. For more information on these events, visit the CCRA Web site at <https://www.ozarkccra.org> and click on the "Events" tab or visit the CCRA Facebook page at <https://www.facebook.com/ozarkccra>.

Note: No Army or Department of Defense endorsement of chapter activities is stated or implied by this article.

Endnote:

[1]Chemical Corps Regimental Association Web site, <http://www.ccrassn.org/chemcorphist.htm>, accessed on 20 October 2016.

Mrs. McCann is the secretary of the Ozarks Chapter, CCRA. She is the deputy chief of the CBRN Doctrine Branch for the Maneuver Support Center of Excellence, Fort Leonard Wood, Missouri. She retired from the U.S. Army as a first sergeant. She holds a bachelor's degree in homeland security and emergency management from Ashford University, San Diego, California.

DOCTRINE UPDATE

U.S. Army Maneuver Support Center of Excellence Capabilities Development Integration Directorate Concepts, Organization, and Doctrine Development Division			
Number	**Title**	**Date**	**Status**
Joint Publications			
The U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS) is not the proponent for joint publications (JPs). However, the Chemical, Biological, Radiological, and Nuclear (CBRN) Doctrine Branch; Concepts, Organization, and Doctrine Development Division; Capabilities Development Integration Directorate; U.S. Army Maneuver Support Center of Excellence, is often a key stakeholder and sometimes the lead agent for a JP. Five JPs affect the development or revision of tactical-level CBRN publications.			
JP 3-11	*Operations in Chemical, Biological, Radiological, and Nuclear (CBRN) Environments*	4 Oct 13	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 Jul 13	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 Jul 13	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. Finally, 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 Oct 14	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 Jun 12	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.
Multi-Service Publications			
The USACBRNS is the U.S. Army proponent and lead agent for eight tactical-level, multi-Service publications. Seven of the publications are sponsored 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 Jul 11	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).			

Number	Title	Date	Status
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 Nov 13	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 16	Current.
ATP 3-11.32 contains information for conducting 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 Nov 13	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 Mar 13	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 Jul 15	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 14	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, U.S. 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 Apr 13	Current.

Number	Title	Date	Status
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.			
Army-Only Publications			
The USACBRNS is the U.S. 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 14	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 about specific technical CBRNE force missions, organizations, capabilities, and employment considerations.			
ATP 3-11.50	*Battlefield Obscuration*	15 May 14	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.			
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 3-38.1 NTTP 3-11.36 AFTTP 3-2.82	*Multi-Service Tactics, Techniques, and Procedures for Installation Emergency Management*	23 Jun 14	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 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.			

"Doctrine is indispensable to an Army. Doctrine provides a military organization with a common philosophy, a common language, a common purpose, and a unity of effort."

—General George H. Decker,

U.S. Army Chief of Staff, 1960–1962

Professional Military Education

Qualification training courses are listed and described in Table 1.

Table 1. Qualification training courses

Enlisted/Noncommissioned Officer (NCO) Qualification Training Courses	
74D10 Chemical, Biological, Radiological, and Nuclear (CBRN) Specialist Course (School Code 031)	
Phase I (Course 031-74D10 [R] [dL])	Once Soldiers are enrolled in Phase I, they will receive e-mail instructions from the Army Distributed Learning Program via Army Knowledge Online (AKO). Students must complete Phase I before reporting for Phase II training. An Army Correspondence Course Program (ACCP) certificate of completion (e-mailed) or other documentation must be presented as proof of Phase I completion during Phase II in-processing. Soldiers who experience problems with Phase I should telephone the ACCP at (800) 275-2872 (Option 3) or (757) 878-3322/3335. If no ACCP representative is available, they should contact Master Sergeant Larry Foreman at (573) 563-7757 or <larry.d.foreman.mil@mail.mil>.
74D10 CBRN Specialist Course (School Code L031)	
Phases II and III (Course 031-74D10 [R1])	These phases consist of resident training conducted at Fort Leonard Wood, Missouri. Soldiers must have an e-mail printout indicating that they have completed Phase I. Soldiers who fail to provide the printout are returned to their units.
74D 2/3/4 CBRN Transition Course (School Code L031)	
This is a three-phase resident course. Soldiers attending the CBRN Transition Course (031-74D2/3/4) must be graduates of a military occupational specialty (MOS) Advanced Leader Course (ALC) or Basic Noncommissioned Officer Course (BNCOC). Soldiers who have not attended ALC or BNCOC must attend the CBRN Specialist Course (031-74D10) to become 74D10 MOS-qualified. Hazmat Awareness Training is now a prerequisite for all courses. The Air Force Civil Engineer Center (AFCEC) Web site no longer contains the training. Training can still be completed at <http://totalforcevlc.golearnportal.org/>. (A common access card [CAC] is required.)	
74D30 CBRN ALC (School Code L031, Course 031-74D30-C45)	
CBRN ALC is a three-phase resident course. Phase I is waived for Soldiers who possess a certificate indicating that they have completed Department of Defense (DOD)-certified hazmat training at the technician level. Effective 1 October 2014, graduation from Structured Self-Development, Level II, is a prerequisite for attending CBRN ALC.	
74D40 Senior Leader Course (SLC) (School Code L031, Course 031-74D40-C46)	
This is a three-phase resident course conducted at Fort Leonard Wood. Graduation from Structured Self-Development, Level III, is a prerequisite for attending SLC.	
Officer Qualification Training Courses	
CBRN Captain's Career Course (C3) (School Code 031)	
Phase I (Course 4-3-C23 [dL])	This branch-specific distributed learning (dL) phase consists of 108 hours of dL instruction, which must be completed within 60 days before attending Phase II. Unit trainers enroll Soldiers through the Army Training Requirements System (ATTRS). Students receive e-mail instructions from the Army Distributed Learning Program. Hazmat awareness training can be accessed at <https://afcec.adls.af.mil> and completed by students prior to attending Phase II. Students who encounter problems should contact the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS) U.S. Army Reserve (USAR) Training Development NCO, Master Sergeant Larry Foreman, at (573) 563-7757 or <larry.d.foreman.mil@mail.mil>. The successful completion of Phase I is a prerequisite for Phase II attendance.
Phase II (Course 4-3-C23)	This branch-specific resident phase consists of 2 weeks of training conducted at USACBRNS. The focus is on radiological operations, live-agent training, hazmat awareness and operations level training and certification, and the basics of the Joint Warning and Reporting Network used within the Maneuver Control System. The successful completion of Phase II is a prerequisite for enrollment in Phase III.
Phase III (Course 4-3-C23 [dL])	This common-core (CC) phase consists of 59.2 hours of dL instruction. Unit trainers enroll Soldiers through ATTRS. Students receive e-mail instructions from the Army Distributed Learning Program. Students must complete Phase III within 60 days of attending Phase IV. Those who encounter problems should contact Master Sergeant Foreman at (573) 563-7757 or <larry.d.foreman.mil@mail.mil>. The successful completion of Phase III is a prerequisite for Phase IV attendance.
Phase IV (Course 4-3-C23)	This resident phase consists of 2 weeks of training conducted at USACBRNS. The focus is on a computer-aided exercise that includes additional Joint Warning and Reporting Network and Maneuver Control System training, culminating in a military decisionmaking process exercise using state-of-the-art battle simulation equipment.

Joint Senior Leader Course (Course 4K-74A/494-F18)
This is a 4-day course for senior leaders focusing on operational- and strategic-level aspects of countering weapons of mass destruction (WMD). Participants also receive toxic-agent training at the Chemical Defense Training Facility. In addition, the Joint SLC forum offers a unique opportunity for senior military leaders, civilian government agency leaders, and leaders representing allied and coalition partners to exchange ideas. You are required to register for the Joint SLC through the Joint SLC action officer, Mr. Brad Sanders at <bradley.w.sanders.ctr@mail.mil> or (573) 528-9491. Registration through ATTRS will not guarantee a seat and may result in being bumped from the course.
CBRN Precommand Course (Course 4K0F4)
This is a 5-day course that prepares Regular Army and Reserve Component (RC) officers who have been selected for command of a CBRN battalion or brigade or a CBRN position in a division. Each student receives instruction in the application of Army Doctrine Publication (ADP) 7-0, *Training Units and Developing Leaders*, concepts to the battalion training management process.
Note: Additional information is available at <https://www.atrrs.army.mil/>.

The courses shown in Table 2 are required by command and control chemical, biological, radiological, and nuclear response element (C2CRE); chemical, biological, radiological, nuclear, and explosives enhanced response force package (CERFP); WMD–civil support team (CST); domestic response force; and homeland response force units for MOS qualification.

Table 2. Functional training courses

Mass Casualty Decontamination Course (School Code 031, Course 4K-F25/494-F-30)
This 9-day course is appropriate for CERFP and domestic-response casualty decontamination team members. Students who successfully complete the course receive certification at the operations levels. The Hazmat Awareness course is now a prerequisite for all courses. The AFCEC Web site no longer contains the training. Training can still be completed at <http://totalforcevlc.golearnportal.org/>. (A CAC is required.)
CBRN Responder Course (School Code 031, Course 4K-F24/494-F29)
This 10-day course is appropriate for C2CRE members. All students attending the course must be International Fire Service Accreditation Congress (IFSAC) DOD awareness-certified before arriving. Students who successfully complete the course receive certification at the hazmat operations and technician levels.
Civil Support Skills Course (CSSC) (School Code 031, Course 4K-F20/494-28)
This 8-week course is appropriate for Army National Guard WMD-CST members. Students receive advanced training in hazmat technician and incident command and CBRN survey, point reconnaissance, sampling operations, personal protective equipment selection and certification, and decontamination. They also receive specialized training on a variety of military and commercial CBRN detection equipment.
Note: All students who successfully complete hazmat training are awarded certificates issued by IFSAC and DOD. Additional copies of certificates can be obtained at <http://www.dodffcert.com>.

A Soldier who arrives for any resident course without having first completed all appropriate dL requirements will be returned to his or her unit without action.

USACBRNS RC Personnel

Officers (O-3 through O-5) and NCOs (E-7 through E-9) who are interested in available drilling individual mobilization augmentee positions throughout USACBRNS should contact the USAR training development NCO.

Field grade USAR officers who would like to transfer into the Chemical Corps should contact the USACBRNS Deputy Assistant Commandant–Army Reserve (DAC-AR) for specific branch qualification information.

The 3d Brigade (Chemical), 102d Division (Maneuver Support), is currently seeking instructors for various locations. An applicant should be an E-6 or E-7, should be qualified (or able to be trained) as an Army basic instructor, and should have completed the appropriate NCO Education System coursework. Interested Soldiers should contact the brigade senior operations NCO, Master Sergeant Yamil Rodriguez at (860) 570-7114 or <yamil.rodriguez.mil@mail.mil>.

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Reference:

ADP 7-0, *Training Units and Developing Leaders*, 23 August 2012.

The Commandant's Reading Program

Compiled by Lieutenant Colonel James P. Harwell

President Harry S. Truman once said, "Not all readers are leaders, but all leaders are readers." Reading should form the foundation of every leader's self-development program. It supplements institutional training and operational experience and provides leaders with knowledge to react to a complex world. The Commandant's Reading Program provides chemical, biological, radiological, and nuclear (CBRN) leaders with the basis for a lifelong self-development program. It supplements other reading lists from the Chief of Staff of the Army to the local unit level, with a particular emphasis on the CBRN profession. The Commandant's Reading Program is all-inclusive. CBRN leaders should use it as a guide, but should develop their personal programs based on their individual needs, knowledge, and experiences.

With each issue of *Army Chemical Review*, the reading program continues to evolve. Based on Brigadier General James Bonner's guidance, the program is expanding. Previous entries on the CBRN profession and weapons of mass destruction (WMD) terrorism are now joined by entries on leadership; strategy; and the building of agile, adaptive leaders and effective organizations. Lastly, each issue continues to include works on contemporary issues facing the CBRN community of practice and profession of arms.

CBRN Profession

- Graham T. Allison, *Nuclear Terrorism: The Ultimate Preventable Catastrophe*, Henry Holt and Company, LLC, New York, 2004, ISBN-13: 978-0-8050-7852-7.
- Kurt M. Campbell et al., *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices*, Brookings Institution Press, Washington, D.C., 2004, ISBN-13: 978-0-8157-1330-2.
- Charles D. Ferguson and William C. Potter, *The Four Faces of Nuclear Terrorism*, Routledge, Taylor, & Francis Group, New York, 2005, ISBN-13: 978-0-415-94244-1.
- Laurie Garrett, *The Coming Plague: Newly Emerging Diseases in a World Out of Balance*, The Penguin Group, New York, 1994, ISBN-13: 978-0-14-025091-6.
- Richard L. Garwin and Georges Charpak, *Megawatts and Megatons: The Future of Nuclear Power and Nuclear Weapons*, University of Chicago Press, Chicago, 2002, ISBN-13: 978-0-226-28427-9.
- Robert Harris and Jeremy Paxman, *A Higher Form of Killing: The Secret History of Chemical and Biological Warfare*, Random House Publishing Group, 2002, ISBN-13: 978-0-8129-6653-4.
- David E. Hoffman, *The Dead Hand: The Untold Story of the Cold War Arms Race and Its Dangerous Legacy*, Anchor Books, New York, 2009, ISBN-13: 978-0-307-38784-4.
- Gregory D. Koblentz, *Living Weapons: Biological Warfare and International Security*, Cornell University Press, New York, 2009, ISBN-13: 978-0-8014-7752-2.
- William Langewiesche, *The Atomic Bazaar: The Rise of the Nuclear Poor*, Farrar, Straus, and Giroux, New York, 2007, ISBN-13: 978-0-374-10678-2.
- Judith Miller et al., *Germs: Biological Weapons and America's Secret War*, Touchstone, New York, 2002, ISBN-13: 978-0-684-87159-2.
- Michael B. A. Oldstone, *Viruses, Plagues, & History: Past, Present, and Future*, Oxford University Press, New York, 2010, ISBN-13: 978-0-19-532731-1.
- Jonathan B. Tucker, *War of Nerves: Chemical Warfare from World War I to Al-Qaeda*, Anchor Books, New York, 2006, ISBN-13: 978-1-4000-3233-4.

WMD Terrorism

Through the last decade, the U.S. Army Chemical Corps and partners from across the CBRN enterprise have provided persistent support to the U.S. Northern Command Defense CBRN Response Force mission. These WMD terrorism-focused entries provide a balance of technological and policy challenges that are facing the Nation, the Army, and the Corps.

- Center for the Study of Weapons of Mass Destruction, "Are We Prepared? Four WMD Crises That Could Transform U.S. Security," National Defense University Press, Washington, D.C., June 2009, <http://wmdcenter.ndu.edu/Portals/97/Documents/Publications/Articles/2009_4_wmd_crises.pdf>, accessed on 28 October 2016.
- Michael A. Levi, *On Nuclear Terrorism*, Harvard University Press, Massachusetts, 2007, ISBN-13: 978-0674032385.
- Stephen M. Maurer, editor, *WMD Terrorism: Science and Policy Choices*, MIT Press, Massachusetts, 2009, ISBN-13:978-0262012980.
- Jonathan B. Tucker, editor, *Toxic Terror: Assessing Terrorist Use of Chemical and Biological Weapons*, MIT Press, Massachusetts, 2000, ISBN-13: 978-0-262-79971-9.

Leadership

- Marcus Aurelius, *The Emperor's Handbook: A New Translation of the Meditations*, Scribner, New York, 2002, ISBN-13: 978-0743233835.
- David Cloud and Greg Jaffe, *The Fourth Star: Four Generals and the Epic Struggle for the Future of the United States Army*, Three Rivers Press, New York, 2009, ISBN-13: 978-0307409072.
- Eliot A. Cohen and John Gooch, *Military Misfortunes: The Anatomy of Failure in War*, Free Press, New York, 1990, ISBN-13: 978-0743280822.
- Epictetus, *Enchiridion*, Dover Publications, New York, 2004, ISBN-13: 978-0486433592.
- Victor Davis Hanson, *The Savior Generals: How Five Great Commanders Saved Wars That Were Lost–From Ancient Greece to Iraq*, Bloomsbury Publishing, New York, 2013, ISBN-13: 978-1608193424.
- John P. Kotter, *Power and Influence*, Free Press, New York, 1985, ISBN-13: 978-1439146798.
- Stanley A. McChrystal, *My Share of the Task: A Memoir*, Portfolio, New York, 2014, ISBN-13: 978-1591846826.
- David Richards, *Taking Command*, Headline, London, 2014, ISBN-13: 978-1472220844.
- Thomas E. Ricks, *The Generals: American Military Command from World War II to Today*, The Penguin Press, New York, 2012, ISBN-13: 978-0143124092.
- James B. Stockdale, *Thoughts of a Philosophical Fighter Pilot*, Hoover Institution Press, California, 1995, ISBN-13: 978-0817993924.
- Martin van Creveld, *Command in War*, Harvard University Press, Massachusetts, 1985, ISBN-13: 978-0674144415.
- Anthony C. Zinni and Tony Koltz, *Before the First Shots Are Fired: How America Can Win or Lose Off the Battlefield*, St. Martin's Press, New York, 2014, ISBN-13: 978-1137279385.

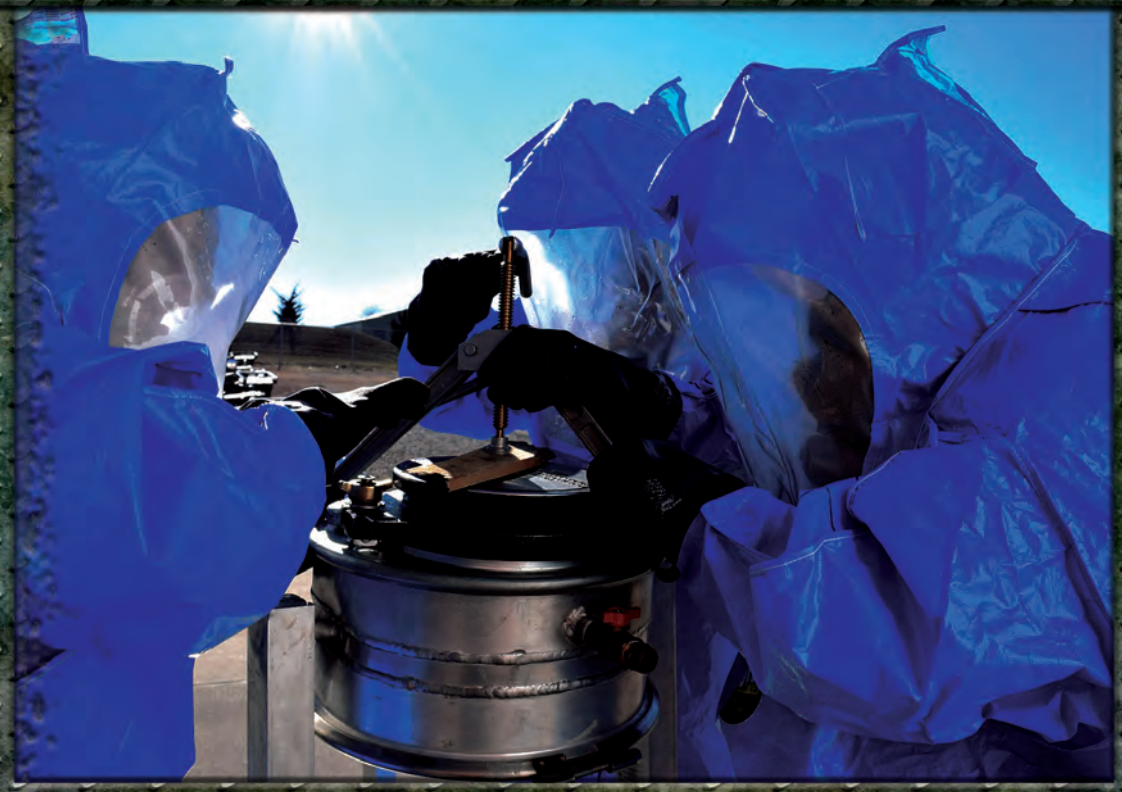
Strategy

- Zbigniew Brzezinski, *Strategic Vision: America and the Crisis of Global Power*, Basic Books, New York, 2012, ISBN-13: 978-0465061815.
- Everett C. Dolman, *Pure Strategy: Power and Principle in the Space and Information Age*, Frank Cass, New York, 2005, ISBN-13: 978-0714684987.
- Lawrence Freedman, *Strategy: A History*, Oxford University Press, Oxford, 2013, ISBN-13: 978-0199325153.
- Richard N. Haass, *Foreign Policy Begins at Home: The Case for Putting America's House in Order*, Basic Books, New York, 2013, ISBN-13: 978-0465071999.
- George C. Herring, *From Colony to Superpower: U.S. Foreign Relations Since 1776*, The Oxford History of the United States, Oxford University Press, New York, 2008, ISBN-13: 978-0199765539
- Robert D. Kaplan, *Asia's Cauldron: The South China Sea and the End of a Stable Pacific*, Random House, New York, 2014, ISBN: 978-0-8129-9432-2.
- Robert D. Kaplan, *The Revenge of Geography: What the Map Tells Us About Coming Conflicts and the Battle Against Fate*, Random House Trade Paperbacks, New York, 2012. ISBN-13: 978-0-8129-8222-0.
- Paul M. Kennedy, *The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000*, Random House, New York, 1987, ISBN-13: 978-0679720195.
- Stanley A. McChrystal, et al., *Team of Teams: New Rules of Engagement for a Complex World*, Portfolio, New York, 2015, ISBN-13: 978-0241250839.
- Williamson Murray and Peter R. Mansoor, *Hybrid Warfare: Fighting Complex Opponents from the Ancient World to the Present*, Cambridge University Press, New York, 2012, ISBN-13: 978-1107643338.
- Joseph S. Nye Jr., *The Future of Power*, Public Affairs, New York, 2011, ISBN-13: 978-1610390699.
- Nancy Sherman, *Stoic Warriors: The Ancient Philosophy Behind the Military Mind*, Oxford University Press, New York, 2005, ISBN-13: 978-0195315912.
- Richard H. Shultz and Andrea J. Dew, *Insurgents, Terrorists, and Militias: The Warriors of Contemporary Combat*, Columbia University Press, New York, 2006, ISBN-13: 978-0231129824.

The Building of Agile, Adaptive Leaders and Effective Organizations

As the Army continues to transform to meet enduring and emerging threats, it requires leaders that understand and can implement the mission command philosophy across all levels. The contemporary operating environment requires leaders and teams capable of adapting to an ever-changing operating environment. The following books provide insights into the development of organizations that can thrive and win in a complex world:

- Ori Brafman and Rod A. Beckstrom, *The Starfish and the Spider: The Unstoppable Power of Leaderless Organizations*, Portfolio, New York, 2007, ISBN-13: 978-1591841838.
- Peter M. Senge, *The Fifth Discipline: The Art and Practice of the Learning Organization*, Currency Doubleday, New York, 1990, ISBN-13: 978-0553456349.
- Schultz Richard, "Military Innovation in War: It Takes a Learning Organization," Joint Special Operations University Report 16-6, 2016, <http://jsou.libguides.com/ld.php?content_id=23175790>, accessed on 28 October 2016.



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