Army Chemical Review

The Professional Bulletin of the Chemical Corps

Summer 2018

U.S. Army Chemical Corps
100 Years
Honoring the Past 1918–2018 Preparing for the Future

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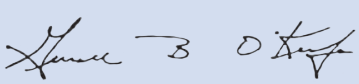

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Army Chemical Review

The Professional Bulletin of the Chemical Corps

PB 3-18-1, Summer 2018

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

Honor the Past

Brigadier General
Andy Munera

Celebrating the 100th anniversary of the U.S. Army Chemical Corps has provided many opportunities to reflect on our proud history. Founded on the battlefields of France during World War I, the U.S. Army Chemical Corps has served with distinction in every conflict since its inception. I walk past pictures of each member of our Hall of Fame every day, and I am inspired by their immense contribution to our Army. They are but a small reflection of the contributions that Dragon Soldiers make to the Nation on a daily basis.

As Chief of Chemical for the last year, I have had the opportunity to see Dragon Soldiers and leaders in action in forward-deployed locations, at combat training centers, and at home station. I have also seen you defending our homeland, advising and assisting international partners, and excelling at a myriad of senior leader positions at the highest level of the Army and the Department of Defense. It is my long-held belief that Dragon Soldiers are the most versatile Soldiers in the Army. You are not only chemical, biological, radiological, and nuclear (CBRN) experts, but also proven leaders with a demonstrated ability to lead in any branch of the Army. I know we have a solid foundation upon which to build for the next century of Service to our Nation. Thank you for remaining **C**ompetent, **B**rave, **R**eady, and O**N**-point for our Nation.

Thanks to your efforts, we are seeing a revitalization of the importance of CBRN readiness and countering weapons of mass destruction (CWMD) across the Army—definitely the greatest emphasis in my 27 years of Service and arguably since our inception. We have a long path ahead of us, but we are well on the way to achieving our vision to transform the Army culture to view the presence of CBRN hazards on the battlefield as a unique opportunity to seize, retain, and exploit the initiative—ensuring that the Army is ready now and postured in the future to fight and win in a contaminated environment as part of large-scale combat operations (LSCO).

I am particularly excited about this edition of *Army Chemical Review*; I believe it offers some key insights into where we are moving as a Corps.

Combined Arms Maneuver in a Contaminated Operating Environment

One of the critical successes we've had over the last year was the execution of the Combined Arms Maneuver in a Contaminated Operating Environment (CAMCOE) tabletop exercise. CAMCOE was an exercise developed to understand how Army forces retain freedom of action in a CBRN environment, and it was conducted in close coordination with our Maneuver Center of Excellence partners at Fort Benning, Georgia. I directed CAMCOE to focus on the following key tasks:

- Consider how we give maneuver commanders "decision space" that allows them to operate.
- See CBRN as a condition of the environment and not as a special case.
- Develop the right capabilities to operate in a contaminated environment and "take advantage" of the CBRN conditions that may exist.

This enormously successful tabletop exercise provided many lessons learned that will drive capability development for many years. I charge each member of our Corps to look for ways to provide the maximum amount of decision space to enable operations for the commander and ensure that U.S. forces are postured to execute their mission in a contaminated operating environment. You can read more about the CAMCOE tabletop exercise in "Exploiting a Chemical, Biological, Radiological and Nuclear Environment" on page 47.

Army Warfighting Challenge No. 5: Countering Weapons of Mass Destruction

Army Warfighting Challenge (AWFC) No. 5 continues to drive the Army's focus on CWMD. AWFC No. 5 focuses on how Army forces prevent, reduce, eliminate, and mitigate the use and effects of weapons of mass destruction (WMD) and chemical, biological, radiological, nuclear, and explosives threats and hazards on friendly forces and civilian populations.

CWMD is a "whole of government" issue; and to be effective, it requires collaboration not only across the Army but also across the Services, other government agencies, and allies. As the primary provider of forces and capabilities in the land domain to counter WMD threats and CBRN hazards, the Maneuver Support Center of Excellence, Fort Leonard Wood, Missouri, works across warfighting functions and Services to develop holistic solutions to support maneuver commander requirements and continues to provide significant contributions to Department of Defense solutions to CWMD. "Countering Weapons of Mass Destruction: An Army Warfighting Challenge" on page 46 provides more insight on AWFC No. 5.

Integrated Early Warning

Lessons learned from CAMCOE drove me to focus our combat developers on the future of integrated early warning (IEW). We know that awareness, coupled with assessment, leads to understanding over time. Understanding allows staffs to generate options and provides a commander with confidence and the ability to make proactive risk-based decisions. Therefore, utilizing all sources of information drives understanding "sooner" and with less risk by reducing vulnerabilities. In simple terms, we must evolve capabilities to detect hazards at a distance before we are standing in contamination. The goal of IEW is to reduce the time required to transition from situational awareness to situational understanding—not to be predictive, but proactive and situationally informed. "Winning in an Uncertain Environment: Integrated Early Warning" on page 19 provides a foundational understanding of the IEW concept.

Doctrine Update—Field Manual 3-11

I have directed substantial revisions to Field Manual (FM) 3-11, *Multi-Service Doctrine for Chemical, Biological, Radiological, and Nuclear Operations*, to ensure that our force is aligned with the new FM 3-0, *Operations*, and that we are prepared to execute our CBRN tasks in support of LSCO.[1,2] The completion of FM 3-11 is on an expedited timeline. We are working closely with leaders and staff in the field to ensure that we get this foundational document right. I need you to contribute to discussions that are shaping this manual as we undergo staffing for comment. There are two main objectives of the new FM 3-11:

- Capture CBRN capabilities in decisive action in the conduct of LSCO.
- Align CBRN roles and responsibilities to the operational Army at division levels and below.

The new FM 3-11 introduces our core competencies of assessing hazards, providing protection, and mitigating CBRN effects and their links to support decisive action. The Chemical Branch core competencies are the strengths, operational advantages, and essential contributions that our Corps makes to the Army and the joint force. These core competencies provide a focus for leader development, force design, and unit training. Understanding and excelling at these competencies allow Army leaders to contribute to mission success across the range of military operations. "Doctrine Update: FM 3-11, CBRN Operations" on page 57 provides a framework for our discussion as we rewrite this important field manual.

Preparation for the Future

The CAMCOE, AWFC No. 5, IEW, and FM 3-11 efforts are part of a larger process that is setting conditions for our future success. I'm proud to be the Chief of Chemical at this critical moment in our history when we take time to honor the past and prepare for the future. I charge each of you to honor our past and our traditions and help drive change to our Army's culture. Our military must be ready to fight and win our Nation's wars in a CBRN environment and protect our homeland.

As we celebrate our past and move toward our next 100 years of Service, one thing has not changed—the fierce resolve of the Dragon Soldier, which serves as the bedrock of deterrence to ensure that our adversaries don't employ WMD; and if they do, ensures that the Army is ready to fight and win in a contaminated environment. Our objective must remain ensuring unit proficiency on CBRN defense tasks and conducting mission-essential tasks in a CBRN environment. We will accomplish these tasks by seeking to increase CBRN defense proficiency at the unit level, evolving CBRN as part of a complex operating environment, and modernizing CBRN defense capabilities. Our end state goal is to retain freedom of action in a CBRN environment.

I am Andy Munera, and I am a Dragon Soldier—**C**ompetent, **B**rave, **R**eady, and O**N**-point for our Nation.

Endnotes:

[1]FM 3-11, *Multi-Service Doctrine for Chemical, Biological, Radiological, and Nuclear Operations*, to be published.

[2]Army Doctrine Reference Publication 3-0, *Operations*, 6 October 2017.

Elementis regamus proelium!

Chemical Corps Command Sergeant Major

Greetings! I'm honored and proud to be a member of the Chemical Corps—the most magnificent Corps in the U.S. Army. On 28 June 2018, our Corps will reach a landmark centennial birthday. Therefore, I ask that you join me in celebrating this once-in-a-lifetime occasion.

Command Sergeant Major Henney M. Hodgkins

Leadership

For more than 240 years, the professional noncommissioned officer (NCO) has played a substantial role as a leader of Soldiers. The roles and responsibilities of the NCO have always been to lead, train, and care for Soldiers and equipment while enforcing standards. Although the principles associated with the NCO Corps will never change, the future operating environment will undoubtedly be more complicated and unknown. Dragon Soldiers, we must be prepared to operate in this environment. The campaign to increase lethality starts in initial military training and is incorporated at all levels of our professional military education. The revisions of our programs of instruction aim to provide U.S. Army Forces Command (FORSCOM) with Soldiers who perform their duties successfully, with discipline and to standard, and who effectively and ethically accomplish the mission despite adversity, obstacles, and/or challenges. Leaders, as you receive these Soldiers within your ranks, it is essential that you continue to coach, mentor, and teach. Adequately integrating these Service members into unit training and providing a clear understanding of unit tactics, techniques, and procedures decrease the time required to support a maneuver commander's request to employ our capabilities.

Preparation for the Future

As we honor the past and prepare for the future, we must pivot from a counterinsurgency mindset to large-scale combat operations (LSCO). LSCO require that our Soldiers are ready to excel and survive in austere environments. We must ensure that our Soldiers are physiologically prepared for the harsh realities of the potential mass casualties of LSCO and increased vulnerabilities to the effects of chemical, biological, radiological, and nuclear (CBRN) hazards. Therefore, it is paramount that we continue to improve Soldiers' lethality, individual and collective training, and knowledge gaps as they pertain to operating on a contested battlefield.

LSCO will create high demands for CBRN personnel and health service professionals. Leaders at all echelons must make every effort to ensure that our force remains deployable to fight and win our Nation's wars. Our Soldiers must be equipped, trained, and prepared to execute reconnaissance and surveillance tasks "to provide commanders with detailed, timely, and accurate CBRN intelligence and to gain situational understanding of CBRN threats and hazards."[1] Area support companies must be prepared to conduct decontamination of targeted areas, and they must possess a level of familiarization to fill in gaps within other specialized areas of our career management field.

Maintenance and Supply Accountability

Leader involvement in maintenance and supply accountability is crucial. The common saying goes, "Check and verify its legitimacy." I encourage every leader to become personally involved with the maintenance of assigned equipment. It is virtually impossible to execute our wartime mission if our equipment is not maintained at or above 10/20 standards. Our brigades cannot be task-organized to support combatant commanders, subordinate joint force commanders, Army force commanders, or functional components faced with CBRN threats or hazards with inadequately maintained equipment or a lack of supply accountability. Supply accountability also involves chemical defense equipment—not just Class IX parts. We must ensure accurate accounts of chemical defense equipment, from corps level down to companies and teams. Force protection is vital to mission success!

Expert Soldier Badge

As directed by the Department of the Army, the U.S. Army Training and Doctrine Command (TRADOC) developed and established a new proficiency badge called the Expert Soldier Badge to recognize trained and ready Soldiers who achieve expert qualifications in warrior tasks and Soldier competencies while demonstrating character and commitment.

(Continued on page 6)

Chemical Corps Chief Warrant Officer

Greetings, Dragon Soldiers! I first would like to say Happy Centennial to our beloved Chemical Corps and the U.S. Army warrant officer cohort.

As we celebrate the centennial of the Chemical Corps, our Army is preparing for the next contingency. Warrant officers will play an instrumental role in preparing the Army for the next fight. Large-scale combat operations (LSCO) require chemical, biological, radiological, and nuclear (CBRN) warrant officers to be trained, proficient, and capable of providing advanced troubleshooting of CBRN systems in the absence of contractual support; be able to plan for the sustainment of CBRN systems during semi-autonomous; and to be contributors to the development and modernization of CBRN systems.

Chief Warrant Officer Two
Jesse S. Deberry

Regaining Ownership of our Profession

Over the past 15 years, we've become reliant on contractual support to maintain our CBRN equipment. Reliability on contractual support has come at the atrophy of technical skill within the warrant officer population. In General Gustave F. Perna's article, "Warrants: Take Back Your Profession," Perna explains the importance of warrant officers getting back to the basics.[1] "Warrant officers must take back ownership of their profession and reassume control as the Army's technical experts, masterfully administering, managing, maintaining, operating, and integrating Army systems across the spectrum of Army operations," he says.[2] The campaign to regain ownership of our profession must begin at the institutional level, within our warrant officer initial military training and professional military education. Graduates of warrant officer professional military education are equipped with the technical foundation and proficiency to integrate systems, perform advanced troubleshooting on par with current field service representatives, and facilitate the training and employment of CBRN systems. Through the redundant application of technical skill, extensive self-development, and emerging equipment technical refreshers, warrant officers can close the technological knowledge gap between the operator and field service representatives. As contractual support attenuates, the warrant officer skill set must progress to meet the challenges of contractual void.

Meeting LSCO Sustainment Demand Challenges

The Army transition from counterinsurgency focus to LSCO will change the way we sustain ourselves. We will no longer have the luxury of conducting missions and resetting from a forward observation base. Future operations will be conducted semi-independently and dispersed within a contested environment. The Army goal for conducting LSCOs is to conduct operations without resupply for 7 to 10 days. Leaders must anticipate the sustainment challenges associated with semi-dependent LSCOs within austere environments. Future modernization efforts and new materiel solutions should include demand reduction considerations. For example, nonaquatic decontamination solutions would be ideal for the support of maneuver in the future fight against a near-peer threat. Water is projected to be one of the highest-demand assets during LSCO. Demand is defined as a unit operational requirement for services or commodities that enable freedom of action, extend operational reach, or prolong endurance and that the unit cannot independently produce or acquire. Innovative internal methods to cross-level equipment and unique consumables will allow our units the ability to support maneuver under increased demand conditions.

Upgrading and Modernizing CBRN Systems

To meet the future challenges of LSCOs, the Chemical Corps must be able to assess, protect the force, and mitigate CBRN hazards in stride, with no degradation to combat operations. Near-peer adversaries are projected to have the access and capability to employ weapons of mass destruction, intermittent air superiority, and cyber-electromagnetic threats as well as cause challenges for resupply. Based on these projected threats and current equipment challenges, the Chemical Corps is focusing its near-term and modernization efforts to improve remote real-time integrated assessment, individual and collective protection, and mitigation of CBRN hazards. In early fiscal year 2019, CBRN warrant officers will have the opportunity to serve as capability developers within the Capabilities Determination Division, U.S. Army Training and Doctrine Command. CBRN warrant officers' experience and expertise on current CBRN capabilities and threats will be leveraged to help drive future materiel solutions. Beginning in July 2018, the Joint Program Manager–Contamination Avoidance will initiate uninterrupted power supply upgrades to Nuclear Biological Chemical Reconnaissance Vehicle sensor suites. The fielding of the M53A1 Joint Service General–Protective Mask to CBRN units is scheduled for fiscal year 2019. The fielding of the Joint General–Purpose Decontaminant is near test completion for the purpose of hardening equipment and terrain decontamination.

Conclusion

This will be my last entry as the Chemical Corps Chief Warrant Officer (CCWO). It has truly been an honor to serve you for the past 24 months. Thank you for your support. Please welcome Chief Warrant Officer Three Robert A. Lockwood as the third CCWO. I look forward to his leadership, and I am excited to see where he next takes the cohort.

I recommend the following reading for warrant officers:

- Gustave F. Perna, "Warrants: Take Back Your Profession!" *Newsliner*, January 2018, p. 6.
- Army Capabilities Integration Center, "Demand Reduction: Setting Conditions to Enable Multi-Domain Battle White Paper," 21 February 2018, <http://www.arcic.army.mil/App_Documents/Demand-Reduction-White-Paper-21-Feb-2018.pdf>, accessed on 20 April 2018.
- Richard R. Kunz, "What Does The New Field Manual 3-0, *Operations*, Mean for the Warrant Officer Cohort?" *Newsliner*, March 2018, p. 8.

Endnotes:

[1]Gustave F. Perna, "Warrants: Take Back Your Profession," *Newsliner*, January 2018, p. 6.

[2]Ibid.

Reference:

Field Manual 3-0, *Operations*, 6 October 2017.

Elementis regamus proelium!

("Chemical Corps Command Sergeant Major", continued from page 4)

All Soldiers except those in the Infantry, Special Forces, and Medical career management fields can compete for the Expert Soldier Badge. The components required include—

- A current Army physical fitness test with at least 80 points in each event (which will transition to the Army combat readiness test when formalized).
- Completion of a 12-mile foot march in less than 3 hours.
- Completion of 30 individual standard testing stations and five commander-selected stations.
- A written examination.

Conclusion

Thanks to all the commands that have hosted our visits over the last 2 years. My engagements with Dragon Soldiers from Korea to Germany and Joint Base Lewis–McCord, Washington, to Fort Bragg, North Carolina, have been inspirational. It is amazing how motivated and eager our warriors are to learn and to ensure that we are prepared to support combatant commanders and defend our homeland.

I would like to send a heartfelt congratulations to the following leaders on their selection to serve as brigade and battalion command sergeants major:

- Command Sergeant Major Kyle Brinkman (U.S. Army Dugway Proving Ground, Utah).
- Command Sergeant Major Roger Mathews (3d Chemical Brigade, Fort Leonard Wood, Missouri).
- Command Sergeant Major Darrell Smith (2-48th Infantry Regiment, Fort Leonard Wood, Missouri).
- Sergeant Major Chesley Baird (83d Chemical Battalion, Fort Stewart, Georgia).
- Master Sergeant Tremayne Robbins (U.S. Army Garrison, Hunter Army Airfield, Georgia).

Until next time, please be safe and continue to do great things for our Corps!

Endnote:

[1]Field Manual 3-0, *Operations*, 6 October 2017, p. 2-51.

Elementis regamus proelium!

Destruction of Chemical Munitions on San Jose Island, Panama

By Lieutenant Colonel Chi K. Nguyen

"The San Jose Island mission required years of coordination with the government of Panama, the [Organization for the Prohibition of Chemical Weapons] OPCW, the American Embassy, and our Army South implementers and highlighted the need for a specialized [chemical, biological, radiological, and nuclear] CBRN and [explosive ordnance disposal] EOD units like the 20th [Chemical, Biological, Radiological, Nuclear, and Explosives] CBRNE Command. Our Soldiers and civilians were able to execute this international, high-profile chemical weapons elimination project without a hitch. It is a superb example of how the 20th combines CBRN and EOD capabilities and expertise to operate effectively across the full spectrum of CBRNE hazards to accomplish a mission no one else could do."

–Brigadier General James E. Bonner, Commander, 20th CBRNE Command[1]

Background

With the advent of chemical weapons during World War I, by the start of World War II, the Allied nations had grave concerns about the Axis use of chemical weapons—hence, the need to study and test chemical munitions for possible use in defensive and offensive postures. Decades after the conclusion of the tests, questions still remain about potential hazards remaining from the program.

San Jose Island is located approximately 55 miles from Panama City, Panama. The isolated, uninhabited state with its tropical environment and terrain made the island an ideal location for the United States, Canada, and Great Britain to test chemical warfare agents and munitions during World War II. Effective 6 March 1944, the United States leased the island under a 1942 treaty agreement with the Republic of Panama for the duration of the war plus 1 year.

The purpose of the San Jose Island Project was to obtain technical data on the behavior of chemical agents in a tropical environment, to ascertain chemical agent effectiveness in jungle terrain, to establish doctrine for efficient employment of chemical agents in a tropical and jungle environment, and to develop a means of reducing enemy bunkers and field fortifications in jungles with chemical weapons. Testing was conducted on nonpersistent (cyanogen chloride, phosgene, hydrogen cyanide) and persistent (mustard) agents and other types of fills (chlorine, butane, methyl salicylate, smoke, benzene, sugar water). From May 1944 to June 1947, more than 124 tests were reported.

At the request of the Panama government in 2001, OPCW conducted a technical assistance visit to San Jose Island,

R-5 AN-M79 1000-pound phosgene munition.

followed by an initial inspection in 2002 of eight munitions potentially filled with chemicals. In June 2013, the Panama government requested assistance from the United States to render the eight declared chemical munitions safe. In 2014, the Chemical, Biological, Radiological, Nuclear, and Explosives Analytical and Remediation Activity (CARA) and the U.S. Army Chemical Materials Activity (CMA) conducted site characterization (Phase I) of the eight munitions. In 2016, CARA Remediation Response East and CMA were tasked to conduct a site assessment (Phase II) of the munitions. In 2017, the Panama government submitted the documentation required by the treaty, which included a bilateral

Panama-U.S. plan for the destruction of the munitions, a verification plan, and a facility agreement that was approved by the OPCW executive council. With the assistance of the United States, this paved the way for the destruction (Phase III) of the eight World War II-era chemical munitions. The munitions consisted of six AN-M79, 1,000-pound aerial bombs; one AN-M78, 500-pound aerial bomb that potentially contained hydrogen cyanide, cyanogen chloride, or phosgene; and one M1A1 portable cylinder that was rusted through, considered destroyed, and confirmed to be empty.

Operations

The munitions slated for destruction were identified by round and number on a map; the average distance between the munitions was 300 meters. There were many challenges associated with the terrain. Before Phase I, there were no pre-existing cleared areas on San Jose Island for helicopter landing zones, casualty evacuation, or command posts. Before clearing and occupation of these areas, CARA personnel checked the routes to and from the munitions sites during all three phases to verify that there was no unexploded ordnance. In addition, paths to Rounds 2–5 required travel through approximately 500 feet of heavy vegetation. The vegetation was cut by hand and verified to be clear of unexploded ordnance hazards before all-terrain vehicles could be used to carry more than 1,000 pounds of high-energy radiographic equipment during Phase II. In order to access Rounds 6–8 during Phase III, three additional paths were created to reduce the risk to Task Force 2 verification teams as they performed post-detonation tasks while wearing chemical personal protective equipment.

The U.S. Army identified the Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD) as the technical lead for the San Jose Island Project. As the technical lead, JPEO-CBD provided program management and on-site project management for Phase I (site characterization) and Phase II (site assessment).

Phase I

Phase I was conducted by CARA and CMA in June 2014. Accurate site characterization was essential for subsequent site assessment and munitions destruction efforts. Key tasks for site characterization included validating that the munitions were of U.S. origin, ensuring that the munitions had OPCW tags, evaluating the condition of the munitions, obtaining data on the munitions, and determining the scope of work for Phase II.

Phase I was an expeditionary activity, with navigation aids, chemical detection and decontamination equipment, personal protective equipment, tools, and drinking water carried into the areas to support several hours of work before returning to vehicles for resupply. The initial routes to Rounds 6–8 were especially difficult to traverse because one end of the road was abandoned, washed out, and overgrown with Black Palm trees, while the other end of the road was home to the San Jose Island bee farm. Black Palm trees, commonly found in Panama, are dangerous because of the slender, brittle spines that are present on the trunk and can penetrate skin. Personnel traveled over the abandoned road with its washed out bridges, steep slopes, and Black Palm trees. The bees were moved prior to Phase II, with the road cleared of vegetation for Phase II and Phase III, allowing for access via all-terrain vehicles.

A CARA unexploded ordnance supervisor photographs the fuse of Round 4.

Safety was of the utmost concern. In performing the site characterization, personnel were directed to approach a munition from an upwind direction, if possible, to minimize potential for exposure to chemical hazards. Upon approaching each munition, personnel conducted a visual and unexploded ordnance sweep of the area to avoid potentially disturbing partially buried munitions. Personnel visually inspected each munition to determine its condition (holey, rusty). By visual and gross-level monitoring, personnel also determined the presence of chemical agents, if any, before proceeding with more detailed site characterization.

Once a munition was determined to be safe, personnel conducted a detailed inspection of it. Upon completion of the inspection, each munition was tagged for reference. The following information was collected:

- Photographs of the fuse, markings, and any areas of special interest.
- Measurements of the munition, to include overall diameter and any item-identifying measurements.
- Video probe data resulting from the inspection of open cavities, when possible.
- Global Positioning System coordinates for each munition on site, when possible.

Phase II

Under the program management of JPEO-CBD and led by CARA Remediation Response East, Soldiers from the 48th Chemical Brigade, 20th CBRNE Command, completed the site assessment in 2016. Organizations supporting the assessment included the U.S. Army Edgewood Chemical Biological Center (ECBC) and CMA. CMA provided an

in-house technical expert and a technical expert from the Idaho National Laboratory to analyze assessment data. The team's task was to conduct a nonintrusive assessment of the eight munitions to identify potential courses of action for their disposition. The end state goal of Phase II was to identify the chemical fill and explosive configuration of each of the munitions by X-ray radiography and gather information needed to develop disposition plans. The assessment resulted in material assessment review board recommendations, which were prepared by the Recovered Chemical Materiel Directorate, CMA, with support from CARA and ECBC.

Round 1, a cylinder, was corroded and contained obvious holes. Physical inspection showed it to be empty. Historical data confirmed that the chemical that had been in the cylinder was nonpersistent. Gross-level monitoring of the cylinder detected no chemical agents. Based on the physical condition, nonpersistent chemical agent usage, and negative monitoring results, the cylinder was determined to be empty and free of chemical agents and considered nonthreatening.

Round 2 was identified as an AN-M78, 500-pound bomb. X-ray analysis showed that the munition had a burster tube but no nose or tail fuses and that it was filled to approximately 40 to 60 percent. A Portable Isotopic Neutron Spectroscopy (PINS) chemical assay system analysis determined that Round 2 contained cyanogen chloride. It was recommended that Round 2 be slated for explosive system demilitarization. While awaiting explosive system demilitarization, Round 2 was disturbed as little as possible due to the potential for polymerization that might cause a rapid build-up of gas in a confined space, leading to a rupture of the container.

Rounds 3 and 4 were identified as AN-M79, 1,000-pound chemical bombs. PINS analysis determined that the munitions contained the chemical agent phosgene. X-ray analysis showed that Round 3 was filled to approximately 80 to 90 percent, while Round 4 was filled to approximately 80 to 85 percent. Both had a tail fuse and burster tube but no nose fuse. Although stable and structurally sound, the munition could not be safely moved due to the condition of the fuse.

Round 5 was identified as an AN-M79, 1,000-pound chemical bomb. PINS analysis determined that the munition contained phosgene. X-ray analysis showed that the munition was filled to approximately 80 percent and that it had a burster tube but no nose or tail fuse. Round 5, stable and structurally sound, was recommended for explosive system demilitarization.

Rounds 6–8 were AN-M79, 1,000-pound chemical bombs. PINS analysis determined that the munitions contained phosgene. Due to the terrain, it was not possible to X-ray the munitions to determine the percentage of agent fill. Visual inspection showed that Rounds 6 and 7 were semi-buried and that Round 8 was mostly buried. There were no obvious signs of physical damage to the munitions. However, given the condition of the fuses, they were assumed to be armed and not safe to move.

The Defense Threat Reduction Agency, Department of Defense, conducted assessments of plume effects on the area of impact and the surrounding environment that would result from explosive venting of phosgene and cyanogen chloride. Mathematical air-dispersion modelling, using various temperature and atmospheric conditions, was used to estimate the plume size. The model indicated that no plume would extend beyond the operational area. With phosgene and cyanogen chloride being nonpersistent chemicals, the immediate environmental effects would include some defoliation in the vented area, as the compounds form acidic products when exposed to water. However, the effects would be further diluted by rainwater, which would limit the impact.

Phase III

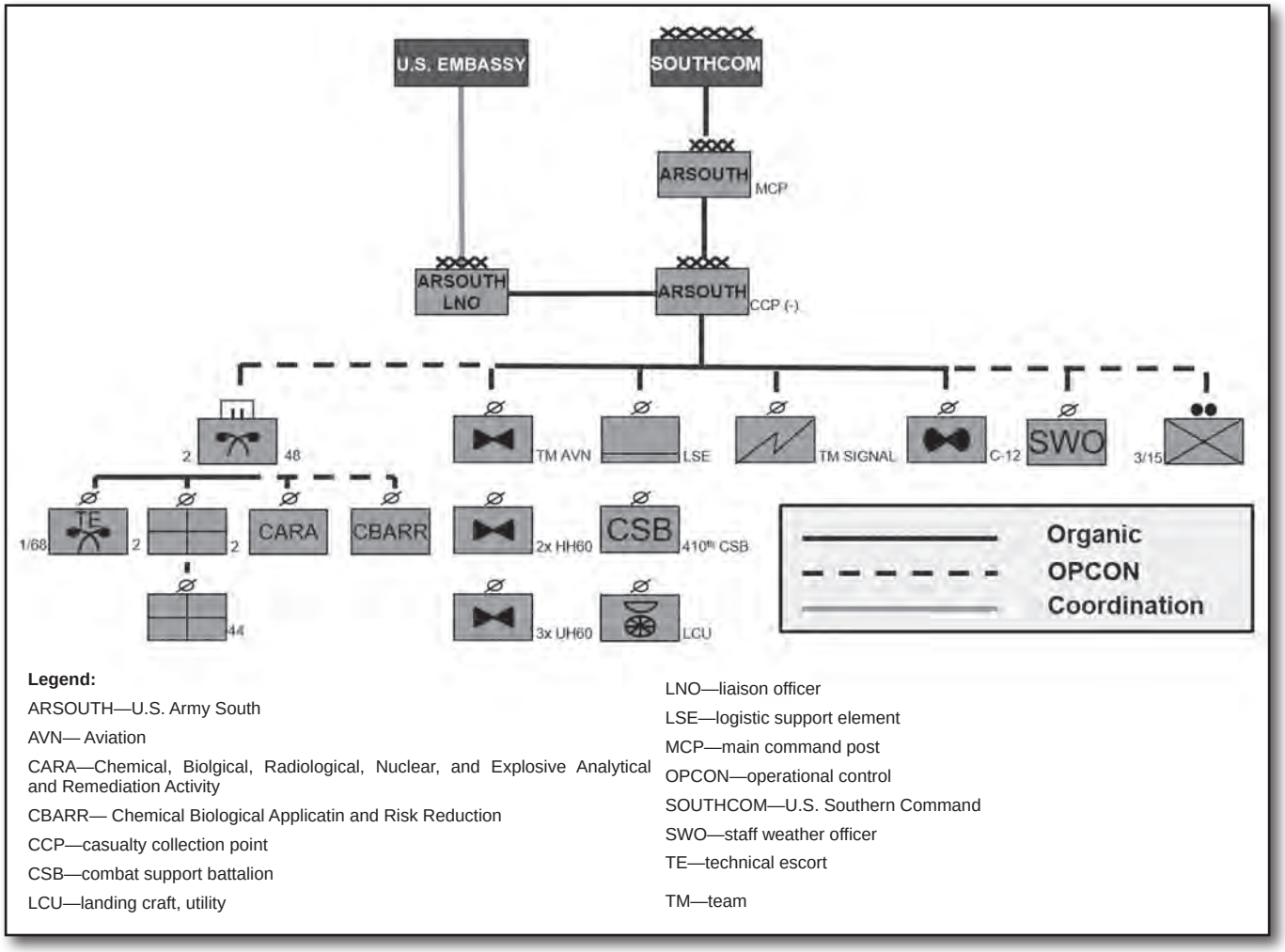
In developing plans for Phase III, negotiations with the Panama government and OPCW were led by JPEO-CBD and supported by ECBC and CMA. Execution of Phase III plans was led by Task Force 2, which consisted of units from the 48th Chemical Brigade; the headquarters element and the 68th CBRNE Company (Technical Escort), 2d Chemical Battalion; and CARA Remediation Response East. Additional medical, sustainment, and technical support were provided by the 44th Medical Brigade and the Chemical Biological Application and Risk Reduction business unit, ECBC. Figure 1 shows the mission command relationship between Task Force 2 and U.S. Army South (ARSOUTH).

Planning Considerations

To date, given their size, condition, and the dense jungle environment with sloping terrain, no technology exists to safely transport the munitions on San Jose Island in their current state. Planning considerations accounted for the large size of the munitions, concern over the physical integrity of the bomb casings, fuse configuration, and the fact that the munitions were previously armed, which required unique safety considerations.

Several courses of action were evaluated for the destruction of the munitions. Since the munitions could not be moved, the first technique considered was to transport demilitarization technology to San Jose Island. However, this was not feasible due to the terrain, dense vegetation, significant logistical burden, and overall safety concerns. The second technique considered was the use of a remotely operated device to drill into the munitions and drain the chemical agents. Because of the unacceptable risk to personnel placing the drilling device on armed and fused munitions and the risk of detonation once drilling was initiated, this option was not deemed feasible. The third option considered was to place an enclosure over the munitions to capture the vented gas and to then transfer the gas to a portable air scrubber system. However, this was not considered feasible given the need identified in Phase II to access the munition using explosives and the logistical burden of moving and operating a portable air scrubber system in a jungle environment.

In July 2017, the OPCW approved the Panama-U.S. plan for destruction of the munitions. The plan called for the use



Legend:

ARSOUTH—U.S. Army South

AVN— Aviation

CARA—Chemical, Biolgical, Radiological, Nuclear, and Explosive Analytical and Remediation Activity

CBARR— Chemical Biological Applicatin and Risk Reduction

CCP—casualty collection point

CSB—combat support battalion

LCU—landing craft, utility

LNO—liaison officer

LSE—logistic support element

MCP—main command post

OPCON—operational control

SOUTHCOM—U.S. Southern Command

SWO—staff weather officer

TE—technical escort

TM—team

Figure 1. Mission Command Relationship Between Task Force 2 and ARSOUTH.

of an explosive shape charge to rupture the munitions in the manner that the bombs were originally intended to function, while releasing the chemical agents into the air and destroying the explosive components. The safest course of action was to destroy the munitions in place given the mitigating conditions of the weather and the nature of the nonpersistent chemicals.

Preparation and Execution

The destruction of the six AN-M79 bombs containing phosgene and the one AN-M78 bomb containing cyanogen chloride took place during the rainy season to minimize environmental impact from the nonpersistent agents. Two separate explosive charges were used in the destruction of all the bombs. The first charge was a specially designed shape charge that initiated the bomb burster charge, opened the munition, allowed the agents to vent, and simultaneously destroyed the explosive hazards. The second charge served as a backup to the shape charge if it failed to initiate the burster. The second charge used explosive cutting tape to cut a hole in the munition body and vent the agent. With the agents vented, EOD Soldiers neutralized any remaining explosive hazards and used additional explosive cutting tape to prepare the munition body for packaging and transport to an approved disposal facility.

Task Force 2 executed the destruction mission in a deliberate manner to ensure that tactical and strategic end state goals were achieved throughout Phase III. Preparations and rehearsals were conducted on the island to refine home station-developed plans and to affirm compliance with OPCW destruction verification protocols. These measures were essential in order to guarantee that procedures, such as personnel accountability across the island and medical evacuation processes and resources, were in place before the destruction of the munitions. Destruction activities consisted of preparing the munitions and the physical terrain at each munition site, disabling the munitions, reducing chemical and explosive hazards up to the point of detonation, verifying the presence or absence of chemical or explosive hazards postdetonation, and confirming their destruction. Upon detonation, hazards were mitigated by precipitation and the time allowed for adequate venting. Munitions were then cut into fragments and packaged for removal from the island.

Summary

On 6 September 2017, Task Force 2 deployed to San Jose Island from Panama City, Panama, in preparation for destruction operations. From 6 to 19 September 2017, Task Force 2 received equipment, completed on-site preparations, and conducted contingency rehearsals. Destruction operations were conducted from 20 September to 2 October 2017. Site closeout, reconsolidation, retrograde operations, and redeployment were conducted on 12 October 2017. The eight identified chemical munitions were destroyed on San Jose Island in accordance with OPCW-approved plans and destruction verification protocols. This end state was safely and successfully achieved with minimal impact to the immediate munition sites and surrounding areas. There was no immediate or long-term threat of chemical or explosive hazards to the island or its inhabitants.

Lieutenant Colonel Kevin Siebold, the Task Force 2 Commander, stated, "Our Soldiers and civilian specialists completed a dangerous and physically demanding mission in an environment that was unforgiving in mistakes. We combined EOD expertise and chemical analysis of these munitions with an aggressive timeline to destroy, by demolition, chemical rounds that were more than 70 years old. That we did this safely is a testament to the skill of our Task Force."[2]

The destruction of these munitions on San Jose Island has significant implications and applications to future Army CBRN operations. This operation was a great example of CBRN and EOD Soldiers and civilians operating as a task force subordinate to an Army service component command to deliberately plan and successfully execute a nonstandard mission. Although compliance with host nation environmental and safety regulations and required coordination with the Panama government and OPCW added complexity to all phases of planning and operations, they did not hinder the overall success of the mission. The San Jose Island Project highlights the need for the institutional Army and the Chemical Corps to train and develop Soldiers and leaders who are capable of conducting complex, nonstandard tactical missions in strategic environments to achieve whole-of-government end states.

Author acknowledgement: This article was written in collaboration with 20th CBRNE Command Soldiers and civilians during my operational experience assignment with the organization and with contributions from individuals with direct knowledge of the San Jose Island Project. Insights from Lieutenant Colonel Kevin Siebold, Task Force 2 Commander; Mr. Christopher Chesney, Director, CARA; Mr. Bruce Griffin, Chief, CARA Remediation Response East; Mr. Michael Rowan, Senior Unexploded Ordnance Supervisor, CARA; Mr. Lloyd Wallace, Safety Office, CARA; Ms. Cheryl Maggio, JPEO-CBD; Mr. Russell Fendick, CMA; and Master Sergeant David A. Rio, 20th CBRNE Command Group Operations Noncommissioned Officer, ensured the accuracy of the information provided in this article and are greatly appreciated.

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[2]Kevin Siebold, Task Force 2 Commander, discussion on the San Jose Island effort, personal communication, 21 December 2017.

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84TH CHEMICAL BATTALION: CBRN OTD TRAINING AND INTEGRATION INITIATIVES

By Lieutenant Colonel Byron G. Galbraith and Major Matthew C. Mason

In October 2017, the Chemical, Biological, Radiological, and Nuclear (CBRN) Officer Training and Development (OTD) Chief, at the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS), Fort Leonard Wood, Missouri, was charged by the 84th Chemical Battalion; the 3d Chemical Brigade; and USACBRNS leadership to undertake a monumental challenge. The challenge was to review, rewrite, design, integrate, and incorporate lesson plans, training events, and leader development opportunities that would provide CBRN officers with the skills and knowledge needed to plan, integrate, and advise all types of commanders—specifically, combat arms commanders—on how to fight, survive, and win in peer-on-peer, large-scale combat operations, all while possibly in a CBRN environment. It is key for our officers to understand maneuver so that they can integrate CBRN capabilities and be effective maneuver supporters.

The challenge began with the Chief of Chemical and USACBRNS Commandant's 90-day assessment and way-ahead leader professional development and a week-long trip to Fort Benning, Georgia. The 84th Chemical Battalion Commander and the OTD Chief met with leaders from Fort Benning, Georgia (from the Ranger Training Assessment Course, Army National Guard Warrior Training Center; the 3-16th Calvary Squadron; the Department of Training for the Maneuver Captain's Career Course [MCCC]; and the 199th Infantry Brigade), who are responsible for instructing the Infantry Basic Officer Leader's Course (IBOLC) and the Armor Basic Officer Leader's Course (ABOLC). The 90-day assessment was capped off with a week-long trip to the National Training Center, Fort Irwin, California, to observe the 83d Chemical Battalion integration with a brigade combat team (BCT). The 90-day assessment and those two trips set the foundation for the many initiatives on which the OTD embarked over the last 9 months. This article highlights the initiatives that OTD is, has, and will continue to plan, resource, integrate, and establish in order to produce technically sound CBRN officers who are better prepared to enable maneuver, counter weapons of mass destruction, and defend the homeland.

Instructor Exchange and Assistance Program

OTD has worked, and continues to work, with the tremendous team of the 199th Infantry Brigade. We have built a strong partnership to share feedback, suggestions, and opportunities to enhance our respective officer training. The partnership started in September 2017, with site visits to the U.S. Army Maneuver Center of Excellence (MCoE), Fort Benning. During this visit, it was agreed that CBRN training must be incorporated into IBOLC, ABOLC, and MCCC, while a better understanding of large-scale combat operations, the military decision-making process, and tactical training must be incorporated into the CBRN Basic Officer Leader's Course (BOLC), CBRN Captain's Career Course, and warrant officer courses. In December 2017, OTD sent a CBRN small-group instructor to Fort Benning to observe the IBOLC and ABOLC capstone field training exercises to facilitate creation and possible implementation of CBRN scenarios into future training events. The trip was very successful; the small-group instructor established communication with IBOLC and ABOLC commanders and battalion command teams. Everyone was excited with the CBRN presence and looked forward to incorporating CBRN into their programs of instruction and, ultimately, their capstone field training exercises. MCoE sent one of its MCCC instructors to Fort Leonard Wood, Missouri, to work side-by-side with CBRN small-group instructors in the creation and development of lesson plans, staff exercises, and training exercises that provide CBRN BOLC officers with baseline foundations of movement and maneuver and information about how to integrate CBRN capabilities into maneuver units and how to assist with maneuver planning.

CBRN BOLC

With the rewrite of Field Manual (FM) 3.0, *Operations*, came changes to the CBRN BOLC course flow and lesson plans.[1] Over the last year, OTD has worked tirelessly with the USACBRNS Department of Training to review, rewrite, recreate, and redesign instruction about how newly appointed CBRN officers are taught so that they receive the skills and knowledge needed to advise commanders on how to integrate CBRN assets and fight, survive, and win large-scale, peer-to-peer conflicts within a CBRN environment.

Movement and Maneuver/Training Implementation

Large-scale combat operations were incorporated into the CBRN BOLC program of instruction with the reintroduction of FM 3.0. CBRN lieutenants receive training on their roles as battalion CBRN officers, understanding, planning, and battle tracking maneuver operations. They learn common battle staff tasks, including how to operate in a tactical operations center and conduct battle captain duties. Additional instruction was created to better enable CBRN lieutenants as platoon leaders operating in support of maneuver by incorporating more tactics such as patrol base operations, movement versus maneuver formations, platoon defense, link-up operations, and integration into an intelligence collection plan.

Capstone Field-Training Exercise Redesign

With the shift to prepare for large-scale conflict, there was a need to redesign the CBRN BOLC capstone field-training exercise. Considering how to prepare CBRN BOLC officers, a capstone field-training exercise was developed and five distinct training events were incorporated to train, test, and evaluate CBRN officers' potential to—

- Conduct CBRN operations in a field environment.
- Advise maneuver commanders on how to fight and win large-scale conflicts in a CBRN operational environment.
- Battle track and assist in operational planning.
- Lead squad and platoon size CBRN elements on the battlefield using basic tactical and technical skills.

To date, four CBRN BOLC classes have executed the newly redesigned capstone field-training exercise, and we continue to receive tremendous feedback. Our officers are graduating from CBRN BOLC with better skills to operate in a tactical operations center, a better understanding of how to incorporate CBRN capabilities on the battlefield and, most importantly, how to articulate the integration to a maneuver commander.

USACBRNS and the National Training Center Leader Development Program

To date, eight officers have benefited from this leader development program and an additional 12 are scheduled for the remainder of fiscal year (FY) 2018 and FY 19. The battalion has developed a partnership with the commander of the Operations Group, National Training Center; it was determined that CBRN lieutenants and select captains would benefit greatly from observing specific points of a training rotation in order to prepare for future positions. The program is intended to provide lieutenants and select captains who have recently graduated from CBRN BOLC or the CBRN Captain's Career Course with the opportunity to observe a combat training center rotation in order to better prepare for future assignments. The focus is on brigade level operations in a decisive-action or mission-readiness exercise, rather than on highlighting CBRN scenarios. When possible, captains and lieutenants are allowed to observe different task forces and/or support elements. In addition, OTD is actively working with the Joint Readiness Training Center, Fort Polk, Louisiana, to incorporate the same leader development program. If approved, this will benefit an additional eight officers.

Army Reconnaissance Course and Reconnaissance Surveillance Leaders Course

During FY 18 and FY 19, the 84th Chemical Battalion has the opportunity to send up to six officers to the Army Reconnaissance Course and two officers to the Reconnaissance Surveillance Leaders Course. With the possible shift of the Nuclear Biological Chemical Reconnaissance Vehicle from the brigade engineer battalions back to cavalry squadrons, it is important to ensure that young CBRN lieutenants have the skills and knowledge needed to advise commanders on the integration and employment of Nuclear Biological Chemical Reconnaissance Vehicles. An agreement with the 3-16th Cavalry allows us to send some of our most-qualified CBRN BOLC officers to the Army Reconnaissance Course and the Reconnaissance Surveillance Leaders Course upon graduation from the CBRN BOLC course. These courses will provide CBRN reconnaissance and surveillance platoon leaders with the enhanced reconnaissance and surveillance skills, tactics, and techniques used by the scouts with which they will be imbedded. These courses will provide the foundation needed to better train, plan, and support scouts and BCTs.

U.S. Army Ranger School

The U.S. Army Ranger School is the best place for CBRN officers to learn how to think tactically and communicate effectively with maneuver counterparts and commanders. While the U.S. Army Human Resources Command allows only one slot for USACBRNS per CBRN BOLC, we have established an excellent relationship with the Ranger Training Assessment Course, Warrior Training Center. We typically receive two slots to attend the Ranger Training Assessment Course per CBRN BOLC. These two officers get to go on to the Ranger School following graduation from the Ranger Training Assessment Course. In addition, an agreement with the 75th Ranger Regiment allows us to send two of our best candidates to attend the Small-Unit Ranger Tactics Course. Upon completion, these personnel then go on to attend the Ranger School. A memorandum of agreement between the U.S. Army Human Resources Command, the 75th Ranger Regiment, and the 84th Chemical Battalion

has been developed to ensure that these officers are given an 18-month assignment upon graduation from the Ranger School and then are returned to the 75th as seasoned first lieutenants.

CBRN Captains Career Course

CBRN and Infantry/Armor Officer Integration Program

OTD, along with the Infantry and Armor Officer Training Departments, teamed up to conduct two pilots with integrating Captain's Career Course students for 2 weeks. The first pilot focused on providing CBRN captains with an opportunity to better understand movement and maneuver while providing infantry and armor captains with an opportunity to better understand CBRN planning into movement and maneuver. The second pilot provided CBRN captains with an opportunity to receive classes on offense, defense, and support unit planning into movement and maneuver. At the same time, CBRN OTD provided a CBRN capabilities and planning block of instruction to infantry and armor captains. The instruction gave the MCCC students a better understanding of CBRN hazards they could face on the battlefield, CBRN capabilities within their formations, and the skills and assessments CBRN officers can provide at the battalion and brigade levels.

CBRN Technical Block Redesign

Observations and feedback from previous combat training center rotations have indicated that CBRN officers were not doing a very good job of incorporating or articulating CBRN capabilities into the BCT. CBRN officers were well-trained in the technical aspects of their jobs, but that knowledge wasn't being reflected on the battlefield—at least not with any significant reliability. As a result, OTD took a hard look at how to better prepare CBRN officers to perform within BCT staffs. The resulting conclusion was that more military decision-making process training should be incorporated into each technical block of instruction.

Civilian and military subject matter experts teach most of the technical blocks of instruction. These blocks cover CBRN aspects of the modern operational environment. Some redundancies and vestigial blocks of instruction were identified and consolidated or removed. The redesign and approval of the technical block of instruction allows more time for subject matter experts to delve deeper into their respective fields, and course hours were realigned to support a week-long staff exercise in place of four, 3-day tabletop exercises. A week-long exercise allows the students to practice the military decision-making process, develop products that are supported by familiar scenarios presented during the common-core instruction, and exercise the rapid decision-making and synchronization process to adapt to a rapidly changing scenario. This adds stress to student "staffs" and reinforces the aspect of the adult learning model of "learning out of need" to close knowledge gaps that may have occurred during instruction. The second addition is the inclusion of a series of critical-thinking exercises that encompasses every aspect of the CBRN Captain's Career Course. Students are presented with widely varying, complex scenarios that require integration and synchronization of CBRN officer competencies across echelons and domains.

Warrant Officer Courses

In the fall of FY 17, the warrant officer courses underwent a critical task site selection board analysis. The board was charged with ensuring that the institutional USACBRNS warrant officer training supports the operational force. The tasks vetted by the board ensure the relevance of future Warrant Officer Basic Course (WOBC), Warrant Officer Advanced Course (WOAC), and Warrant Officer Intermediate Level Education programs of instruction. The board recommended greater emphasis on equipment training, particularly on the technology behind CBRN equipment, in WOBC. Based on the outcomes of the critical task site selection board, the OTD warrant officer instructors, along with the USACBRNS Department of Training, completely redesigned the WOBC and WOAC course flow and program of instructions. The first WOAC redesign program of instruction was implemented (with emphasis on intelligence preparation of the battlefield) during Class 01-18, 6 February–3 April 2018, and the WOBC redesign program of instruction was implemented with WOBC Class 01-18, 30 May–6 September 2018. OTD partnered with the U.S. Army Intelligence School to help improve and add more instruction on intelligence preparation of the battlefield. It was determined that there is a need for senior warrant officers to aid in the intelligence preparation of the battlefield process.

Capstone Field-Training Exercise Observation and CBRN Incorporation

During the IBOLC and ABOLC capstone field-training exercises, there were multiple opportunities for CBRN implementation, which had a significant impact on training, ultimately creating more dilemmas and forcing more battlefield decisions for platoon leaders and company commanders on the ground. Implementing CBRN in the capstone field-training exercise benefits IBOLC/ABOLC and effects change in MCCC. The IBOLC/ABOLC field-training exercise incorporates students of the Noncommissioned Officer's Academy Senior Leader Course who take leadership roles as first sergeants, platoon sergeants, and senior leaders throughout operations and MCCC students on the ground as company commanders and battalion leaders. Incorporating CBRN tasks impacts MCoE at all levels.

Currently, CBRN OTD is working with IBOLC and ABOLC course managers to incorporate training that would require IBOLC and ABOLC students to complete and send a CBRN 1 report. MCCC students acting as company commanders will be required to receive the report and send it to higher echelons, ultimately providing lieutenants and captains with valuable training that will save lives on a contaminated battlefield. IBOLC and ABOLC students will be required to clear buildings in a chemically contaminated environment, submit reports, monitor the presence of chemical

(Continued on page 18)

Enabling the Warfighter: 9th CBRNE Company Supports 1-2 SBCT CALFEX

By Captain Michael T. Lindsay and First Sergeant Tecarlos Y. Williams

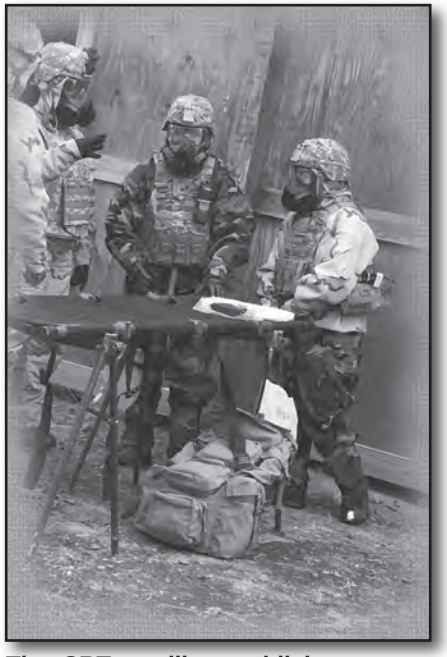
Our foundational task and purpose as a Chemical Corps is to enable the warfighter in its chemical, biological, radiological, nuclear, and explosives (CBRNE)/countering weapons of mass destruction (CWMD) mission. As chemical, biological, radiological, and nuclear (CBRN) leaders, there are two questions that should drive our actions and decisions:

- Question No. 1: "Can I execute my mission?"
- Question No. 2: "Are my Soldiers ready for combat?"

No more than 11 words together, these questions lie at the heart of the Army pursuit of readiness. Although personal assignments and responsibilities may differ, these questions seldom change for leaders. They drive everything that a commander and first sergeant do. There are often clear answers to these questions—and definite reasons why. The answers shape decisions, command priorities, and training, which are the cornerstones of readiness.[1] So when the 1-2 Stryker Brigade Combat Team (SBCT), Joint Base Lewis–McChord, Washington, requested CBRNE/weapons of mass destruction (WMD) support for its company level combined arms live-fire exercise (CALFEX), chemical, biological, radiological, nuclear, and explosives response teams (CRTs) from the 9th CBRNE Company (Technical Escort), 110th CBRN Battalion, were ready and first in line.

Defeating CBRNE/WMD Threats

On 30 October 2017, the CRTs and additional personnel from the 110th CBRN Battalion began a 167-mile ground convoy to the Yakima Training Center, Washington. The company mission was to deploy and establish a mission command node within the brigade combat team (BCT) area of operations, and the task and purpose were to integrate CBRNE enablers in support of two 1-2 SBCT infantry battalions, Task Force 5-20th Regulars and Task Force 1-23d Tomahawks. Through a 12-day field-training exercise, the company headquarters provided 24-hour operational and sustainment support to the CRTs and the CRTs completed six 24-hour CBRNE missions during blank-fire and live-fire exercises. The days were long, the training was tough, the terrain was challenging, and the weather was unforgiving. When mission support tasks were completed, the CRTs from Joint Base Lewis–McChord didn't stop; they continued with day and night situational training exercises developed to replicate a WMD network built from the CALFEX enemy situation template.



The CRT readily establishes a personnel decontamination site on the objective.

The CRT direct-support relationship to a single infantry company was a great experience. Each CALFEX lane featured a series of urban seizure objectives, mine and wire obstacles (requiring engineer mine clearing and Bangalore torpedo breeches), a trench system and, lastly, a CBRN target nestled in a large urban city block. Due to the nature of lane training, each CRT responded to the same target multiple times over the field-training exercise. This was not a drawback, as one might first believe. Lane training is a vital approach to efficiently building training proficiency across multiple units without considerable resource requirements.[2] Despite similar live-fire lane configurations, each mission was different, bringing unique challenges to the rotating infantry company and the CRT. For many of the Soldiers, this was the first time they had maneuvered within an infantry formation. Defeating enemy units on likely CBRN targets and securing WMD materials found on site were critical to the ground commander's mission. As the CBRNE enabler, the CRT key tasks were to integrate with the maneuver units, execute troop leading procedures, advise the ground

commander, conduct convoy and dismounted maneuver, and conduct CBRNE operations in a time-constrained and contested environment.

Lessons Learned

During each mission, the CRT executed on target thanks to a combination of the maneuver unit ability to operate in a CBRN environment and to isolate, seize, and secure a CBRNE threat (control tasks of CWMD operations) and the CRT capacity to understand, communicate, and maneuver within the ground plan. Rehearsals were crucial for the warfighters and the enablers. In the case of the Task Force 1-23d Infantry Tomahawks, the earlier September CBRNE situational training exercise train-up with the CRTs proved invaluable. The unit's ability to maintain tempo in elevated mission-oriented protective posture (MOPP) and its fluid actions on a CBRN target were indicative of proper preparation and training. There are two important lessons to share from the experience at Yakima, and each lesson was derived from understanding how both elements must work together to be successful.

Lesson No. 1

BCTs need CBRN enablers for training support, early integration, technical capacity, and leader development.

CRT Soldiers training in U.S. Army Chemical, Biological, Radiological, and Nuclear School Technical Escort (L3) Course at Fort Leonard Wood, Missouri.

A CRT leader advises and participates in the company operations order.

Each BCT is different in its design and warfighting capability. Because each BCT must approach its mission-essential tasks and combined arms training strategy based on available equipment and resources, it needs a tailored CBRN training experience, assisted by its CBRN leaders, installation CBRN units, or combat training center rotational enablers. For a BCT to be successful in its train-up for a combat training center rotation or regional deployment, training with chemical enablers must be an early integrated part of its unit training plan.[3] It is too late to learn how to don MOPP gear during reception, staging, onward movement, and integration operations. To build CBRN capacity within the BCT, integration at the individual, squad, and platoon level is critical. Early training with enablers, even to augment basic Soldier survival tasks such as masking procedures or the donning of MOPP gear, is preferred over a rushed train-up weeks before collective training.[4] Early integration and support planning benefit the warfighter and the enabler, increasing success in combat training. The participation of the 9th CBRNE Company with 1-2 SBCT during collective training throughout fiscal year 2018 provides a good pattern to follow. Integration efforts began in early October 2017, during the BCT squad and platoon situational training exercises, and continued through National Training Center Rotation 18-06 at Fort Irwin, California.

The warfighting brigades need CBRN Soldiers and leaders to be flexible, agile, technically proficient, and ready to go. There are a vast number of training venues, schools, and annual exercises that are uniquely designed to build individual and unit technical mission capacity. Two examples are the CBRN Defense Training Facility at Fort Leonard Wood, Missouri, and the annual North Atlantic Treaty Organization Exercise Precise Response in Alberta, Canada.[5] At these venues, Soldiers can operate in live-agent conditions (chemical, biological, radiological), gaining absolute confidence in their tactics, techniques, and procedures. These courses and training opportunities help CBRN units sustain a band of excellence within their technical skill sets and mission-essential tasks.

The common necessity between the warfighter and the enabler is for CBRN leaders who know their craft to teach their commanders that CBRN enablers do more than just decontaminate vehicles or assist in unit MOPP gear exchange.

A CRT mitigates and prepares a munition for transload and escort.

These are common tasks expected to be executed internally in the BCT.[6] That mentality continues to persist because CBRN leaders fail to carry knowledge and quality training to their units. The relevancy of CBRN defense operations was all but forgotten during the Nation's counterinsurgency wars, misshaping our sense of purpose to a new generation of Army leaders. CBRN assets should not be considered a de facto decontamination solution each time chemical rounds are fired during combat training center rotations. While enablers could do that, they should be employed for the strategic mission for which they were designed—CWMD. This is a complex and difficult mission for maneuver commanders to understand, and CBRN leaders are expected to facilitate their understanding and demystify this technically intensive mission. This ties into the second lesson.

Lesson No. 2

CBRN enablers need subject matter expertise, the ability to conduct CBRN intelligence preparation of the battlefield with target analysis, and tactical proficiency. Maneuver commanders have no patience for CBRN officers and noncommissioned officers who try to learn their job-specific fundamentals in the midst of early morning chemical strikes at combat training centers. CBRN BCT personnel need to study CBRN doctrine, and CBRN units should likewise assist them in shaping leader development with regard to CWMD. The roles and tasks of maneuver and CBRN enablers within the combined arms mission are fully incorporated into the military decision-making process and are clearly outlined in Table 1-1 of Army Techniques Publication (ATP) 3-90.40, *Combined Arms Countering Weapons of Mass Destruction*.[7]

Understanding combined arms CWMD operations is just as much a responsibility of CBRN leaders as it is maneuver leaders. Every CBRN leader should immediately make an effort to understand this doctrine and implement it into officer and leader professional development efforts. Remember, our Corps enables the warfighter.

To conduct an appropriate response to a CBRN target, CBRN enablers (such as CRTs or hazard assessment platoons) rely on key pieces of intelligence.[8] Examples are site imagery, historical intelligence, building blueprints or schematics, patterns of life, suspected agents, weather analysis, target indicators, map graphics, and critical command guidance. Without key pieces of information, enablers are disadvantaged in their approach to support the warfighter. CBRN units must have an understanding of the developed enemy CBRN threat and should read up on targeting matrices and intelligence estimates.[9] This may require one-on-one coaching regarding what proper CBRN intelligence preparation of the battlefield is and what it is not. It is not simply memorizing doctrinal chemical weapon delivery systems and templating possible locations of CBRN targets on a map. Instead, it is tactical planning and analysis across each warfighting function, with a deliberate collection of human and geospatial intelligence focused on CBRNE/WMD targets. The decide, detect, deliver, and access (D3A) targeting method for CWMD operations is not just about providing a CRT or Nuclear Biological Chemical Reconnaissance Vehicle platoon with a robust mission packet.[10] A BCT commander needs his or her staff to answer the "What's different? What's next?" questions of CWMD operations. In this sense, the CBRN asset becomes an intelligence, surveillance, and reconnaissance asset, supporting the commander's critical information requirements and attacking the WMD network.

An unfortunate truth across our technical units is that there is a general lack of tactical skills. Gains in one area seem to cause losses in another. This is the nature of balancing unit training proficiency, and it stresses the importance of officers and noncommissioned officers in battle-focused training.[11] As the company experienced during its field training exercise, to assist the maneuver unit in controlling the CBRNE/WMD threat, the CRTs had to first get to it. CBRN Soldiers and units must be proficient in convoy security procedures and trained in protect-and-defend tasks. These are critical skills within each CBRN unit training strategy.[12] To be successful in a dynamic and complex environment, CBRN Soldiers must be better qualified on individual weapon systems and must experience hard field conditioning and challenging training to fight and win our Nation's future wars. Building the tactical capacity to shoot, move, communicate, and execute our wartime mission is our most important responsibility as CBRN leaders.

Summary

As the Army continues to pursue readiness across the force, our most critical mission as a Chemical Corps is to enable the warfighter. The CRTs gained clear insight on the challenges and scope that this mission presents during

their support to the 1-2 SBCT in October 2017. The CMWD mission is unique, complex, and technical. Leader development and subject matter expertise are maneuver and CBRN unit necessities to achieve this mission. Successful BCT integration for the CWMD mission requires CBRN Soldiers and leaders who are technically and tactically skilled. This is best achieved by leader development, deliberate training management, and battle-focused training. Disciplined training management is critical for building and sustaining combat readiness among CBRN units. Done right—with proper training, development, and resources—CBRN Soldiers will be prepared to execute their mission in combat.

Endnotes:

[1]Field Manual 7-0, *Train to Win In a Complex World*, 5 October 2016, p. 1-1.

[2]Ibid., p. E-1.

[3]Ibid., p. 2-1.

[4]Soldier Training Publication 21-1-SMCT, *Soldier's Manual of Common Tasks Warrior Skills Level 1*, 28 September 2017.

[5]CBRN Defense Training Facility Web site, <http://www.wood.army.mil/CDTF/CDTF.html>, accessed on 27 March 2017.

[6]Michael T. Lindsay, "Decontaminating a Stryker Brigade Combat Team," *Army Chemical Review*, Winter 2016, pp. 23–24.

[7]ATP 3-90.40, *Combined Arms Countering Weapons of Mass Destruction*, 29 June 2017, p. 1-5.

[8]Ibid., pp. 2-9–2-13.

[9]Ibid., pp. 2-6–2-8.

[10]ATP 3-90.40, p. C-1.

[11]Field Manual 7-0, p. 1-8.

[12]Soldiers can access training and evaluation outlines and unit combined arms training strategies through the Army Training Network at <https://atn.army.mil>.

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("84th Chemical Battalion: . . . ," Continued from page 14)

agents in the air, use chemical agent detector kits, treat casualties in a contaminated location, and complete unmasking procedures upon objective completion.

The 2d Battalion, 11th Infantry Regiment, and the 199th Infantry Brigade have significant CBRN protective equipment shortfalls that need solutions before implementation and execution. The CBRN OTD and CBRN Joint Program Management Office began identifying sourcing solutions for CBRN equipment that would further enhance training being conducted at MCoE. In a 1-month timeframe, USACBRNS provided little-to-no-cost items that included the Joint Service Lightweight Integrated Suit Technology, Joint Chemical Agent Detectors, M256 chemical agent detector kits, M8/M9 detector paper, and M40 protective masks.

We are working hard to develop leaders with the right skills and training to better enable expeditionary maneuver, the countering of weapons of mass destruction, and defense of the homeland. FM 3.0 was integrated as a fundamental source to change our instruction. Honing technical skills, developing mutually beneficial partnerships with other centers of excellence, obtaining more tactical schools for our officers, and immersing them in a much more maneuver-oriented environment will better enable our officers to integrate CBRN capabilities and advise maneuver commanders on how to survive and operate on a multidomain battlefield.

Endnote:

[1]Field Manual 3.0, *Operations*, 6 October 2017.

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Winning in an Uncertain Environment:
Integrated Early Warning

By Mr. Larry Lazo, Mr. Joseph Baker, and Major Yulang Tsou

"Decisions are the most important products of the [command and control] C2 function because they guide the force toward objectives and mission accomplishment. Commanders and staff require not only information to make these decisions, but also the knowledge and understanding that results in the wisdom essential to sound decision making."[1]

Armed with an understanding of time and space, commanders can make informed and timely decisions to assess, protect, and mitigate weapons of mass destruction threats and chemical, biological, radiological, and nuclear (CBRN) hazards in the future operational environment. Future forces will fight for information in the deep, close, supporting, and consolidation areas. This is a fundamental shift in the joint CBRN defense community view of how the integration of sensors (CBRN and non-CBRN) will provide situational awareness. This is also a fundamental shift in how trained, competent, and dedicated CBRN staffs, enabled with integrated early warning capabilities, assist in situational understanding development in a CBRN environment so that commanders can make risk-based decisions to retain freedom of action.

Requirement Description

"The Intelligence, Surveillance, and Reconnaissance (ISR) Joint Force 2020 construct should focus on networked joint ISR solutions rather than platform-centric sensors and processing, exploitation, and dissemination (PED) methods. It should encourage the integration and innovation of multiple sensors to provide the fidelity and redundancy required to support rapid and sound decision making."[2]

The U.S. Army Training and Doctrine Command recently conducted a focused tabletop exercise on combined arms maneuver in a contaminated operating environment. This event was sponsored by the Army Capabilities Integration Center, Fort Eustis, Virginia; the Maneuver Support Center of Excellence, Fort Leonard Wood, Missouri; and the Maneuver Center of Excellence, Fort Benning, Georgia. The primary observation was that the Army's robust surveillance and reconnaissance networks must recognize and report weapons of mass destruction threats and CBRN hazards as priority intelligence requirements. CBRN reporting must easily move horizontally and vertically across the force. In addition to the primary observation, a key finding was that in contaminated environments, a commander's decision space is further compressed and largely influenced by his or her ability to rapidly integrate information from a varied network of available passive and active sensors that enable proactive, risk-based decisions. The phrase "good enough" was used several times, and it became clear that not all of the information would always be available. This led to the epiphany that a lack of proliferation of sensors exists across the battlespace and that sensors that might enhance the decision-making process and speed up actions were already deployed. What if sensors already in use on the ground could be expanded to provide the commander with additional information?

Enhanced situational understanding could be derived from the interpretation of all relevant information. Understanding requires access to information from CBRN and non-CBRN assets in a timely and reliable manner. The key to developing understanding is identifying what information is required for an informed risk-based decision. Available options (courses of action) must be linked to the success of the mission and retention of freedom of action through the assessment of the CBRN core competencies of assess, protect, and mitigate. The staff produces assessment, protection, and mitigation options for the commander, who can then make a decision with confidence due to near-real-time understanding.

Sensors and Sensor Information

Warnings from devices come in all forms, including audible sirens and visual cues. The commonality of these warnings is that they originate from a base language of information made up of ones and zeros. This binary code represents data or processor instructions that interpret what a sensor

has discovered, causing a predetermined action, which results in a warning of some type. The data being processed by existing sensors is limited to a focus field of information and may have more functionality that is simply dormant, waiting for additional binary switches to be activated.

Using air and missile defense radar systems as an example, commanders could have an early warning of incoming threats. What additional data could be processed within the air and missile defense radar systems to detect and identify additional aspects of the threat? Theoretically, a missile that has a "wobble" as it spirals through the air could contain a liquid payload that signifies a possible incoming chemical threat. This information becomes one small piece of a larger puzzle. What if that information was linked to other sensors? Weather sensors could show wind speed and direction data, adding resolution to the picture. Having this information ahead of time would permit air defense units to assess incoming threats before engaging them, minimizing or negating the vulnerabilities and effects of the possible contaminated debris that might land. At the same time, additional sensor information could influence maneuver commanders in the engagement area to take action that protects operational tempo and maintains freedom of movement.

To take a step further, current unmanned ground sensors could be added. Most are designed to detect personnel or vehicle traffic. It may be possible to use unmanned ground sensors to detect whether the incoming threat has been engaged and when debris will start to hit the ground. Reports could indicate the size of the debris field and whether it is liquid or not and possibly provide preliminary information about what agent was in the payload.

This information can be used for much more than immediate decision making when "good enough" will suffice. It can also be incorporated into future operations planning. All of the collected data becomes part of an artificial intelligence database that can assist future planners in determining the best course of action during mission analysis. Plans are subjected to scrutiny of the artificial intelligence environment, tested against enemy trends as they emerge, and identified through sensor collection and analysis.

This artificial intelligence environment can also become the warning and reporting system that aids in alerting units in a prioritized manner from the most- to least-imminent threat. This same system could be tied into physical sensors and data systems in other areas in the future. For example, medical data from hospitals and aid stations could be collected to generate possible predictive patterns for the use of biological agents. If 10 Soldiers get sick, the cause might be an illness; a virus; or a bad lot of meals, ready to eat. The artificial intelligence environment might allow us to see more of the picture. If the data indicates that there are 10 Soldiers at one station, 10 Soldiers at another station, and several Soldiers in outlying outposts who are sick with similar symptoms, this might be an indication of something more serious. This information, tied in with reports from sensors, may prompt an alert to start testing to confirm or deny the use of a chemical agent.

Awareness and Understanding

In the CBRN environment, situational awareness involves possessing data, information, and the resulting knowledge about CBRN threats and hazards within time and space. The tactical commander obtains data, information, and knowledge from ISR sources to establish knowledge of CBRN threats and hazards in the operational environment. Employment of ISR assets provides the tactical commander with physical space so that timely and informed decisions can be made. In a CBRN environment, situational understanding is the result of applying the assessment and analysis of CBRN situational awareness to recognize the change and magnitude of effect regarding CBRN hazards, thereby allowing for the assessment of risk.

Integrated early warning systems collect and integrate all available awareness data (events, information, feeds, reports, sensors). The information from the systems is maximized as the data is assimilated, while the time to assimilate the information is compressed. This leads to a near-real-time understanding.

Conclusion

Awareness, coupled with assessment over time, leads to understanding. Understanding allows staffs to generate options and provides the commander with the confidence and ability to make proactive, risk-based decisions. Therefore, integrated early warning systems drive understanding "sooner," with less risk, by reducing vulnerabilities. The goal of an integrated early warning is to reduce the time required to transition from situational awareness to situational understanding—not to be predictive, but to be proactive and situation-informed.

Endnotes:

[1]Joint Publication 3-0, *Joint Operations*, 17 January 2017.

[2]Joint Chiefs of Staff, *Intelligence, Surveillance, and Reconnaissance Joint Force 2020 White Paper*, June 2014.

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Optimizing the Army CBRNE Force Structure

By Major Alexi D. Franklin

The Army must reorganize to more effectively defend against current and future chemical, biological, radiological, nuclear, and explosives (CBRNE) threats. The U.S. Army established the Chemical Corps after poison gas attacks during World War I. Biological warfare and nuclear weapons research peaked during the Cold War. There has been significant growth in medical and industrial uses for radioactive isotopes since the mid-20th century. This growth has increased the risk of nonnuclear, radiological "dirty bomb" style weapons. With nearly every development, U.S. Army CBRNE forces have grown. However, CBRNE forces have grown separately, not together.

The Army lacks horizontal integration across CBRNE-related career fields. It has divided its "boots on the ground" responders into several discrete areas of expertise. Army chemical, biological, radiological, and nuclear (CBRN); firefighter; and explosive ordnance disposal (EOD) career fields are wholly separate. As a result, CBRN, firefighter, and EOD units may not be fully capable of responding to all aspects of an incident.

The Army lacks vertical integration across its CBRNE-related career fields. It has divided its intellectual CBRNE expertise between ground level operations and strategic-level matters. In addition to CBRN and EOD officers, the Army has "Functional Area 52" nuclear and counter-proliferation (NCP) officers. These Soldiers receive advanced training to become experts in strategic-level nuclear policy, science, or both; but they never return to the tactical force. CBRN and EOD officers lack an Army-sanctioned program to develop their technical and policy expertise at the graduate level. As a result, CBRN and EOD officers on strategic-level staffs cannot offer the same quality of planning as NCP officers.

The Army misutilizes CBRNE personnel within its CBRNE units. The most glaring example is within the Chemical Corps. The brigade combat team is the core warfighting unit of the U.S. Army. An infantry brigade combat team consists of nearly 30 CBRN Soldiers. The brigade's CBRN platoon consists of just over 10 Soldiers. The rest of the units in the brigade consist of nearly 20 CBRN Soldiers. Non-CBRN duties occupy the majority of the time of individual Chemical Corps Soldiers at the unit level.

CBRNE capability is required in nearly every unit in the U.S. Army. Requirements differ based on a given unit echelon and operational focus. For example, an infantry brigade has an acute need for robust CBRNE capabilities, but a team size veterinary detachment does not. In addition to defining individual and unit level requirements, several successively higher-echelon CBRNE formations are necessary to provide unit commanders the ability to respond to CBRNE threats.

Parochialism and bias, real or perceived, are obstacles to CBRNE restructuring. To the greatest extent possible, a reorganization seeks to provide the right organizations and proper blend of forces within the Army CBRNE enterprise. Plainly put, if the Army CBRNE force structure were a blank slate, it would never be designed as it exists today. The following CBRNE personnel and force structure solutions presented in this article do not necessarily represent the only way forward for the Army; these solutions are merely part of a unified theory that represents a possible improvement upon the status quo. The proposed theory includes the personnel management and force structure redesigns necessary to create and support the restructure of a unified CBRNE branch.

Individual Personnel Management

Enlisted Army CBRN specialists, EOD technicians, and firefighters would remain as separate career fields under a hypothetical CBRNE branch for the majority of their careers. Combining these fields under one branch would ensure greater communication and cooperation between doctrine development, training, and equipping. Enlistees would still be able to join the Army as firefighters or EOD technicians, but their firefighting or EOD training would only begin once they completed Army CBRN training. This would provide a greater level of interest in the CBRN career field. Any individuals who failed firefighting or EOD training would serve as CBRN Soldiers, and all CBRNE branch Soldiers would have the knowledge base needed to compete for senior enlisted leader positions later in their careers.

CBRNE officers would follow a "logistics branch" model, with the Army combining CBRN, EOD, firefighter, and NCP officers at the rank of captain. This model would prepare officers for tactical-level staff and leadership positions where they could be familiar with the entire scope of CBRNE threats. Advanced training and leadership-focused training options would be open to all CBRNE officers at the field grade level. After completing common-core education, field grade CBRNE officers would complete a technical graduate degree, the advanced operations warfighting course, or both. Officers would then seek staff positions, leadership positions, or both—across the whole CBRNE enterprise.

EOD companies would essentially remain unchanged. Ideally, EOD personnel would be assigned to the combined CBRNE company level, but Army EOD personnel would be

unlikely to expand the hundreds of positions required to adequately staff such an initiative. Breaking EOD companies down to blend EOD personnel into CBRNE units at the company level would be a suboptimal solution. This would degrade the ability of senior EOD personnel to mentor and develop new EOD officers and junior sergeants, while simultaneously complicating EOD-only incident response under unnecessary levels of non-EOD bureaucracy.

Army regulations currently mandate the assignment of CBRN personnel down to the company level in every operational, non-CBRN Army unit. Assigning newly trained CBRN personnel down to the company level in non-CBRN units dilutes their efficacy and limits the quality of advice that they can provide to unit commanders. Army regulations also currently allow for the discretionary appointment of alternate, company level CBRN defense personnel—individuals who attend a 2-week CBRN defense course. In lieu of newly trained CBRN Soldiers, an increased number of CBRN defense course-trained personnel, to include unit commanders, would be mandatory at the unit level. Commanders need to be educated and prepared to develop their own CBRN-infused training plans. This practice would also be replicated on battalion level staffs.

CBRNE Unit Design

Redesigned brigade combat team CBRN reconnaissance platoons would absorb all Chemical Corps authorizations currently assigned to the brigade into one organization. This would allow the detachment to include three squads of eight personnel, two EOD technicians, a commander, an executive officer, and a first sergeant. Three squads could provide immediate incident response to each of the three maneuver battalions in the brigade during combat operations. During garrison and training operations, this beefed-up detachment could provide robust subject matter expertise, training development, and training evaluation far better than a lone, stranded junior enlisted Soldier at the company level ever would.

There would only be one CBRN company design. The multiple variants of CBRN companies that currently exist do not provide additional capability to maneuver commanders: they provide confusion. A single multifunctional CBRN company with a variety of trained personnel and equipment required to respond to a spectrum of CBRN threats would give maneuver commanders a single solution to a complicated problem. All personnel in the unit would be trained and capable of conducting reconnaissance, assessment, remediation, and decontamination for all CBRN threats, and the unit should have sufficient equipment to support these requirements.

Regardless of physical location, CBRN units must have a CBRNE parent organization for training guidance and oversight. Roughly, only one-third of all Army National Guard CBRN companies currently affiliate with a CBRN battalion. In this future construct, all CBRN companies would have a formal relationship with a CBRNE battalion headquarters.

A CBRNE battalion would consist of three CBRNE companies, a headquarters company, and a support company. Battalion senior officers and noncommissioned officers would be multifunctional CBRNE officers and senior sergeants. The CBRNE battalion would include two EOD-pure companies; EOD companies would remain largely unchanged from what currently exists. Robust, EOD-only response would remain a tactical requirement. The placement of EOD companies within a CBRNE battalion would provide EOD companies with an organic, CBRNE-focused higher headquarters.

The CBRNE battalion would also provide firefighting capability. Each battalion would have an assigned firefighting platoon consisting of a headquarters detachment and four firefighting teams. The firefighting detachment would be functionally pure in order to retain a semiautonomous, specialized capability at the tactical level. Attaching a firefighting detachment to a CBRNE battalion would place the unit in a headquarters with a hazmat and incident management focus. The CBRNE battalion support company would include a standard, battalion level logistics asset, but with additional duties and equipment to provide decontamination support. The support company would also include medical and analytical platoons in order to provide specialized CBRNE medical assistance and laboratory-grade identification of suspected CBRNE materials.

The CBRNE brigade would provide support to corps and theaters of operation. The CBRNE brigade would consist of three or four CBRNE battalions, a special troops battalion, and a headquarters company. The special troops battalion, consisting of a technical escort company, an analytical company, a signal company, and a military intelligence company, would allow the CBRNE brigade to conduct sustained, independent operations and to manage complex, long-term hazmat sites.

Staffs at division and higher levels suffer from a lack of CBRNE subject matter expertise. Division and corps level staffs have single-digit senior CBRNE personnel serving in staff positions. A CBRNE staff augmentation detachment would be a 25-person Reserve Component unit with a blend of senior CBRNE officers and noncommissioned officers. The detachment would augment the planning processes of a supported unit staff during exercises or training or in theaters where there may be CBRNE threats.

The 20th CBRNE Command would continue to serve as the headquarters for Regular Army CBRNE units, but would also assume control and oversight of U.S. Army Reserve CBRNE forces. Unique units such as the 21st EOD Company, the 1st Army Mobile Laboratory, and any future specialty units would report to the 20th CBRNE Command. The 20th CBRNE commander would be the single force provider for all Army CBRNE personnel.

Billpayer Considerations

A major force structure reorganization would affect tens of thousands of positions. To be feasible, any suggested strategy must not only meet capability requirements but also result in balance and little to no growth across Army components. Overall, these new units would require 300 new EOD authorizations, representing approximately 18 percent growth in the specialty. Some of this growth

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CBRN Integration Into Forward Support Operations

By Captain Keith J. Johnson and First Lieutenant Robert J. Park

The forward support company (FSC), which is designed to provide direct logistics support to its supported battalion, is not typically assigned enabler assets due to sustainment operations. During National Training Center Rotation 17-03, the 70th Brigade Engineer Battalion (BEB) FSC provided mission command to a chemical, biological, radiological, and nuclear (CBRN) reconnaissance platoon and hazard assessment (HA) platoon capable of decontamination operations. The relationship between the FSC and CBRN platoons proved to be successful. This relationship could work for future combat training center (CTC) rotations due to the available maintenance expertise, distribution assets available, and CBRN iterations during a CTC rotation.

FSC Organization

The FSC is composed of three platoons—distribution, field feeding, and maintenance. The distribution platoon role is to conduct daily receipt; storage; and issue of Class I, II, III, IV, V, and IX supplies and transport them across the battlefield. The field feeding platoon role is to distribute, prepare, and serve meals. The maintenance platoon role is to perform field maintenance and maintenance management functions (such as dispatching and scheduling services) for the battalion. The distribution and maintenance platoons provide useful capabilities to CBRN assets. The distribution platoon Soldiers provide movement of classes of supply (particularly Class I) and bulk water to decontamination sites within the security zone or forward area. Maintenance platoon Soldiers, who have additional skill identifiers of F1 and F6, provide mechanical expertise; and they are capable of servicing sensors on the Nuclear Biological Chemical Reconnaissance Vehicle (NBCRV).

CBRN Assets

The CBRN reconnaissance platoon is a small platoon, but its missions have lasting effects across the battlefield. The CBRN reconnaissance platoon is organic to all brigade combat teams. The only difference from one to another is the platform that is used. Many units align the platoon with the cavalry squadron due to similarities in reconnaissance missions. The CBRN reconnaissance tasks are slightly different, but they are still rooted in the fundamentals of reconnaissance. The CBRN reconnaissance platoon focuses on identifying and marking an uncontaminated route to provide freedom of maneuver, conducting CBRN surveys to determine the extent of a contamination, and collecting samples to provide theater laboratories with the ability to determine potential CBRN agents.

The HA platoon is capable of CBRN dismounted reconnaissance and limited operational decontamination. Dismounted reconnaissance is used to address priority intelligence requirements and illegal trends. The platoon is capable of assessing sensitive sites and presumptively confirming or denying enemy CBRN capabilities.

FSC and CBRN platoons do not typically interact before CTC rotations, but during NTC Rotation 17-03, the 70th BEB leveraged weekly in-progress reviews to allow the platoons to communicate and understand the mission sets that they would encounter. These weekly reviews narrowed the scope of responsibility and identified who would be providing mission command for the platoons. Additionally, a predeployment site survey and leader training program participation helped platoon leaders and the FSC commander create a template outlining the support relationship between FSC and CBRN platoons during the rotation.

Typical CBRN Utilization

During CTC rotations, CBRN assets are often used incorrectly or in a limited fashion due to the number of CBRN-related missions that are required to support the brigade. During NTC Rotation 17-03, the correct employment of CBRN assets was directly attributed to a mission commander and an FSC commander who was a CBRN officer who fully understood how to employ CBRN platoons and seamlessly integrate them throughout all operational phases.

The BEB faces a unique challenge compared to other battalions; the BEB supports more than 1,000 personnel throughout a rotation with a wide range of missions. Ensuring that mission command is properly delegated to the right commander is crucial in managing simultaneous tasks. CBRN assets are typically attached to the headquarters and

headquarters company. This improves the flow of information in the event of a chemical attack. However, the reality is that CBRN platoons are often considered extra security assets and are integrated in the perimeter security plan.

During the leader training program, key leaders from the battalion staff, CBRN platoons, and the FSC developed a plan for how the CBRN platoons would be utilized during defensive and offensive operations. This plan clearly outlines the task and purpose of the platoons. In defensive operations, the reconnaissance platoon was strategically placed to provide early warning for possible chemical attacks near the brigade combat team support areas. In offensive operations, the reconnaissance platoon was placed with the HA platoon to confirm or deny templated clean and dirty routes and possible decontamination sites. The HA platoon was placed far enough forward, with security, to conduct dismounted reconnaissance in the event of a possible CBRN incident.

Possible Future Employment

With the current BEB FSC modified table of organization and equipment, the relationship between FSC and CBRN platoons does offer sustainable benefits. FSC equipment enhances CBRN capabilities. In decontamination operations, water is often an issue within the brigade combat team. For example, who will provide the water and how long will it be before it arrives at the decontamination site? The distribution platoon can dedicate a water asset to the reconnaissance platoon to ensure that the platoon has adequate water to support a company size element of Strykers or equivalent, and the maintenance platoon can provide NBCRV maintenance support. The reconnaissance platoon offers security during convoy movements for the FSC. This relationship has the potential to satisfy CBRN platoons and the FSC.

Conclusion

The maintenance expertise within the FSC increases the reconnaissance platoon ability to provide early warning of imminent chemical attacks and mark or bypass potential areas of chemical contamination. The distribution assets within the FSC provide the HA platoon with the ability to maneuver delicate equipment across restricted terrain to confirm or deny chemical presence. With the increase in chemical attacks around the world, it is prudent that CBRN assets be employed correctly, sustained through their own capabilities with a possible modified table of organization and equipment change, or aligned with an FSC in order to best conduct their CBRN missions.

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would be easily achievable with positions opening up in state National Guard units that currently have little or no EOD force structure. Other innovative ideas may be necessary, such as activating U.S. Army Reserve EOD units to attract new applicants or starting an EOD warrant officer program to retain technically competent, high-preforming EOD technicians in uniform. A modular, cookie-cutter design would also require the addition of approximately 125 Army firefighter positions.

CBRN positions removed from non-CBRN units could be used to support the growth in dedicated support personnel for the new CBRNE battalions and brigades. Roughly 70 percent of current CBRN personnel authorizations would remain in CBRN units; brigade combat teams; and maneuver enhancement brigade, division, and corps staffs. The remaining 30 percent of total Army authorizations would come from company and battalion level CBRN personnel assigned to non-CBRN Army units. Reducing Chemical Corps personnel by more than a quarter would be significant, but these reductions would be "addition by subtraction"—necessary reductions that increase capability by focusing more intently on clarified competencies. The new CBRNE branch would be slightly larger, but vastly more capable than the Army's existing CBRNE force structure.

Conclusion

Currently, the only true CBRNE units in the Army are one two-star-general headquarters and six small companies. The Army must create units capable of conducting combined CBRNE operations down to the platoon level and at every CBRNE-related unit in every echelon. The lack of cohesion and singular strategic approach in responding to CBRNE threats represents a massive waste of time, money, energy, and talent. Bureaucratic realignments can result in overly large organizations that become unwieldy by lashing together incompatible functions, but this proposed restructuring of Army CBRNE-related functions is intended to do the opposite.

The United States is currently in an era of shrinking defense budgets and increasing CBRNE threats. Separating, spreading, and segmenting Army CBRNE forces leads to a lack of effectiveness. If given the task to stand up the Army from the ground up and provide CBRNE capability today, no one would advocate for the current design. The Army CBRNE force structure consists of several interrelated but wholly separate stovepipes of excellence that are situated within the Army, primarily due to historical oddities and parochialism. These units need to be reorganized and combined to help fight and win current and future wars, not past conflicts or bureaucratic ones.

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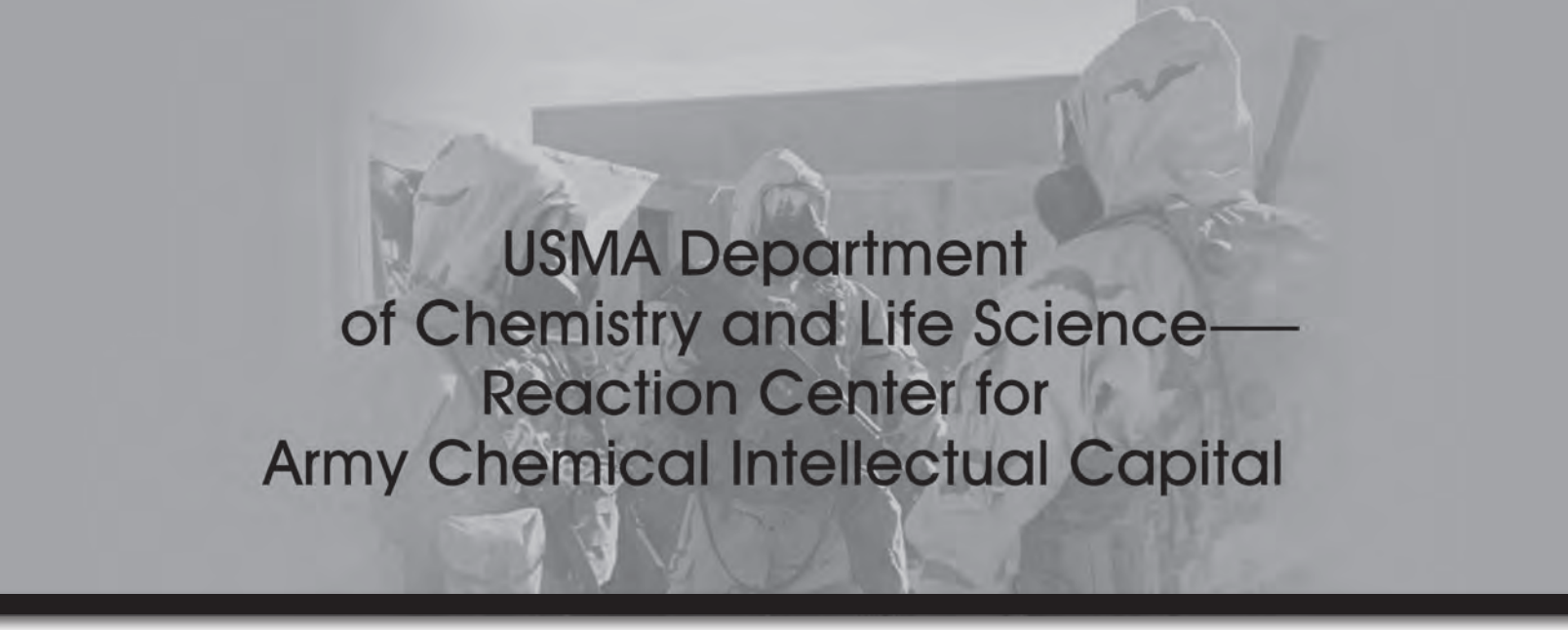


USMA Department of Chemistry and Life Science—— Reaction Center for Army Chemical Intellectual Capital

By Colonel F. John Burpo, Lieutenant Colonel Richard L. Comitz, and Major Stephen G. Hummel

The threats and hazards of chemical, biological, radiological, and nuclear (CBRN) events are as real today as they have ever been. The United Nations has launched several investigations into the accusations of Syria and the Islamic State of Iraq and the Levant using chemical weapons on civilians. More than 10 incidents from 2014 to 2018 have been investigated; and evidence of the use of chlorine, sarin, and mustard agents has been found.[1–5] These threats, in addition to North Korea's continued testing of nuclear weapons, the aggressive posturing of Russia, the Ebola outbreak in West Africa, and the unpredictability of Iran, make CBRN a vital concern. This is evident in the fact that countering weapons of mass destruction is prioritized in nearly every strategic guidance document identifying threats to the United States.[6, 7]

The operational environment is not the only place CBRN is encountered. Industrial, energy, medical, pharmaceutical, and academic research sectors also present potential CBRN threats. These concerns are pervasive in many dangerous regions that have their own complexities. When CBRN threats are combined with increasingly available technology, the result is an exponential increase in danger and complexity in these areas. Now more than ever, the Army needs officers who are experts in CBRN, capable of articulating threats, and creative in problem-solving capacities to synchronize effective responses.[8, 9] Senior commanders and leaders, not only in the U.S. Army but also throughout the Department of Defense (DOD) and U.S. government, require such advisors to help them understand CBRN threats and make informed policy and operational decisions. In order to ensure effective and timely support, this CBRN expertise must be deliberately integrated at echelons to form an effective network of intellectual capital to conduct research, analysis, policy formulation, and operations.[10]

CBRN Officers

The 2017 edition of the milSuite Smartbook, Department of the Army (DA) Pamphlet (PAM) 600-3, which outlines commissioned officer and warrant officer development and career management programs for each of the Army's career branches and functional areas, states the following for the Chemical Branch: "The [Chemical] branch is aligned under the maneuver support functional group in the operations functional category and is focused primarily on the development, integration, and employment of tactical capabilities that identify, prevent, and mitigate the entire range of chemical, biological, radiological, and nuclear (CBRN) threats and hazards through CBRN operations; that support operational and strategic objectives to combat weapons of mass destruction (WMD) through nonproliferation, counterproliferation, and CBRN consequence management; and [that] allow our sister Services and unified action partners to operate safely in a CBRN environment. Additional functions include scientific, developmental, and material management activities for these programs. The branch provides the Army with a highly trained corps of CBRN experts to advise commanders and staffs at all levels in DOD."[11] It is incumbent on the officers to be experts in CBRN and activities of the programs necessary to carry out the mission.

The milSuite Smartbook further defines skills and knowledge that are essential for CBRN officers. Specifically, it cites decision making in a complex environment, tactical and technical knowledge, multifunctionality, and situational understanding of the operational environment.[12] These areas explicitly and implicitly point to a level of knowledge that is above entry-level Soldiers; and the deeper the understanding, the better prepared an officer may be.

As part of the career development of a CBRN officer, education is key at every level. While the CBRN educational construct provides an initial foundation on which to develop the necessary professional skills for a CBRN officer, advanced

technical graduate degrees provide an enormous benefit, especially when coupled to a broadening assignment. The milSuite Smartbook provides a number of pathways to enhance an officer's career, but few provide the opportunity to obtain an advanced technical degree.[13]

USMA Department of Chemistry and Life Science

A route to enhance a CBRN officer's skill set through an advanced technical degree is via a broadening assignment combining advanced civil schooling with a utilization assignment in the Rotating Faculty Program at the U.S. Military Academy (USMA)—West Point, New York. The Department of Chemistry and Life Science (CLS) maintains six dedicated rotating faculty positions, each tied to an advanced civil schooling allocation for a master's or doctorate degree. CLS is uniquely poised to develop CBRN officers with chemical and biological technical expertise, addressing many of the persistent threats described above.

The USMA mission is "to educate, train, and inspire the Corps of Cadets so that each graduate is a commissioned leader of character, committed to the values of Duty, Honor, [and] Country and prepared for a career of professional excellence and service to the Nation as an officer in the U.S. Army."[14] CLS supports the achievement of the USMA mission with its own mission to educate, train, and inspire cadets with a firm foundation in the fields of chemistry, life science, and chemical engineering so that each graduate is a commissioned leader of character who can leverage his or her understanding of science and engineering to implement solutions using critical thinking and problem-solving skills and be prepared for a career of professional excellence and service to the Nation as an officer in the U.S. Army.

Within the realm of CBRN, the argument could be made that every process involves fundamental chemistry. For chemical and biological weapons, CLS offers the opportunity for officers to become experts in the underlying chemistry and biological processes from which these weapons are derived and that they affect. Such an understanding enables CBRN officers to be more proficient in distilling a breadth of complex scientific data about these weapons to nonscientists.

A faculty tour in CLS provides an enriching transition path from organizational leadership, building on the previous role of company grade officers with direct leadership and preparation of Soldiers for combat. Field grade officers often perform their duties through direct and indirect leadership in mixed military and civilian workplace environments. USMA offers an opportunity to prepare for these roles through the Advanced Civil Schooling Program and a subsequent utilization tour as a faculty member. Just as important as the faculty role in developing Army leaders with each graduating class, USMA's "second graduating" class is the cohort of field grade officers who complete their faculty experiences better prepared to solve problems at the operational and strategic levels.

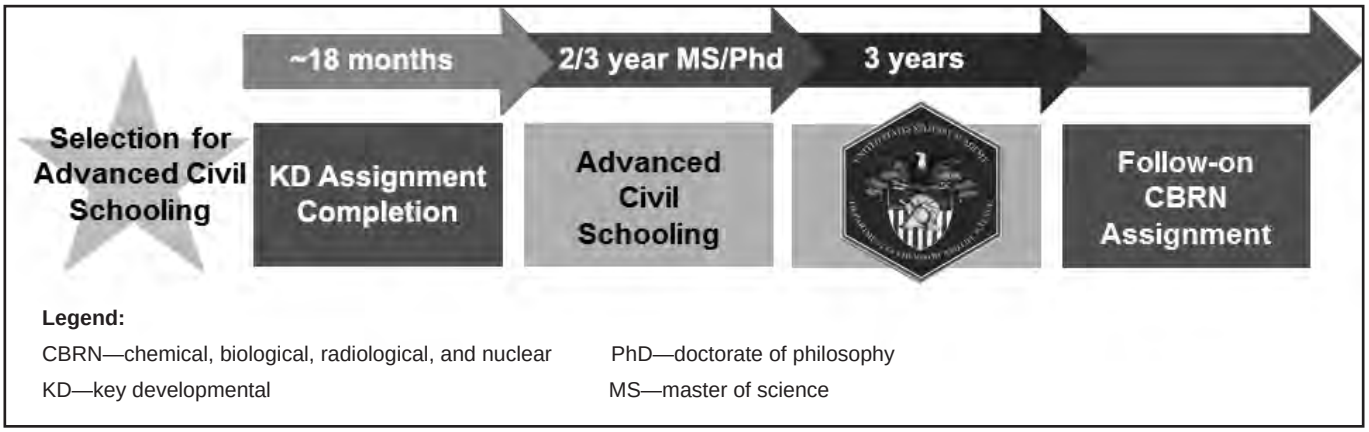
Advanced Civil Schooling

The USMA faculty is composed of approximately 25 percent civilians and 75 percent military officers. Within the military faculty, there are three groups (senior permanent military USMA professors [department heads and deputies], senior rotating faculty with doctorate of philosophy (PhD) degrees, and junior rotating faculty with master's degrees). All faculty positions involve some form of committee selection at the Army, USMA, or department level. PhD and master degree rotating positions in CLS are selected at the department level. The CLS department currently maintains six 74A positions on its table of distribution and allowances (TDA). (See Table 1.) TDA manning rules offer the flexibility to fill positions "one-up/one-down" in grade, enabling the department to better manage talent and potential tour extensions.

Line	Position	Grade	Position Code	Degree
14	Instructor / Researcher	0-4	74A	PhD
15	Instructor / Researcher	0-4	74A	PhD
22	Instructor	0-3	74A	MS
23	Instructor	0-3	74A	MS
24	Instructor	0-3	74A	MS
25	Instructor	0-3	74A	MS
Legend: PhD—doctorate of philosophy MS—master's of science degree				

Table 1: USMA TDA, 74A authorizations for CLS

Selection packets are submitted to the department for committee review and consist of a resume/curriculum vitae, personal statement, transcripts, standardized test scores, and letters of recommendation. Committee selections are normally conducted in December, with notifications occurring in January and a graduate school start date approximately 18 months later. This timeline allows officers to complete key developmental assignments and apply to graduate programs. CBRN officers have come from diverse undergraduate science, technology, engineering, and mathematics (STEM) experiences ranging from electrical engineering and engineering physics to microbiology and immunology. There is a great latitude in pursuing chemical- and biological-related graduate degrees that not only support the department's three program majors of chemistry, chemical engineering, and life science, but also enrich the chemical-biological expertise within the CBRN community. A few examples of graduate degrees attained by CBRN officers in the department are organic chemistry, analytical chemistry, nuclear chemistry, bioengineering, chemical engineering, and biology.



Timeline for advanced civil schooling selection and completion, utilization tour at CLS, and follow-on CBRN assignment

The Advanced Civil Schooling Program allows officers to attend a university of their choice, ranging from public to private schools. Senior faculty mentorship assists selected officers in finding the best university fit aligned with department needs, officer research interest, and timeline feasibility. The timeline for advanced civil schooling selection is 2 years for a thesis-based master's degree or 3 years for a PhD, a 3-year utilization tour at CLS, and then a follow-on CBRN assignment. The graduate school broadening opportunity places the officer in a non-DOD environment. Through the company grade and early field grade ranks, many Army officers have limited interaction working with a non-DOD population. Graduate school provides an important opportunity for officers to work with current and future experts within their field of study. The graduate school experience also offers the unique leadership opportunity for officers to lead, interact with, and become part of a group with no rank structure. Ultimately, the officer and the Army benefit from better problem-solving skills at operational and strategic echelons.

Faculty Experience

USMA faculty participate in activities across five domains: teaching, scholarship, cadet development, faculty development, and service. CLS organizes all of those activities around Army- and DOD-relevant research, often in collaboration with DOD laboratories. Teaching cadets in the classroom results in technical knowledge and problem-solving skills that are then applied in the laboratory at USMA and during summer research internships for cadets and faculty. This integrative process, depicted in Figure 1, leverages the synergies of all five domains of faculty activity, such that every interaction is a developmental event for cadets and junior and senior faculty.

This integrative developmental model also ensures that the research an officer begins in graduate school continues and evolves upon joining the USMA faculty. CBRN officers have received funding for their research from organizations such as the Defense Threat Reduction Agency (DTRA), Fort Belvoir, Virginia, and the U.S. Army Edgewood Chemical Biological Center, Aberdeen Proving Ground, Maryland. These research efforts have the further benefit that CLS CBRN faculty become directly engaged in the research programmatic efforts of the organizations in which they are likely to serve in the future. Additionally, there are ongoing CLS research efforts in the areas of material science and engineering for sensors and energy-based devices, molecular diagnostics and nerve repair, and explosives and pyrotechnics. The research conducted within CLS includes basic sciences and engineering and policy. Previous faculty have published articles in conjunction with the Combating Terrorism Center at West Point and worked with the Center for Combating Weapons of Mass Destruction at the National Defense University, Washington, D.C. These collaborative relationships have provided numerous unique opportunities for CBRN officers to brief senior military and civilian leaders, to include combatant commanders, the Secretary of De-

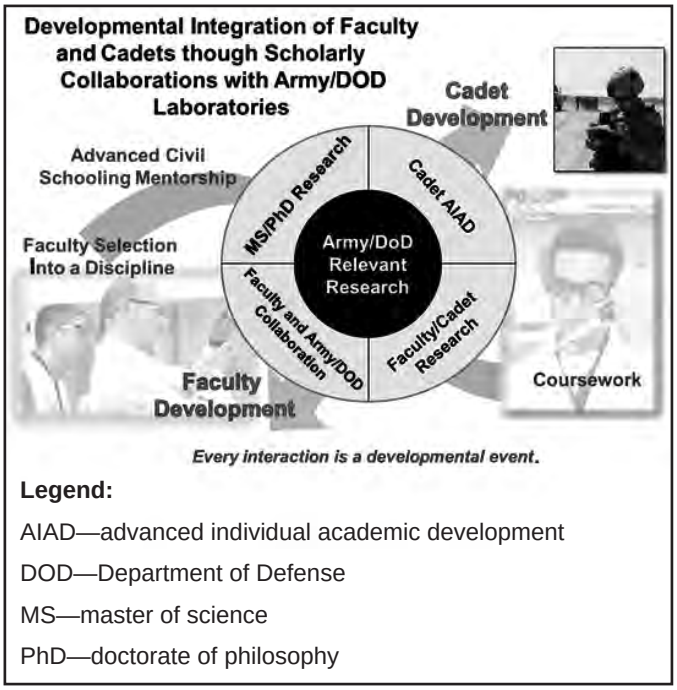


Figure 1. The Deparmtent of Chemistry and Life Science developmental model integrating faculty and cadets through scholarly collaborations with Army and DOD laboratories

fense, and the Director of the Central Intelligence Agency.

Given the time required to complete an advanced graduate degree and serve a 3-year utilization tour, career timelines often require careful management. To mitigate timeline challenges, many CBRN officers serving in CLS may complete Intermediate Level Education at West Point via distance learning or satellite during the summer.

CBRN Community Contributions

In addition to academic committee work associated with university faculty positions, CLS officers have contributed to the CBRN community beyond USMA in a variety of ways. Given their technical expertise and research in chemical and biological fields, combined with operational experiences across various unit types, echelons, and theaters of deployment, CLS faculty offer the CBRN network a unique perspective that facilitates the translation of basic and applied science into practical fielded systems, policies, and analysis. This service includes the following experiences:

- DTRA, Chemical and Biological Defense Program, Basic Science Reviews.
- DTRA, Chemical and Biological Defense Program, Program Management Reviews.
- DTRA, Chemical and Biological Defense Science and Technology conferences and warfighter panels.
- Edgewood Chemical Biological Center Technical Advisory Board.
- Edgewood Chemical Biological Center In-House Laboratory Independent Research and Surface Science Initiative grant proposal reviews.
- U.S. Army Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) Imperatives Council of Colonels.
- Joint Program Executive Office–Chemical and Biological Defense, Chemical Biological Defense Acquisition Initiative Forum.

CBRN Community Enrichment

After further developing technical chemical and biological expertise, honing communication skills in the classroom, and leading in a diverse military-civilian organization, CLS faculty depart for follow-on assignments to contribute across the DOD CBRN community. Former CLS faculty have served at the—

- Office of the Secretary of Defense–Joint Staff.
- DTRA.
- Defense Intelligence Agency, Washington, D.C.
- National Defense University.
- Headquarters, Department of the Army.
- 48th Chemical Brigade, 20th CBRNE Command, Aberdeen Proving Ground, Maryland.
- U.S. Army Edgewood Chemical Biological Center.

Numerous former faculty serve in military and civilian positions at DTRA. Additionally, CLS permanent military faculty have also contributed to the CBRN community in 6-month to 1-year operational assignments within the 20th CBRNE Command, with duties involving contingency operations development, science and technology integration, and strategic-communications integration. Further, emerging chemical and biological faculty and research positions at the Air Force Institute of Technology and the Armed Forces Radiobiology Research Institute at the Uniformed Services University offer potential follow-on assignment opportunities to sustain long-term research efforts. The former military faculty serving as senior civilians in these organizations represent USMA's "third graduating class" and further demonstrate the positive influence of CLS on the CBRN community across three time scales—the first graduating class of lieutenants, the second graduating class of field grade officers, and the third graduating class of chemical-biological leaders transitioning from military to civilian service. The integration and contribution of CLS across the CBRN community establishes its role as a nexus of chemical and biological expertise, as shown in Figure 2 (page X).

The Way Forward

CLS continues to develop synergistic relationships within the CBRN community and to enrich the chemical and biological intellectual capital for the Army and DOD CBRN community. Continued partnership between USMA and the U.S. Army Human Resources Command, Fort Knox, Kentucky, will ensure that the best officers pursue graduate technical degrees through the Advanced Civil Schooling Program. Combining teaching, research, and Service experience at USMA forges a developmental pathway to providing Army and DOD expert problem solvers with the ability to communicate and solve the most difficult future chemical and biological challenges at the operational and strategic levels.

For more information on opportunities available in CLS at USMA, contact <cls.personnel@usma.edu> or (845) 938-3767.

Endnotes:

[1]United Nations Security Council, *Seventh Report of the Organization for the Prohibition of Chemical Weapons—United Nations Joint Investigation Mechanism Addressed to the Secretary-General*, 2017.

[2]United Nations Security Council, *Sixth Report of the Organization for the Prohibition of Chemical Weapons—United Nations Joint Investigation Mechanism Addressed to the Secretary-General*, 2017.

[3]United Nations Security Council, *Fifth Report of the Organization for the Prohibition of Chemical Weapons—United Nations Joint Investigation Mechanism Addressed to the Secretary-General*, 2017.

[4]United Nations Security Council, *Fourth Report of the Organization for the Prohibition of Chemical Weapons—United Nations Joint Investigation Mechanism Addressed to the Secretary-General*, 2016.

[5]United Nations Security Council, *Third Report of the Organization for the Prohibition of Chemical Weapons—United Nations Joint Investigation Mechanism Addressed to the Secretary-General*, 2016.

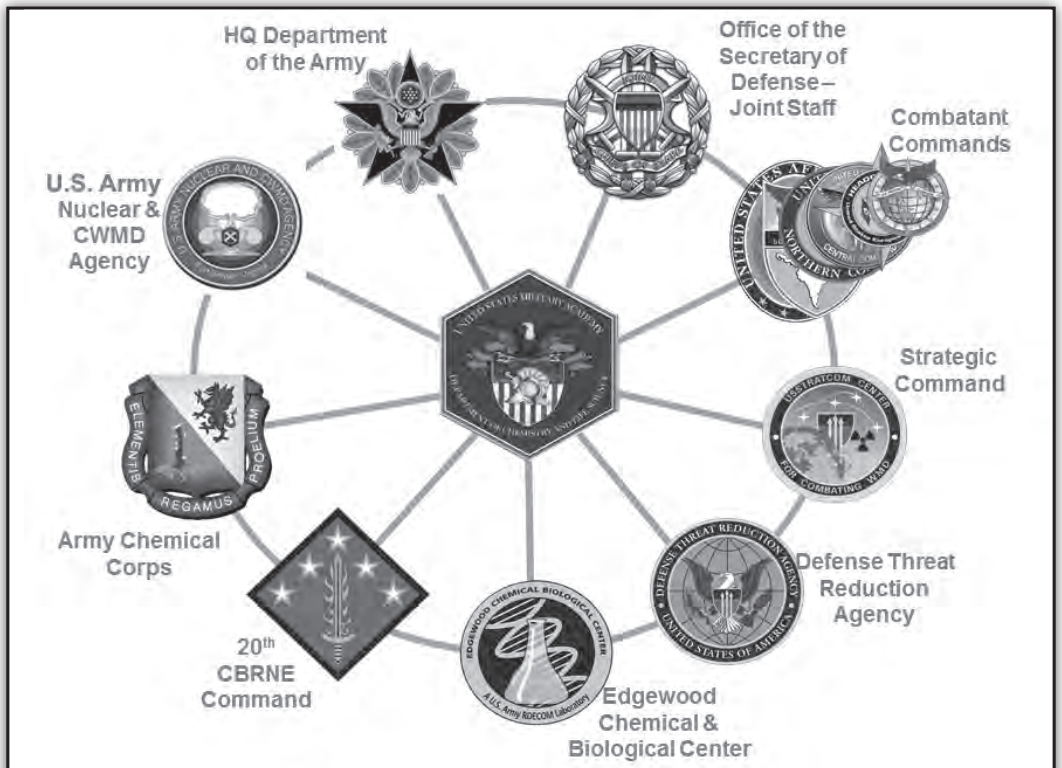


Figure 2. The CBRN community network with the West Point Department of Chemistry and Life Science serving as the nexus of chemical and biological intellectual capital.

[6]U.S. Department of Defense, *Quadrennial Defense Review*, 2014.

[7]U.S. Army, *Army Strategic Planning Guidance*, 2014, <http://www.g8.army.mil/pdf/Army_Strategic_Planning_Guidance2014.pdf>, accessed on 12 April 2018.

[8]Michael Aaronson et al., "NATO Countering the Hybrid Threat," *PRISM 2*, No. 4, 2012, pp. 111–124.

[9]Brian P. Fleming, *The Hybrid Threat Concept: Contemporary War, Military Planning and the Advent of Unrestricted Operational Art*, Army Command and General Staff College, Fort Leavenworth Kansas School of Advanced Military Studies, 2011.

[10]Paul Wolfowitz, "Remarks by Deputy Secretary of Defense Paul D. Wolfowitz," National Defense University WMD Symposium, 2003.

[11]milSuite, Smartbook DA PAM 600-3, pp. 1-3, <https://www.milsuite.mil/book/groups/smartbook-da-pam-600-3>, accessed on 19 April 2018.

[12]Ibid.

[13]Ibid.

[14]USMA, "The West Point Mission," <https://www.usma.edu/about/sitepages/mission.aspx>, accessed on 12 April 2018.

Colonel Burpo is the head of CLS at USMA. He previously served as the Deputy Commander–Transformation, 20th CBRNE Command, Aberdeen Proving Ground, Maryland. He holds a master's degree in chemical engineering from Stanford University, Stanford, California, and a doctorate degree in bioengineering from the Massachusetts Institute of Technology, Cambridge.

Lieutenant Colonel Comitz is the assistant program director for CLS, USMA. He holds a master's degree in chemistry and a doctorate degree in organic chemistry from the Florida Institute of Technology, Melbourne.

Major Hummel serves on a nuclear disablement team, 20th CBRNE Command. He holds master's degrees in chemical and physical biology from Vanderbilt University, Nashville, Tennessee, and in radiation biology from the University of Iowa, Iowa City.

By Major Timothy D. Cox and First Lieutenant Andy H. Harvey

The 2017 Best Ranger Competition started off as a shot in the dark for three officers from the 3d Chemical Brigade and the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS). In August 2016, Brigadier General James E. Bonner, the USACBRNS commandant at the time, showed interest in fielding a team to represent the school. At first, this task seemed impossible with only seven chemical, biological, radiological, and nuclear (CBRN) ranger-qualified personnel within the command and only three capable of competing in the high-demand competition. The purpose of this article is to describe our preparation, provide an overview of the competition, and explain our purpose for competing.

The Best Ranger Competition is the Army's elite endurance competition designed to identify the best two-man airborne ranger buddy team. Traditionally, about 50 teams from across the maneuver and ranger communities compete each year. The teams are tested mentally and physically during 60 hours of competition at Fort Benning, Georgia. The competition, which is hosted by the Airborne and Ranger Training Brigade (ARTB), identifies the best of the best.

The competition, which originated in 1982 with Lieutenant General David E. Grange Jr. (Retired), has changed very little. Legacy events have remained consistent, with personal touches added each year. Each maneuver unit receives an invitation with an allocated number of teams allowed to compete based on the number of airborne ranger-coded positions within the unit. Because USACBRNS did not receive an allocated competition slot, engaged leadership and attention to detail was required to obtain a slot for the USACBRNS team. The USACBRNS competition packet was submitted before that of any other team, and the ARTB commander granted USACBRNS an unallocated slot.

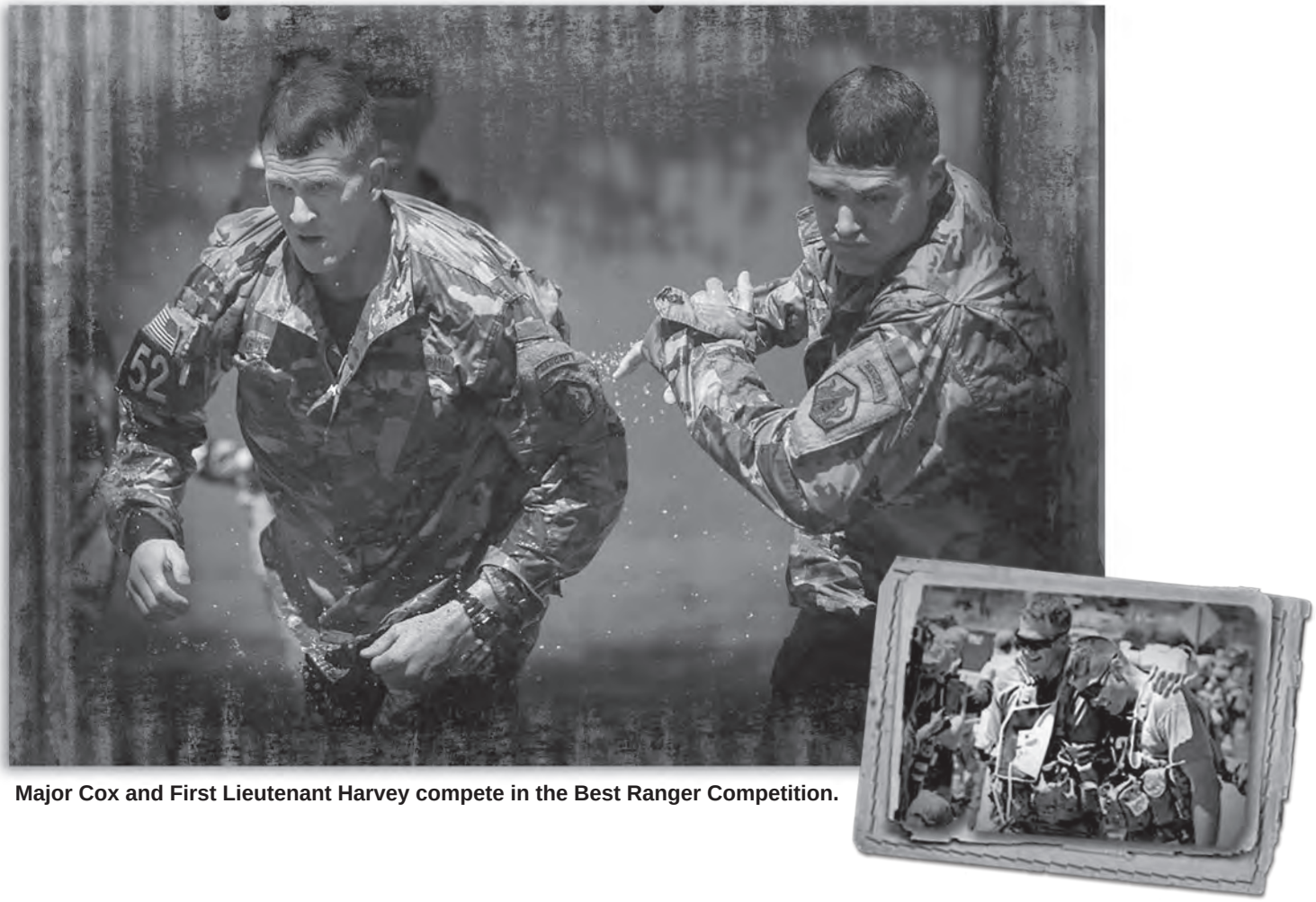
A team had been formed before the competition slot was allocated to ensure that a competitive team could be fielded—USACBRNS could not show up and be unable to perform. Good teammates must have complementary personalities and physical talents. We, (then) Captain Timothy D. Cox and First Lieutenant Andy H. Harvey, were selected as the two-man airborne ranger buddy team that would represent USACBRNS. After discussion with our leaders, Major Peter C. Zappola was selected to serve as our coach and manage our physical preparation.

Major Zappola created a plan that allowed us to achieve a base level of physical readiness, while avoiding overtraining that might lead to injury. In October 2016, we began training multiple times per week to be ready for the dedicated preparation training, which would begin after the first of the year.

The official train-up began immediately after returning from holiday block leave. It required strict attention to detail, specific workout and nutrition instructions, and long days of preparing our bodies to endure the rigors of the competition. Each month, the training progressed in difficulty, culminating with a "miniature competition" at the end of the month. The purpose of the miniature competitions was to mimic the environment and feel of the competition as well as to gauge our fitness and technical proficiency. From rucking on a treadmill due to sub-zero temperatures in January to executing competition grade events in March, the physical training program created by Major Zappola allowed us to arrive at Fort Benning in peak shape.

With our physical training program on track, we needed to ensure that our technical training plan met the same standards. From Major Cox's previous competition experience, we knew that being physically prepared, but not technically sound, would be a recipe for failure. In 2011, Major Cox placed 18th while representing the 75th Ranger Regiment. With that in mind, we crafted our technical skills plan based on experience and training advice from previous winners of the competition. The strategic impact of two CBRN Soldiers competing and performing well in a competition dominated by the maneuver community was monumental in showcasing the Chemical Corps capabilities and ability to fight with and support the maneuver force.

The ARTB released the list of invited teams and potential events to all competitors in late January. This provided us with direction and focused our training. We trained and drilled two tasks per day, creating competition-like scenarios and executing the tasks until they were embedded in our minds. We utilized subject matter experts during our training. We leveraged the U.S. Army Sapper School for demolitions and mountaineering skills training, Military Occupational Specialty 13F noncommissioned officers for call-for-fire training (and were granted access to the call-for-fire simulation center), installation combat life saver trainers for combat lifesaver training, Military Occupational Specialty 68W noncommissioned officers for first-responder training, and U.S. Army Military Police School pistol and rifle marksmanship instructors for fundamentals and best



Major Cox and First Lieutenant Harvey compete in the Best Ranger Competition.

practices training. We also leveraged sports psychologists working within the Army Resiliency Program to train and develop our mental strength skills throughout the train-up. Proper preparation took effort from the entire installation, and we were very grateful to have everyone's support.

The 2017 Best Ranger Competition field was packed with previous winners and multiple Top 5 performers from years past. The 2009 winner, Master Sergeant Chad Stackpole, represented the 82d Airborne Division along with Staff Sergeant Carlos Mercado, who placed in the Top 10 in the 2016 competition. The 2014 winner, Captain Michael Rose, represented the 75th Ranger Regiment along with Master Sergeant Josh Horsager, who had placed in the Top 3 multiple times. The 2016 winners, Captain Robert Killian and Staff Sergeant Erich Friedlein from the U.S. Army National Guard, had hopes of a repeat. The talent present in the 2017 competition was some of the best ever. On the morning of April 7th, we were focused and ready to put all of our training and physical preparation to the test; 5 months of preparation and training culminated in 3 days of competition. Our goal was to finish in the Top 10.

The opening ceremony started at 0600. The first event, the unknown distance buddy run, kicked off at 0615. This turned out to be a 5-mile event that ended back at Camp Rodgers, where we secured our ruck sacks. We then took off again toward Victory Pond. After that 3-mile ruck, a chilling swim across Victory Pond led to a water-soaked run back to Camp Rogers. Next, we executed the famed Malvesti Obstacle Course—a course that every ranger has fond memories of executing the first week of U.S. Army Ranger School. Following the obstacle course was another unknown distance run but, this time, wearing body armor. This run, which turned out to be another 8 miles, brought us to the Selby Combined Arms Collective Training Facility and the urban obstacle course. Thankfully, this also brought us to our first small break in the competition, which allowed us to properly hydrate, replenish lost nutrients and, most importantly, dry out our water-logged socks and boots for a moment.

Following the urban obstacle, we moved by Blackhawk to the Lee Drop Zone, departed the Blackhawk via the Fast Rope Insertion Extraction System, and then conducted sling load recovery by moving Class I items from one designated point to another. Directly following, we moved a weighted litter loaded with more than 100 pounds approximately 2 miles to the Malone Range Complex. At the range complex, we zeroed an M4 with iron sights and an M249 squad automatic weapon with limited ammunition and a short timeline, qualified on each weapon system, moved to the M4 moving target range, and then moved to Malone 18 to conduct alternate firing positions and controlled pair engagements.

Upon completion of the range events, the ARTB presented the leaderboard for the first time in the competition. We viewed the results, starting at the bottom and scrolling up. Reaching the positions in the 20s, we were still unable

to locate our names. When we viewed the Top 10 list, we discovered that we were in 8th place; we were excited and pleasantly surprised. It was a turning point in the competition. This signified our transition from participants to competitors. We knew our goal of a Top 10 finish was within reach, and the unknown distance road march (one of our better events) awaited.

We waited for darkness to start the unknown distance road march, an event that would cut the number of teams from 53 to 24 upon completion. The night was long, and the terrain was challenging. A noncommissioned officer with whom Major Cox had worked at the 75th Ranger Regiment had always said that Wildcat Road was the worst terrain on Fort Benning, and we now know this to be true. After placing 5th in the road march, we knew that we had to continue to knock events down as they came, stay focused, and move forward. Night stakes was next. This tested our technical proficiency at demolitions, land navigation fundamentals, and room clearance. After night stakes, we were in 6th place overall. Next up was the Spartan Race, which we knew was going to be a gut check following the road march, night stakes, and less than an hour of sleep. A 4th place finish in the Spartan Race pushed us into 5th place overall in the competition. Day stakes on Todd Field was a round robin event consisting of a grenade assault course, Buchanan Range stress shoot, call for fire, ranger first responder, tri-tower challenge, and knots. Our many months of technical training paid off, as we performed well and finished the day stakes still in 5th place. After day stakes, we rested a few hours and waited for darkness once again for night orienteering. At 2100, we began night orienteering, moving all night under load (approximately 60 pounds), orienteering through the red clay of Fort Benning, and finishing at 0435 at our final destination, Camp Darby. We moved more than 20 miles in order to accumulate the required points to move on.

The lineup for Day 3, the final day, included the Darby Queen Obstacle Course, combat water survival assessment, helocast, and final buddy run. We dropped from 5th to 6th place following the combat water survival assessment and headed into the final buddy run. We finished 4th in the final buddy run out of the 21 remaining teams, which allowed us to finish the competition in 6th place.

The CBRN team from Fort Leonard Wood was the "unknown" team of the 2017 Best Ranger Competition. Our Families who were attending the competition were asked the following questions multiple times by different coaches and spectators: Who is Team 52? Where did Team 52 come from? What is the 3d Chemical Brigade? Where is Fort Leonard Wood? Our performance had spoken for itself.

The purpose in sharing our story is to motivate others to take a similar path. Our Regiment must strive for greatness and attempt to leave a legacy. Competing in this competition brought excitement across the Regiment and a sense of pride in belonging. This was highlighted in an engagement with Lieutenant General Grange, who, year after year, enjoys watching the competition that he started in 1982. After the moving target range event, we were in the holding area preparing to move to the next event. Lieutenant General Grange was there, so we approached him, saluted him with a sharp "Rangers Lead the Way, Sir!" and then shook his hand. Not recognizing our patch, he asked us where we were from. Somewhat sheepishly, we replied that we were from Fort Leonard Wood, Missouri, and were representing the 3d Chemical Brigade. He stared at us for a moment and said, "I remember you as a different name, the 3d Chemical Mortar Battalion. You guys got me and my guys out of a tough spot during [World War II]. I was a company commander then, and I remember we were pinned down. Thanks to your indirect fire, me and most of my guys made it out of there." We were amazed, and you might say that we walked to the next event a little taller and even more proud to be CBRN Soldiers.

In closing, competing in the competition started as a vision from the USACBRNS Commandant and 29th Chief of Chemical. Nearly every maneuver organization was represented at the 2017 Best Ranger Competition. Our job as CBRN professionals is to support maneuver. There is no better way to bring credibility to Fort Leonard Wood and the Chemical Corps than by going step-for-step and pound-for-pound with the best infantry Soldiers in the world. The strategic impact of two CBRN Soldiers going the distance, competing with, and winning against the best has astounding effects on the perception of the Chemical Regiment.

Many said that we won by showing up on the starting line—we went in believing in ourselves and our preparation. Crossing the finish line is a feeling that cannot be explained; it must be experienced. We put our best foot forward, gave everything we had, and accomplished our goal. It was one of our most rewarding memories in the military—and one that we will cherish for years to come. We know that we had a great partnership, an inspiring coach, and a supportive cast of Family and leaders. We did something together that many said we couldn't do. We were the underdogs of the competition, and that was the way we liked it. We had support from our Families, the 3d Chemical Brigade chain of command, and the Commanding General of Fort Leonard Wood. We represented the Chemical Corps, the Maneuver Support Center of Excellence, and Fort Leonard Wood with honor and distinction, and we were the story of the 2017 Best Ranger Competition.

Major Cox is currently a student at the Command and General Staff College at Fort Leavenworth, Kansas. He previously served as a CBRN defense and protection officer, 3d Chemical Brigade. At the time this article was written and during the competition, he was a captain. He is pursuing a master's degree in homeland security from the University of Kansas.

First Lieutenant Harvey is the aide-de-camp for the Commanding General of the 20th Chemical, Biological, Radiological, Nuclear, and Explosives Command, Aberdeen Proving Ground, Maryland. He previously served as the company executive officer for Company F, 1st Battalion, 48th Infantry Regiment, 3d Chemical Brigade. He holds bachelor of art degrees in biology/zoology and Spanish from Southern Utah University, Cedar City, Utah.

Preparing for Mission Command of DCRF Operations

By Colonel John C. Becking

Scenario: A terrorist organization intent on harming the United States obtains a nuclear weapon from a rogue nation. After gaining entrance to the United States, a lone terrorist transports the nuclear device into a large metropolitan area in the back of a rented truck. Shortly after the morning rush hour, terrorists detonate the nuclear device in the city center, inflicting thousands of American casualties in the worst attack to date on the United States.

Fortunately, the above scenario has never occurred. The threat of a chemical, biological, radiological, or nuclear (CBRN) attack upon the United States, its possessions, or territories is exactly why the Department of Defense maintains the Defense Chemical, Biological, Radiological, and Nuclear Response Force (DCRF). It would assist local and state agencies with a response to such an attack. To ensure that U.S. Army brigade and battalion headquarters are prepared to conduct the DCRF mission in response to an attack, these units must specifically train mission command as part of defense support to civil authorities (DSCA) tasks.

DCRF Overview

Joint Task Force–Civil Support (JTF-CS) is a subordinate command of U.S. Northern Command, which is tasked with the lead in providing DSCA in response to a CBRN attack on the United States. JTF-CS is only one part of the military response to a potential CBRN incident in the United States; other organizations (such as the Army National Guard Homeland Response Forces, civil support teams, and CBRN enhanced response force packages) are also involved.

JTF-CS leads the DCRF, which is organized with brigade task forces for operations, aviation, medical, and logistic support. These units are sourced from across the Department of Defense, but largely consist of Regular Army units. Upon alert for response to a CBRN incident, JTF-CS deploys to the affected area and assembles the DCRF to assist local authorities. The DCRF typically provides assistance to local authorities searching for, decontaminating, medically treating, and further evacuating survivors of a CBRN incident.[1]

DCRF Training

As might be expected from the above description, the DCRF mission is unique enough that proficiency with offensive and defensive tasks of unified land operations does not guarantee proficiency in executing the DCRF mission. The conditions are very different; the DCRF operates in an environment quite alien from that for which Army units typically train. Instead of having primary responsibility for an operation, the DCRF is in support of another lead agency, such as the Federal Emergency Management Agency.[2] Instead of being deployed to a foreign country, the DCRF deploys to major American cities or territories. Instead of acting in accordance with a status-of-forces agreement or international law, the DCRF is concerned with abiding by laws such as the "Posse Comitatus Act."[3]

The above varied conditions drive different operating and training requirements for DCRF units vice units preparing for offensive and defensive tasks. Units assuming the DCRF mission must first understand the military role in DSCA operations; the military is there to support rather than lead. As such, a battalion or brigade headquarters must understand how a military unit may integrate with the National Incident Management System developed by the Federal Emergency Management Agency.[4] A likely first step would be to learn and understand the vocabulary of the National Response Framework.[5]

Soldiers from the 864th Engineer Battalion plan for an upcoming urban search-and-rescue mission while training at Muscatatuck Urban Training Center, Indiana.

Units usually assume the DCRF mission for 1 year, with considerable training having been planned and organized by U.S. Army North (ARNORTH) (the U.S. Army Service Component Command of U.S. Northern Command) and JTF-CS before assuming the mission. However, the unique conditions and varied tasks for the DCRF mission dictate that oncoming DCRF units develop a comprehensive training plan to augment ARNORTH and JTF-CS training. Training should focus on individual (such as DSCA Training Levels I and II) and collective (such as mission command of DSCA tasks) training. For example, units should become adept at rapid task organization changes, integration into the incident commander's operational concept, and mission command of mass casualty decontamination lines. Unit-developed training complements ARNORTH- and JTF-CS-provided training.

Soldiers from the 864th Engineer Battalion prepare to extract a simulated casualty from a trench.

Training Oversight

Given the enormity of preparing for these tasks, organic parent organizations (typically corps, division, and brigade headquarters) should take ownership of preparing battalions and brigades to assume the DCRF mission. Battalion and brigade headquarters assuming the DCRF mission do not have all the assets necessary to fully resource their training. Training exercises require dedicated exercise control and higher command cells to adequately train mission command tasks. Further, only parent organizations can adequately remove competing distractions from unit training schedules to support dedicated training time to prepare for the DCRF mission.

Soldiers from the 110th CBRN Battalion train to operate a mass casualty decontamination line at Joint Base Lewis–McChord, Washington.

Not only do organic parent commands best resource subordinate training, but they also bear the responsibility for certifying DCRF battalions and brigades for assumption of the DCRF mission. Just as with offensive and defensive tasks for unified land operations, parent commands should appoint a senior trainer to oversee the training progression of each unit assuming the DCRF mission. This senior trainer should be assigned the task of approving the training plan to ensure that the unit progresses from initial training through the certification training event. Finally, the senior trainer should serve as the authority for certifying the unit at the certification exercise.[6] Without dedicated training oversight from parent commands, battalions and brigades will not be properly prepared to assume the DCRF mission.

Conclusion

The United States employs a myriad of precautions and measures to keep the Nation and its citizens safe. The totality of these measures has ensured that no CBRN attack has occurred in the United States to date. However, given the grave potential impact upon the Nation, DCRF units must ensure that they are ready to perform mission command of complex DSCA operations to respond to an attack on America's worst day. While we may not be able to prevent or thwart every malicious threat against our country, the Army must be ready to respond to a CBRN attack.

Endnotes:

[1]Joint Task Force Civil Support Web site, "FAQs," <http://www.jtfcs.northcom.mil/About/FAQs/>, accessed 22 March 2018.

[2]Department of Defense Directive 3025.18, *Defense Support of Civil Authorities (DSCA)*, 29 December 2010, p. 6.

[3]U.S. Code, Title 18, *Crimes and Criminal Procedure*, §1385, "Posse Comitatus Act."

[4]Department of Homeland Security, "National Incident Management System," 1 March 2004.

[5]U.S. Department of Homeland Security, *National Response Framework*, Third Edition, June 2016

[6]Field Manual 7-0, *Train to Win in a Complex World*, 5 October 2016, pp. 1-6 and 3-13.

Colonel Becking commands the 555th Engineer Brigade, which is currently serving as the DCRF Task Force Operations headquarters. He is a graduate of the University of Michigan, Auburn University, and the U.S. Army War College.

Smith Sworn in as New Army Inspector General, Promoted to Lieutenant General

By Mr. Dustin Perry

Two days after being sworn in as the Army's 66th inspector general (IG), Leslie C. "Les" Smith was promoted to lieutenant general during a 9 February 2018 ceremony at Fort McNair, Washington, D.C. Smith takes the role after having served as the deputy IG since April 2015. He succeeds retired Lieutenant General David E. Quantock, who was the IG from December 2014 until February 2018. Army Chief of Staff General Mark A. Milley hosted and provided remarks at the ceremony, which was held at Fort McNair, with a crowd of Smith's Family, friends, and IG Soldiers and civilians in attendance.

During his remarks, Milley listed some notable past officers who held the three-star rank, including George Washington, Ulysses S. Grant, and George Patton. He then noted that Smith, a graduate of Georgia Southern University, was one of only 52 of the more than 6,000 who were commissioned as second lieutenants in 1983 to have reached the level of general officer. "Les has an extraordinary amount of competence, and that has been demonstrated repeatedly, in assignment after assignment, from [when he was a] second lieutenant up to right now," said Milley. "There is no question in my mind that everyone in this room, Les, is very proud of you," he added.

Left: Lieutenant General Smith is sworn in as the Army's 66th inspector general. Right: Lieutenant General Smith's wife and mother affix new rank epaulets to his jacket during his promotion ceremony.

Following his remarks, Milley called Smith up to the stage, where his wife, mother, and two daughters joined him. Smith stood and beamed as his Family affixed new rank epaulets to his jacket and shirt. Milley then administered the oath of office to Smith, officially signifying Smith's promotion to lieutenant general.

Smith's remarks largely focused on thanking the many people in his life whom he said had significantly contributed to shaping his values and work ethic and who played a vital role in his success as a commissioned officer. Smith thanked the Army's senior leadership, the IGs who came before him, his commissioned and noncommissioned peers, his college fraternity brothers and church family, and his immediate Family—particularly his mother, Lily, who raised Smith and his siblings as a single parent when their father, Calvin, died suddenly when Smith was only 5 years old.

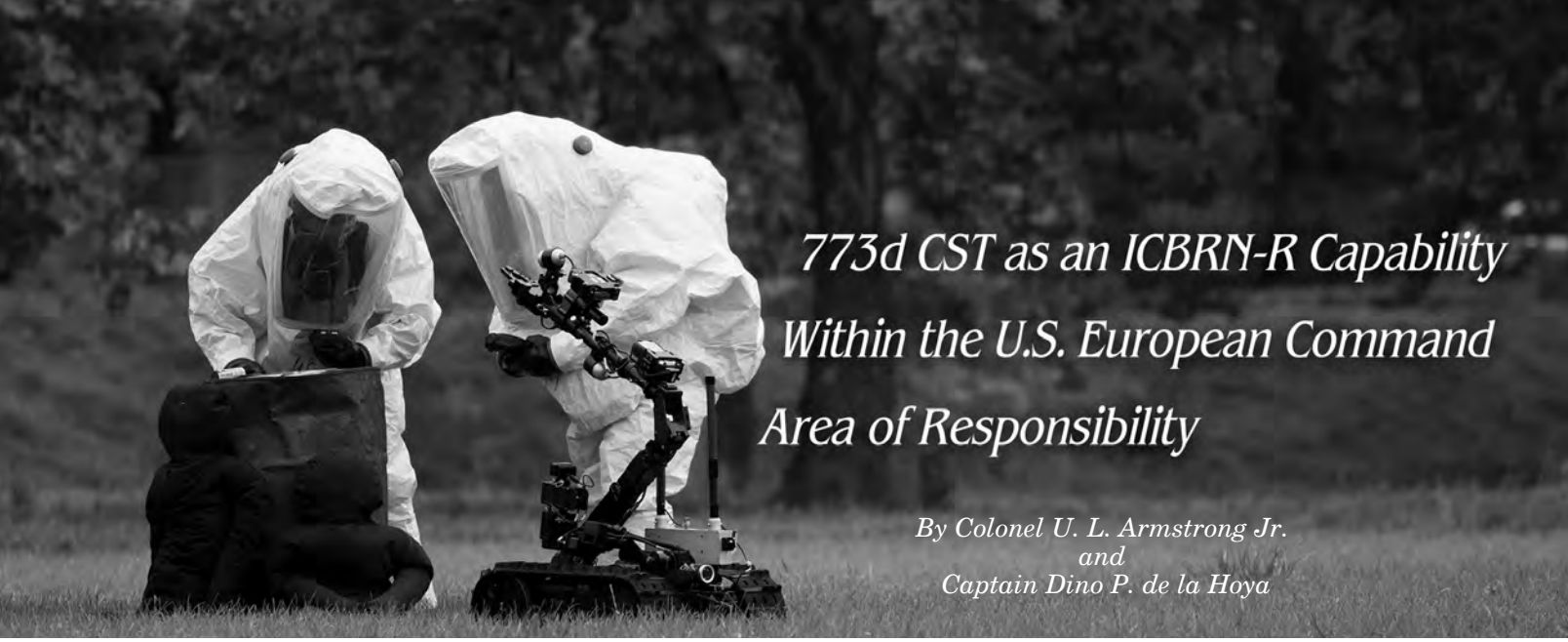
"While I don't remember much from [that young age], I know that high standards were set for my siblings and [me] and those standards served as the foundation for who I am today," said Smith. It was those positive qualities, as well as Smith's professionalism, experience and distinguished service career, that made him an ideal choice as the Army's next IG, Milley said. The chief of staff went on to praise Smith as "a uniquely qualified individual . . . [of] unbelievably extraordinary character."

"That is exactly what we need in an IG—a man who is possessed of enormous integrity and moral courage," Milley added. "Les, it is no doubt in my mind . . . that you are the right guy for this job. It is an important job, and we know you are going to do it with excellence the entire time."

Smith acknowledged the responsibilities that will come with his new role and concluded by directly addressing the IG Soldiers and civilians in the crowd, asserting his commitment to the job. "I pledge my complete focus, dedication, and drive as your 66th inspector general," said Smith. "I know you will do the same as we work on readiness, reform, and taking care of our people each day," he added.

The mission of the Office of the IG is to provide impartial, objective, and unbiased advice and oversight to the Army through relevant, timely, and thorough inspection, assistance, investigations, and training. The Office of the IG also works to promote and enable stewardship, accountability, integrity, efficiency, and good order and discipline to enhance total Army readiness.

Mr. Perry is an editor for the Office of the Army IG, Washington, D.C.



773d CST as an ICBRN-R Capability Within the U.S. European Command Area of Responsibility

By Colonel U. L. Armstrong Jr.
and
Captain Dino P. de la Hoya

The rise of terrorist attacks and reoccurring natural disasters that impact man-made storage facilities within Europe have increased awareness of the requirements for the international chemical, biological, radiological, and nuclear response (ICBRN-R) measures (formerly known as foreign consequence management). The effects of a chemical, biological, radiological, and nuclear (CBRN) incident within a host nation and/or on U.S. government property as a result of a natural or man-made incident could result in catastrophic loss of life and would require collaborative responses from various organizations. Installation commanders who are outside the continental United States have a responsibility to respond to CBRN incidents that occur on foreign territory and on their installation.[1] The U.S. government follows ICBRN-R guidelines, which define U.S. response as activities that assist friends and allies in the event of an intentional or accidental release of a CBRN agent in order to preserve life.[2]

In 2009, the 773d Civil Support Team (CST) activated its weapons of mass destruction (WMD) team in support of ICBRN-R, U.S. installation commanders throughout Europe, and European allies and partners. The 773d CST mission is to assist authorities by identifying chemical, biological, radiological, nuclear, and explosives (CBRNE) agents and substances; assessing current and projected consequences; advising on response measures; and assisting with the appropriate requests for additional support requirements.

The 773d CST is assigned to the U.S. Army Reserve and is forward-stationed in Germany. While there are smaller Regular Army CBRN elements in Europe, the 773d provides the most robust CBRN capability within the U.S. European Command area of responsibility. The team enables the combatant commander to quickly receive a presumptive or field confirmatory analysis of potential CBRN threats in the event of a natural or man-made incident. Additionally, the 773d CST has the ability to transmit its analytical results via secure communication technologies to designated representatives.

Beyond the CBRN analytical and communication capabilities that the 773d CST provides to the U.S. European Command area of responsibility, the CST has additional capability to continue to build operational readiness in the U.S. Army Reserve while meeting the Army Service component commander's requirements. These requirements are nested within the 7th Mission Support Command guidance in supporting the U.S. Army Europe Command "Pillars of Strong Europe."[3]

Strong Europe—Army Reserve Integration and Dynamic Presence

The 773d CST routinely participates in U.S., North Atlantic Treaty Organization (NATO), and European Union exercises that involve interfacing across U.S. government organizations, partner nations, and allies throughout complex international disaster response operations. The team's readiness posture allows for quickly responding to international emergencies. Recently, the team participated in a challenging, internationally based crisis response exercise with a multitude of nations and varying skill sets within medical, CBRNE, and urban search-and-rescue arenas. Over the course of 5 days, the 773d CST worked alongside established partners and forged new joint and combined relationships throughout Bosnia and Herzegovina. The team faced a multitude of CBRN problem sets for which it utilized its capabilities to identify and assess threats and advise and assist the local emergency management agency. Exercises of this nature allow the 773d CST to practice technical functions and successful deployment and redeployment operations.

These civil-military training activities demonstrate a capable U.S. presence and foster interoperability by building relationships across echelons and nations, thereby helping a host nation deal with future challenges of a possible CBRN nature. Finally, these exercises send a clear message to the U.S. European Command and NATO partners and allies that the 773d CST has the capability and rapid ability to respond when called upon to support military and civilian authorities.

Soldiers from the 773d CST participate in a Training Proficiency Evaluation.

Soldiers from the 773d CST worked alongside the Spanish CBRN Military Emergencies Unit in Bosnia/Herzegovina.

Strong Europe—Strong Partnerships and Enabled Alliances

International training events (such as NATO Euro-Atlantic Disaster Response Coordination Centre exercises) afford invaluable opportunities by increasing interoperability and capabilities of NATO partners and allies. More importantly, these events help the team establish and build relationships so that there is a familiarity and mutual understanding of capabilities between CBRN participants in the event of a real-world catastrophe.

Trusting and relating to others are important factors for training readiness. The 773d CST continues to build strong partnerships with multiple countries throughout Europe while supporting Strong Europe guidance.[4] This is accomplished by building CBRN capability and capacities from shared CBRN tactics, techniques, and procedures when responding to hazard incidents or simply by assisting European countries with testing and training on new technologies during an ICBRN-R incident.

Conclusion

The 773d Civil Support Team contributions within Europe continue to build readiness within the U.S. Army Reserve and advance the U.S. European Command's Strong Europe concept by strengthening alliances, building partner capacity, and maintaining a routine CBRN presence throughout the theater of operation.

Endnotes:

[1]Joint Publication 3-41, *Chemical, Biological, Radiological, and Nuclear Response*, 9 September 2016.

[2]Ibid.

[3]"The Official Home Page of United States Army Europe," <http://www.eur.army.mil/>, accessed on 15 March 2018.

[4]U.S. Army Europe Command Web site, "Army Strong, Strong Europe," <http://www.eur.army.mil/StrongEurope/>, accessed on 13 April 2018.

Colonel Armstrong is the commander of the 773d CST. He is a graduate of the U.S. Army War College, and he holds a master's degree in behavioral science from the University of Houston, Texas.

Captain de la Hoya is the operations officer of the 773d CST. He holds a bachelor's degree in organizational communications and public relations from California State University, Los Angeles, and a master's degree in conflict resolution from the Catholic University of Leuven, Belgium.

Defining the CBRNE Problem

By Major Alexi D. Franklin

The Department of Defense (DOD) and the Army use the terms *weapon of mass destruction* (WMD); *chemical, biological, radiological, and nuclear* (CBRN); and *chemical, biological, radiological, nuclear, and explosives* (CBRNE) synonymously. This synonymous use fuels confusion within DOD and throughout the government regarding the capability and capacity of Army CBRNE forces. The nature of definitions, words, and constructs matters. Terminology helps identify shortfalls and provides a shared vocabulary for solutions. In light of Army goals, as pertaining to the defeat of CBRN threats, CBRNE is a more descriptive and comprehensive term than WMD or CBRN. This fact argues for the exclusive use of the term *CBRNE*.

Deciding the Role of Army CBRNE Forces

The U.S. government conducts a variety of operations in response to the dangers that WMDs pose. Until 2014, the three pillars of combating WMDs (nonproliferation, counterproliferation, and consequence management) were used by DOD and much of the U.S. government. With the release of Joint Publication 3-40, *Countering Weapons of Mass Destruction*, DOD retained the core nature of these three pillars but recast them as three lines of effort.[1] In broad terms, with regard to either scheme, three phases of anti-WMD actions are undertaken by the United States: before acquisition, during possession, and after the use of WMDs. Regardless of the name, official DOD doctrine recognizes all three phases as distinct from one another.

Nonproliferation is preventive and takes place before WMD acquisition. Nonproliferation actions stop WMD acquisition from occurring by "dissuading or impeding access to, or distribution of, sensitive technologies, material, and expertise."[2] Nonproliferation actions can include enforcing international agreements to control the sale of sensitive material or gathering and sharing intelligence to identify potential proliferates. The majority of this activity is diplomatic and involves government policy, industry, and the intelligence community.

In contrast, counterproliferation efforts focus on acquired weapons and the dangers that they pose. Counterproliferation actions can include active medical surveillance to provide early warning of a biological weapons attack. Seizing and destroying the chemical weapons stockpile of another nation is an example of counterproliferation. These activities involve the coordination of the intelligence community and law enforcement and some support of the military.

Consequence management is essentially reactive. Consequence management efforts can include identifying the perpetrator of a WMD attack postevent or cleaning up contamination after a WMD strike. The overwhelming majority of the Army CBRNE focus is on conventional-, tactical-, and operational-level, nonspecial operations, consequence management. While some Army nuclear and counterproliferation officers assist with offensive nuclear planning and some Army special operations and intelligence personnel assist with counterproliferation efforts, these personnel number in the low hundreds. Consequence management-oriented Army CBRNE personnel number in the tens of thousands.

Of these three lines of effort, the Army mission clearly focuses on consequence management tasks, almost to the exclusion of nonproliferation and counterproliferation tasks. Hence, its organizational structure should reflect this emphasis. Consequence management—to "contain and reduce threats" using the current lexicon—should be the focus of Army CBRNE efforts.[3] The use of the terms *WMD* and *CBRN* by Army CBRNE elements causes unnecessary lack of clarity.

Determining CBRN or CBRNE

The production methods and physical properties of CBRN materials and explosives materials are extremely similar. This commonality renders an artificial separation between "CBRN" and "E" unnecessary, even dangerous. The production of chemical weapons, drugs, and explosives all share similar precursors and technical processes. A CBRN dispersal device may include an explosive component. During

domestic or deployed operations, any hypothetical CBRN response will likely require explosive ordnance disposal (EOD) expertise, and any EOD response element should include robust CBRN detection and response capabilities. Army CBRN forces receive limited explosives awareness training, and Army EOD forces receive limited CBRN awareness training. Maintaining an artificial separation between these two functions degrades their effectiveness.

The 1878 *Posse Comitatus Act* prohibits the use of federal military personnel for civil law enforcement purposes.[4] Several exceptions to the law exist, one of which permits DOD to provide support to national special security events.[5] National special security events include such events as North Atlantic Treaty Organization summits, Republican or Democratic national conventions, and Presidential inaugurations. Army CBRNE forces prepare and respond to domestic emergencies separated along career field lines. During national special security and similar events, active Army units provide CBRN and EOD support. To do so, active Army CBRN and EOD personnel form on-the-spot teams to provide combined CBRNE event support. Such ad hoc teams are not as effective as units that form and train as cohesive, enduring teams.

Army National Guard WMD–civil support teams (CSTs) provide an emergency CBRN response capability in each of the Nation's 54 states and territories. Army National Guard WMD-CSTs are full-time forces that lack organic EOD capability. Only 13 state National Guards contain any tactical-level EOD personnel, all of whom are part-time Guardsmen. As a result, WMD-CSTs commonly train and respond to CBRN calls without EOD support. WMD-CSTs are forced to develop partnerships with nonmilitary EOD personnel, commonly forming ad hoc teams during an incident response.

Some may say that there are a myriad of reasons why the term *CBRNE* should not be used exclusively, but the statutory definition of WMD is far too broad for most DOD applications. More EOD-related incidents occur than CBRN-related incidents. Tying EOD response so closely to CBRNE response may prove to be a hindrance and a distraction for CBRN and EOD forces. The Army bifurcated CBRNE enterprise effectively manages incident response at home and abroad. At the tactical level, response forces arrayed against particular weapons may be purely CBRN or EOD specialists. However, these critiques do not negate the need for reforming the Army vocabulary problem; they help suggest the solution.

The constituents of WMD, CBRN, and CBRNE overlap to a great degree. This overlap can lead to confusion, which results in suboptimal policy development and incident response. When attempting to construct specific policies or in preparing to respond to a specific threat, precise language is essential. WMD, CBRN, and CBRNE describe similar, but ultimately distinct, security threats. The Army, DOD, and the federal government do not do use WMD, CBRN, and CBRNE carefully. Similar to the consideration given to the term WMD, using CBRN or CBRNE must be deliberate and purposeful, not accidental. Using CBRNE exclusively would clarify what the Army trains, mans, and equips in order to accomplish its missions on the battlefield and in defense support of civil authorities. To do otherwise sends an incorrect message to Soldiers, national-level policymakers, and international partners.

Sloppy use of terminology causes confusion and a lack of synchronization within DOD and across the government. Shared use of agreed-upon definitions eases interoperability. The Army-wide focus should be on CBRNE threats, and Army CBRNE forces should be understood to be part of a larger, cohesive CBRNE enterprise. Individual Soldiers and individual units would still have a technical focus specifically on CBRN or explosives; but as an institution, Army doctrine and organizations should be focused on defeating CBRNE threats. For interagency cooperation, integrated and comprehensive incident response, and talent management purposes, *CBRNE* is the best term for Army-wide use.

Distinguishing CBRNE from WMD

According to the U.S. Army CBRN Web site, the mission of the Chemical Corps is to conduct CBRN operations in order to protect the force and the Nation from WMD/CBRN threats and hazards."[6] While the Chemical Corps mission statement is relatively straightforward, it also needs to be updated. "Operations" is far too general; a straightforward statement focusing on consequence management or CBRN defense would provide a greater degree of clarity as to what the branch actually does. The Chemical Corps vision statement is more developed, but the problem with the mission and vision statements is that they both conflate WMD and CBRN. This is not an uncommon occurrence. The government, media, and academia regularly use WMD and CBRN interchangeably.

The make-up of WMD is very broad and malleable. The constituents of WMD can change over time. The Archbishop of Canterbury first coined the phrase "weapons of mass destruction" in 1937.[7] The archbishop probably used the phrase to describe massive aerial bombardment during the Spanish Civil War. In the modern era, few would consider conventional aerial bombardment to be WMD. Alternatively, some have suggested that cyber warfare constitutes WMD, an opinion not shared by everyone.

With regard to the broad nature of the generally agreed-upon categories of WMD, not all CBRNE threats have "massive" outcomes. A single chemical or radiological weapon lacks a mass effect; a single nuclear or biological weapon can result in the deaths of hundreds of thousands of people. The taxonomies of nuclear and biological weapons themselves contain great variations of possible harm. Nuclear weapons can be optimized to release nothing but a powerful electromagnetic pulse, damaging electrical equipment without directly harming individuals. Biological weapons run the gamut from extremely virulent smallpox to totally nontransmissible ricin.

The U.S. government cannot agree on a single definition for WMD. U.S. Code, Title 18, Section 2332a, *Use of Weap-*

ons of Mass Destruction, contains the official U.S. government definition of WMD.[8] This statutory definition equates to CBRNE. The definition includes toxic or poisonous chemicals, biological agents or toxins, any weapon designed to release radiation, and destructive devices. Destructive devices are further defined in U.S. Code, Title 18, Section 921, *Definitions*, as "any explosive, incendiary, or poison gas bomb, grenade, rocket, missile, mine," to include any similar or modified device.[9] In contrast, the *DOD Dictionary of Military and Associated Terms* defines WMDs as "chemical, biological, radiological, or nuclear weapons capable of a high order of destruction or causing mass casualties and excluding the means of transporting or propelling the weapon where such means is a separable and divisible part from the weapon."[10]

CBRN and CBRNE are precise terms in contrast to the vague term WMD and, to that extent, far more useful for U.S. Army purposes. CBRN and CBRNE include specific weapons are uncommon, technical, and capable of physical danger. The term *WMD* is a function of novelty to some extent. The "uncommon" aspect is borne out by the words of the Archbishop of Canterbury, when juxtaposed against the threat of cyber warfare. Aerial bombardment was new to his time, as cyber warfare is to ours. This function of novelty also applies to the threat as perceived by civilian law enforcement agencies in which massive explosions are the daily work of DOD while such explosions are rare in civilian life. Federal, state, and local law enforcement authorities often use the term *CBRNE*, but DOD generally uses the term *WMD*. While the Army or DOD inclusion of destructive devices might be overly inclusive for combat operations, it is arguably appropriate when seen in the context of regular DOD support to civilian law enforcement.

The aspect of direct physical danger of CBRNE sets it apart from WMD. WMD is a handy term for broadly describing offensive uses. The best use of the term *CBRNE* is in the context of describing defensive acts. The reason that cyber threats are not considered CBRNE but can be WMD is the lack of direct physical danger. The nonrestrictive definition of WMD allows for flexibility in laws, treaties, and policies. It can include emerging threats, and it can exclude categories once a weapon loses its novel nature. CBRNE is a useful shorthand that can be used to lump together scientific, nonkinetic threats. The primary function of the Army in regard to WMD is the consequence management of specific CBRNE threats. For purposes of clarity, the Army should tailor organizational rhetoric to match what it is actually expected to accomplish.

Rather than continue to try to perfect the definition of a euphemistic term like *WMD*, DOD should abandon the term and simply use direct terminology to help describe what it intends to accomplish. Simply put, given enough cover, an individual can protect himself or herself from a projectile weapon. Human senses can easily detect the firing of bullets. In contrast, defeating CBRNE weapons requires advanced technical detection, protection, and mitigation. The technical complexity required for detecting, identifying, and defeating CBRNE weapons is the glue that binds CBRNE hazards together.

Conclusion

Some may say that attempting to divorce CBRNE and WMD is just bureaucratic wordplay, but a lack of precision in using the terms *WMD*, *CBRN*, and *CBRNE* can have significant consequences. By using WMD to mean CBRNE, local authorities may prepare for the wrong threats and place equal emphasis on different weapons because they are all labeled as WMD, as opposed to tailoring their response to discrete hazards. Cooperating with U.S. local, state, or federal first responders or with partner nations in hazardous incident response can be challenging enough; using an inherently euphemistic term like *WMD* in lieu of the clearly defined *CBRNE* makes the task more daunting. In the context of Army CBRNE defense operations, using CBRNE in lieu of WMD clarifies exactly what Army CBRNE forces are trained, manned, and equipped to accomplish.

Endnotes:

[1]Joint Publication 3-40, *Countering Weapons of Mass Destruction*, 31 October 2014.

[2]Ibid.

[3]Ibid.

[4]U.S. Code, Title 18, *Crimes and Criminal Procedure*, Section 1385, "Posse Comitatus Act."

[5]DOD Instruction 3025.20, *Defense Support of Special Events*, 6 April 2012.

[6]U.S. Army CBRN School Web site, <http://www.wood.army.mil/newweb/chemical/>, accessed on 4 April 2018.

[7]W. Seth Carus, *Occasional Paper 8: Defining Weapons of Mass Destruction*, Center for the Study of WMD, National Defense University, January 2012, <http://ndupress.ndu.edu/Portals/68/Documents/occasional/cswmd/CSWMD_OccationalPaper-8.pdf>, accessed on 4 April 2018.

[8]U.S. Code, Title 18, Section 2332a, *Use of Weapons of Mass Destruction*.

[9]U.S. Code, Title 18, Section 921, *Definitions*.

[10]*DOD Dictionary of Military and Associated Terms*, DOD, February 2018, p. 248.

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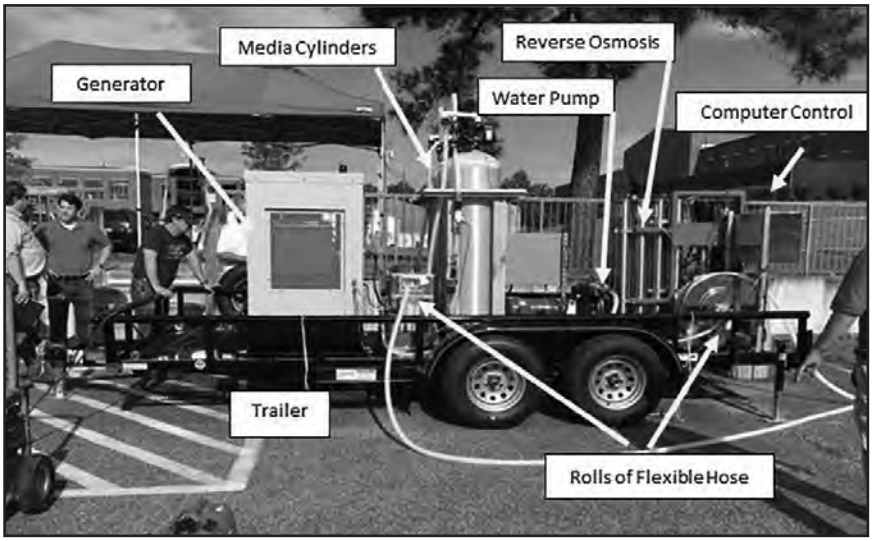
DEVELOPING AND TESTING THE DECONTAMINATION EFFLUENT TREATMENT SYSTEM

By
Dr. Victor F. Medina, Mr. Scott A. Waisner, Dr. Edith Martinez-Guerra, and Mr. Jared L. Johnson

Introduction

Decontamination operations of personnel, vehicles, and the affected area following a chemical, biological, radiological, and nuclear (CBRN) attack require large volumes of water. The resulting wash water from these operations will likely contain an unpredictable mixture of toxic and hazardous contaminants alongside sediments, surfactants, soaps, and disinfecting agents such as bleach that threaten human health and the environment. The Army currently has no capability to treat or recycle the effluent from its aqueous-based CBRN decontamination operations. This effluent is very hazardous, and is a major handling and logistical problem and, potentially, a political burden. To address this, the Deployable Treatment of Decontamination Effluent Project was initiated to develop and evaluate technologies and approaches to achieve effective treatment of contaminated wash water. An alpha version of a pilot-scale treatment system, which is called the Decontamination Effluent Treatment System (DETS), was developed for the project.



A pilot-scale DETS

This study evaluated field treatment of decontamination wash water at a pilot scale. Holistic evaluation of the DETS proceeded along three axes. The first goal was evaluating the feasibility of integrating the DETS into CBRN decontamination operations. The second goal was establishing viable performance metrics for a scaled-up system. The third goal was identifing shortcomings of the system with the idea that any such shortcomings could be addressed in a beta version of DETS.

System Size

The system was sized to address a chemical release event involving people and vehicles. For this study, the DETS was designed to render-safe wash water from the decontamination of approximately 200 people and 10 large military vehicles (representative of a battalion size event). Water use factors were calculated from Army G-3/5/7 decontamination planning factors. Combining the estimated water generated over a 12-hour treatment period resulted in an approximate rate of 10 gallons (38 liters) per minute.

Treatment Strategy

The objective of DETS is to have the capacity to treat any chemical, metallic, radioactive, or biological contaminant to a sufficient level so that the effluent can be safely discharged with no limitation. To achieve this goal, an agnostic treatment approach is needed, meaning that the treatment approach is effective for all contaminants. Membrane treatment is an effective, agnostic treatment that can be readily adapted for this approach. However, membrane treatments can be compromised by constituents that foul, clog, or degrade the membrane; pretreatments were added to protect the reverse-osmosis system. The constituents that are expected in decontamination effluent and the treatment process that targets those constituents are identified below:

- **Sediment.** Sediment could cause clogging in the reverse-osmosis system. A settling process (tank or blivet) and filtration in the sand filter are used to remove particulates.

- **Hardness.** Some forms of bleach (particularly super-tropical bleach) can greatly increase water hardness (the combined concentration of calcium and magnesium ions). Excessive hardness could result in scaling that would compromise the granular activated carbon column and the reverse osmosis. An ion exchange resin media filter removes calcium and magnesium ions before the granular activated carbon treatment.
- **Surfactant.** Surfactants (the active components of soaps) can foul reverse-osmosis systems. Granular activated carbon is an effective pretreatment.
- **Bleach.** Granular activated carbon is an effective pretreatment.
- **Oils, greases, and miscellaneous organic compounds.** These were washed off people or vehicles during decontamination. Two processes target these compounds: granular activated carbon and reverse osmosis.
- **Chemical warfare agents.** Chemical warfare agents are effectively removed by granular activated carbon. In addition, reverse osmosis provides complete removal for any agents that might pass the granular activated carbon process.
- **Radioisotopes.** Most radioisotopes are in the form of particulates, so they should be effectively removed by the same processes that target the particulates—settling and sand filtration. However, some radioisotopes (such as ionic cesium) could be in ionic form. For these forms, the most effective removal method is reverse osmosis.

In addition, removal can occur during the treatment of another contaminant. For example, chemical weapon residue could be adsorbed on sediments and particulates and removed during settling or sand filtration.

System Costs

Table 1 summarizes the costs of system elements. Equipment costs were $60,000 (including the trailer). If a DETS unit were needed in a highly contaminated environment, it might be more economical to surplus the unit. Keeping costs low allows for a unit to be disposed of in its entirety if it gets highly contaminated during treatment.

Field Evaluation

The field evaluation was conducted at the Waterways Experiment Station, operated by the U.S. Army Engineer

Unit	Cost	Comments
Reverse osmosis unit with pump and prefilter Cleaning units for scale and organics Sand filter media unit Carbon filter media unit Water softener media unit Ultraviolet sterilization unit (not used in these studios)	$13,621.44	Price is for all of the units listed.
Generator	$9,922.45	
Bredel pumps with mounting equipment and hoses	$13,283.09	Two were purchased for this study, but only one was used. Cost is for one unit.
Flanges	$1,066.00	
Hose reels	$8,939.92	
Trailer Trailer upgrades	$5,000.00 $1,500.00	We determined that upgrades were needed after the field evaluation.
Control units with associatiated software	$1,800.00	
Instrumentation and wiring	$5,045.00	
Total:	$60,177.00	

Table 1. Cost of System Elements

Research and Development Center, Vicksburg, Mississippi. The evaluation focused on vehicle decontamination. Vehicles were moved to a wash area where they were pressure-washed using a firehose, scrubbed with soapy water, and then washed again with a firehose. Water was collected using the storm drainage system present at the site. Influent water was spiked with supertropical bleach, Malathion (a simulant for organophosphate chemical warfare agents), and cesium (Cs-133). DETS was then used to treat the water in the 250-gallon influent tank. The concentrate was collected in another 250-gallon tank. The treated effluent was allowed to flow into an open storm drain downstream of the test area.

The field evaluation test took approximately 6 hours. However, the actual DETS operational time was 2 hours, during which time approximately 1,200 gallons (4,500 liters) of contaminated water were treated.

Operation

The system performance was evaluated as very successful. The system showed no signs of performance degradation. One minor leak occurred after 1 hour of use; however, it was quickly repaired, and the operation continued. At approximately the 2-hour mark, the system pressure of the reverse-osmosis unit climbed by about 20 pounds per square inch, resulting from sediment buildup in the 5-micrometer prefilter cartridge at the entry point of the reverse-osmosis system. The system was stopped for a few minutes, and the cartridge was immediately replaced.

Treatment Results

Figure 1 shows a comparison of samples collected from the system influent and effluent. The influent on the left was brown and opaque, and the effluent on the right was very clear, which demonstrates the effective performance of the system for turbidity and suspended solids removal. A colorimetric measurement method was used to detect total chlorine (as a measurement for bleach). The influent sample had a strong color response to the reagent, indicating a high chlorine concentration, and the effluent sample was clear, indicating that bleach was effectively removed.

Figure 1. System Samples

Samples were collected during operation and analyzed. The constituents, analytical method, average concentrations, and percentage removal are given in Table 2 (page 44). Turbidity, hardness, total chlorine, and Cs-133 were 100 percent removed. Surfactants and total organic carbon were 98.7 and 98.0 percent removed, respectively. Malathion was measured using two methods. With the first method, a phosphorus balance method, Malathion was 98.7 percent removed. With the second method, U.S. Environmental Protection Agency Method 8141A, *Organophosphorus Pesticides-GC Capillary Column* (gas chromatograph with electron capture detector), essentially 100 percent of the Malathion was removed.[1] All measurements indicate that DETS is highly effective when treating constituents found in decontamination wash water.

Aqueous Wash Water Treatment

Water is a very effective solution for decontamination. Most CBRN agents are at least partially soluble in water, and washing with water can be very effective. Water can also be readily used with additives (such as bleach, surfactants, adsorbents, and enzymes) to further improve decontamination. For continental United States events, water-based decontamination is the primary approach and is expected to continue to be so into the future.

Due to transportation logistics and the lack of water availability, the Army is aggressively studying methods for nonaqueous decontamination for overseas operations. Such methods include the use of wipes that remove and sequester the constituents for people and equipment as well as the use of fixatives, which can be applied as a patch to isolate the agents on vehicles and equipment, allowing them to complete the missions.[2, 3] Efforts to reduce the role of water in decontamination are expected to continue, but nonaqueous methods are currently applicable primarily to small-scale applications. It may still be several years before water-based decontamination is supplanted, even for overseas operations.

Recycling

William Horne describes the need to conserve water during decontamination in his article entitled "The Need to Conserve Water During CBRN Decontamination."[4] Operating environments are frequently located in areas with limited water, and decontamination operations can use a substantial amount of water. This may stress local water resources and adversely affect friendly or neutral populations. The DETS system can address this issue because it has shown that high contaminant removal produces treated water that is suitable for reuse.

Figure 2 (page 45) demonstrates the advantage of water reuse based on a scenario of 85 percent water recovery (which was achieved by DETS) and an initial water volume of 600 gallons. The scenario assumes that 100 percent of the wash water is captured. The solid lines represent the scenario in which the treated water is reused for decontamination and the concentrate is simply collected. In this scenario, 600 gallons can be used instead of 4,000 gallons for decontamination (see solid blue line). The total collected concentrate would be 600 gallons (solid grey line).

In addition, the concentrate could be treated and reused as well (see dashed blue line). If the original 600 gallons can

Constituent	Analytical Method	Influent Concentration	Effluent Concentration	% Removal
Turbidity	USEPA Method 180.1[1]	>4200 NTU	1.825 ± 1.145 mg/L	100.0
Hardness	Summation of Ca2+ and Mg2+ concentrations as measured by ion chromatography	82.36 ± 40.79 mg/L	0 mg/L	100.0
Total Chlorine	Standard Method 4500-Cl G[2]	0.26 ± 0.07 mg/L	0 mg/L	100.0
Surfactants	Spectrophotometric method[3]	1.422 ± 0.359 mg/L	0.019 ± 0.017 mg/L	98.7
Total Organic Carbon	USEPA 9060[4]	58.23 ± 29.7 mg/L	1.18 ± 0.84 mg/L	98.0
Malathion	Phosphorus balance	26.71 ± 12.16 mg/L	0.08 ± 0.05 mg/L	98.7
Malathion	USEPA 8141A[5]	24.7 mg/L	0.000097 mg/L	100.0
Cesium	USEPA 6020A[6]	2.97 ± 4.21 mg/L	0 mg/L	100.0

Legend:

USEPA—U.S. Environmental Protection Agency

Ca^{2+}—calcium ion

Mg^{2+}—magnesium ion

mg/L—milligram per liter

NTU—Nephelometric Turbidity Unit

Cl—classifier

Endnotes:

[1]USEPA Method 180.1, *Determination of Turbidity by Nephelometry*, August 1993.

[2]Standard Method 4500-Cl G, *DPD Colorimetric Method*, 2011.

[3]Ralf Kloos, "Measuring 'LAS' Based Surfactants with Hach Barcode Cuvette Testing TNTPlus 874," Application Note, Hach Company, Loveland, Colorado, 2015.

[4]U.S. Environmental Protection Agency Method 9060, *Total Organic Carbon*, November 2004.

[5]USEPA Method 180.1. *Determination of Turbidity by Nephelometry*, August 1993.

[6]USEPA Environmental Protection Agency Method 6020A, *Inductively Coupled Plasma/MS*, 1 January 1998.

Table 2. Summary of Treatment of Key Constituents by DETS Field Evaluation

be reused, this would produce a total volume of more than 7,000 gallons of recycled water. The total collected concentrate (dashed grey line) would be more than 550 gallons. In either case, reuse of treated wash water can greatly extend water resources.

Conclusions

Based on this study, several conclusions can be derived. DETS is a low-cost treatment system—the first of its kind to treat and recycle decontamination effluent. DETS as an effective means of capturing wash water from vehicle decontamination was clearly shown, and the process was effective at 98 percent or higher removal of all constituents tested. The system was easy to use and performed reliably.

Endnotes:

[1]U.S. Environmental Protection Agency Method 8141A, *Organophosphorus Pesticides-GC Capillary Column*, 1 September 1994.

[2]Mark Disbrow, et al., "Hazard Mitigation, Material, and Equipment Restoration (HAMMER)," Advanced Technology Demonstration, Joint Military Utility Assessment, Edgewood Chemical Biological Center, ECBC-TR-1211, 2013.

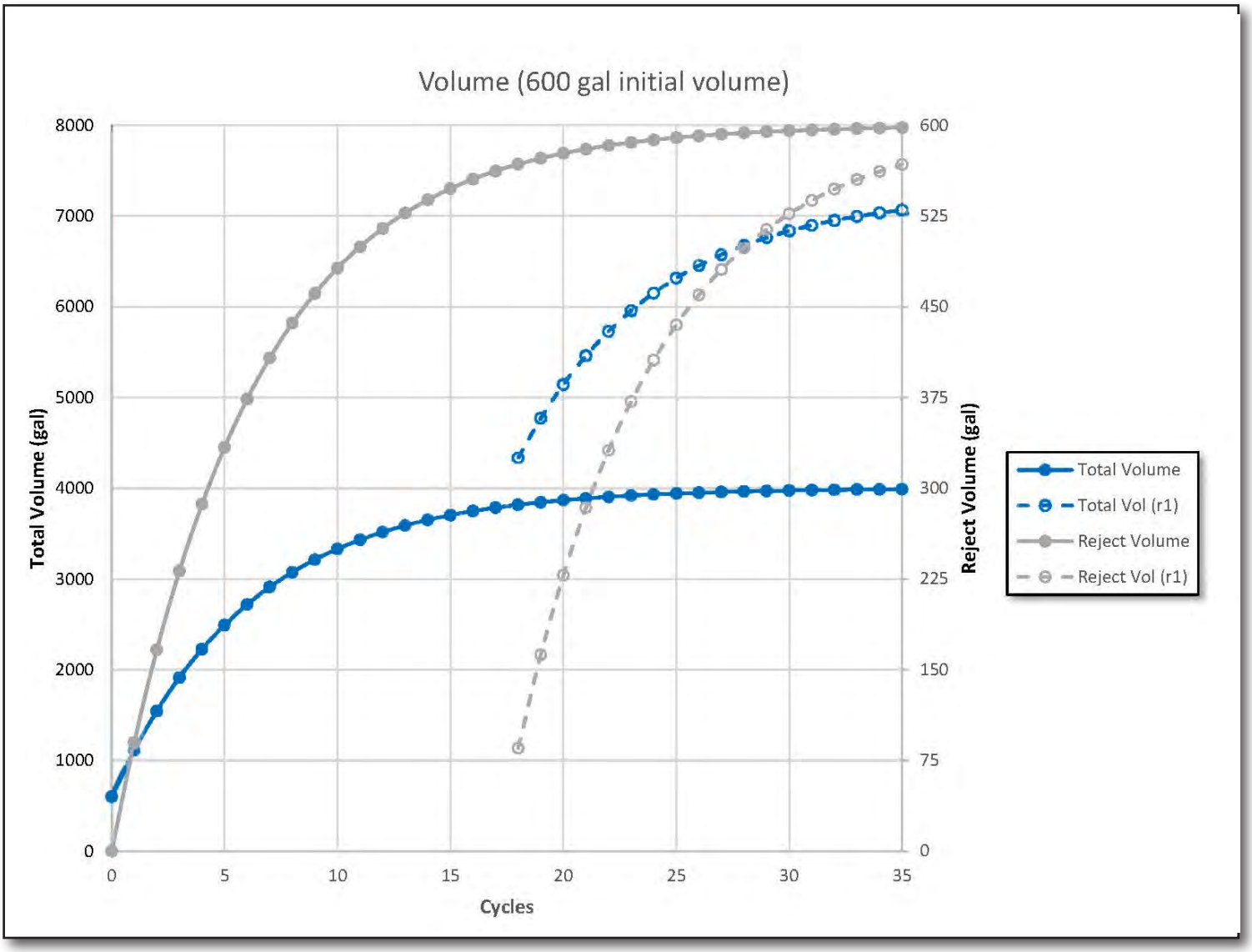


Figure 2. Water Reuse With DETS

[3]Joint Requirements Office for Chemical, Biological, Radiological, and Nuclear Defense, "Capability Development Document–Joint Service Equipment Wipe (JSEW)," 2013.

[4]William H. Horne, "The Need to Conserve Water During CBRN Decontamination," *Army Chemical Review*, Summer 2015, pp. 27–30.

Reference:

Jonathan A. Brame et al., *Composition of CBRN Decontamination Effluent and Development of Surrogate Mixtures for Testing Effluent Treatment Technologies*, U.S. Army Corps of Engineers, Engineer Research and Development Center, ERDC/EL SR-16-2, July 2016.

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COUNTERING WEAPONS OF MASS DESTRUCTION: AN ARMY WARFIGHTING CHALLENGE

By Major Yulang Tsou

The Army warfighting challenges (AWFCs) represent the foundational questions that frame learning and collaboration. These enduring questions yield solutions that improve the combat effectiveness of current and future forces. Because of the nature of AWFCs, the Army can integrate near-term, mid-term, and long-term solutions for the future force. The application and employment of AWFCs through a sustained and collaborative construct serve as the analytical framework to guide research, learning activities, modernization, and future force design. The focus of this article is on AFWC No. 5, Countering Weapons of Mass Destruction.

The problem statement for AWFC No. 5 is "How do Army forces prevent, reduce, eliminate, and mitigate the use and effects of weapons of mass destruction (WMD) and chemical, biological, radiological, nuclear, and . . . explosives (CBRNE) threats and hazards on friendly forces and civilian populations?"[1]

WMD are chemical, biological, radiological, and nuclear (CBRN) threats capable of causing a high order of destruction or mass casualties. WMD require at least one of the four components—chemical, biological, radiological, or nuclear—to be considered WMD and, thus, to be addressed by countering weapons of mass destruction (CWMD) operations. CWMD is an Army mission that maneuver commanders execute during combined arms operations. It is a complex mission that requires the integration of Army capabilities as part of a joint, interorganizational, and multinational team to prevent WMD proliferation and use. The purpose of the inclusion of explosives (the "E" of CBRNE) as part of the threat is to depict the effect of energetics on the dispersion or spread of contamination as a result of the weaponization of CBRN materials. Events in which explosives are exclusively employed are not considered WMD events.

The CWMD mission includes all efforts employed against actors of concern to curtail the conceptualization, development, possession, proliferation, use, effects, related expertise, materials, technologies, and means of delivery of WMD.[2] The Army supports national CWMD objectives by executing and/or contributing to the following four CWMD activities:

- Understanding the environment, threats, and vulnerabilities.
- Cooperating with and supporting partners.
- Controlling, defeating, disabling, and disposing of WMD.
- Safeguarding the force and managing consequences.

As the primary provider of forces and capabilities to counter WMD threats and CBRN hazards in the land domain, the Maneuver Support Center of Excellence, Fort Leonard Wood, Missouri, works across the Services and the warfighting functions to develop holistic solutions to support maneuver commander requirements.

AWFCs are built around learning demands, which are the fundamental questions that must be answered to effectively operate under unified land operations. These questions establish conditions or criteria under which the exercises are to be conducted. There are seven overarching learning demands that capture the requirements for AWFC No. 5:

- **Learning Demand 1:** How do future forces detect, protect, and mitigate future WMD threats and CBRNE hazards to maintain freedom of action and increase situational understanding across wide areas and in dense urban environments?
- **Learning Demand 2:** How do future forces deny the ability for WMD proliferation pathways to prevent adversary development of WMD?
- **Learning Demand 3:** How do future forces conduct sustained operations in a CBRN hazard environment?
- **Learning Demand 4:** How do future forces support the attribution of WMD threats and CBRN hazards?
- **Learning Demand 5:** How do future forces support tactical elimination of adversary WMD programs?
- **Learning Demand 6:** How do future forces prevent the employment of enemy WMD capabilities?
- **Learning Demand 7:** How do future forces support CBRN consequence management operations to save lives, mitigate human suffering, and protect infrastructure?[3]

Data is compared, captured in an assessment tool, and prioritized into categories ranging from extremely high to low through these learning demands. This captured data is used to identify gaps in CWMD capabilities and to assign potential doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) solutions. An interim solution strategy defines the timeframe for the availability of capabilities to mitigate gaps for near-term (now–2025), mid-term (2026–2035), and long-term (2036–beyond) solutions.

The AWFC process culminates in a capabilities integration enterprise forum in which the AWFC running estimate is briefed to the director of the Army Capabilities Integration Center and the community of practice. Five of the 20 AWFCs are presented every quarter; the latest annual

(Continued on page 48)

EXPLOITING A CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR ENVIRONMENT

By Major John N. Waugh and Mr. Larry Lazo

Military forces must be able to integrate available information to support proactive risk-based decisions in a chemical, biological, radiological, and nuclear (CBRN) environment. That was one of the immediate and major takeaways from the recent Combined Arms Maneuver in a Contaminated Operating Environment (CAMCOE) tabletop exercise, an exercise developed to understand how U.S. Army forces retain freedom of action in a CBRN environment.

The CAMCOE tabletop exercise presented the Army with evolutionary CBRN ideas, through vignettes and focused discussion, to support Army forces maneuvering through or encountering a CBRN environment. The exercise was held at the Maneuver Battle Laboratory, Fort Benning, Georgia, 16–27 October 2017. It included more than 90 participants from around the Army (U.S. Army Forces Command, Office of the Surgeon General, key staff officers across all warfighting functions, and subject matter experts from all U.S. Army Training and Doctrine Command [TRADOC] centers of excellence).

Analysts from across TRADOC were on hand to support data capture and exploration, which aided the completion of a capabilities-based assessment; 10 days of analysis and capability gap identification followed the event. The outcome of the capabilities-based assessment was included in an ongoing Army fiscal year 2017/2018 capability needs analysis, which has a final report and formal outbriefing due to TRADOC leaders before the end of calendar year 2018.

The Chief of the Chemical Corps and U. S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS) Commandant, Colonel (Promotable) Andy Munera, opened the tabletop exercise with the following guidance for participants:

- Consider how we give maneuver commanders "decision space" that allows them to operate.
- See CBRN as a condition of the environment—not as a special case.
- Develop the right capabilities to operate in a contaminated environment and "take advantage" of the CBRN conditions that may exist.

CAMCOE generated input from warfighters for the future force of 2025–2040. The joint force must adapt CBRN operational capability and capacity to facilitate movement and maneuver when conducting large-scale combat operations, cross-domain maneuver, semi-independent operations, and integrated reconnaissance and security operations.

CAMCOE increased understanding of how Army forces retain freedom of action in a CBRN environment. It also further clarified and refined the information needed to help shape future capability development efforts. The takeaway is that military forces need to integrate available information in order to support proactive risk-based decisions in a CBRN environment.

The real meaning of situational understanding involves supporting proactive risk-based decisions in a CBRN environment by integrating available information. Situational understanding allows commanders to make tactical and operational decisions before arriving in a contaminated environment. The ultimate goal is to enable operations by providing the maximum amount of decision space.

The most significant conclusion for Army forces is that the CBRN community is developing a solution to reduce operational risk by providing commanders with information derived from an integrated situational understanding of the operating environment in a more proactive manner. Situational understanding will be derived from the interpretation of relevant and available information.

Situational understanding requires access to information from CBRN and non-CBRN assets in a timely and reliable manner. The key to developing understanding is identifying what information is required for an informed, risk-based decision. Available options (courses of action) must be linked to mission success and retention of freedom of action through the assessment of the CBRN core competencies of assess, protect, and mitigate. The staff produces assessment, protection, and mitigation options for the commander, who can then make a proactive decision with confidence due to near-real-time situational understanding.

It is essential to expand sources of information beyond traditional means in order to provide near-real-time

understanding of the CBRN environment. CBRN-centric sensing and detection capabilities must be integrated with all-source information collections in order to conduct holistic assessments of available information and to develop trends (troop observations, Combined Information Data Network Exchange reports, sick-call trends). In addition, existing battlefield sensing capabilities (indirect-fire radar, electronic warfare, cyber collection measures) can be harvested to provide CBRN indicators according to mission, enemy, terrain and weather, troops and support available, time available, and civil considerations (METT-TC). CBRN analysts are better able to conduct detailed and thorough analyses from this collective effort. CBRN analysts then integrate decision support products into the commander's decision cycle, providing near-real-time understanding of the CBRN environment, which enables proactive risk-based decision making.

Along with situational understanding, the participants provided a host of CBRN capabilities for the future force, to include—

- Assessing and gaining real-time situational awareness of hazards at a distance.
- Achieving a level of protection that allows commanders to operate in a contaminated environment without reduction of capability or combat power.
- Mitigating hazards through the development of resident decontamination, diagnostics, and therapeutics.
- Conducting sustainment operations in a contaminated environment.
- Continuing emphasis on mission-essential task list training in a CBRN environment.

Supporting proactive risk-based decisions in a CBRN environment through CBRN-centric sensing and detection capabilities will enable operations by providing commanders with the maximum amount of decision space. Integrating all available information with all-source information collections in order to conduct holistic assessments and develop trends ensures that U.S. forces are postured to exploit a contaminated operating environment.

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Mr. Lazo is a retired CBRN master sergeant with more than 32 years of combined military and federal service. He is the programs and operations analyst for the Capability Development and Integration Directorate, Maneuver Support Center of Excellence, Fort Leonard Wood. He holds a bachelor of art degree in homeland security from the American Military University.

("Countering Weapons of Mass Destruction: . . . ," continued from page 46)

update for AWFC No. 5 occurred in February 2018. Throughout the previous year, strides were made in resolving near-term readiness gaps with AWFC No. 5. Future capability requirements were identified to improve the Army ability to fight and win in a contaminated environment with the long-term goal of transforming Army culture to view the presence of CBRN hazards as a unique opportunity to seize, retain, and exploit the initiative.

The major recommendations from the most recent update were to—

- Prioritize the return of Military Occupational Specialty 74D to brigade combat team formations in order to mitigate the impact of past mandatory Army personnel reductions.
- Establish a procedural directive to include the integration of complex environments in future campaign-of-learning events, specifically the integration of CBRN as a condition of the environment.
- Conduct an integrated early warning tabletop exercise to identify CBRN-specific information exchange requirements across the sensor-computing environment.

AWFC No. 5 maintains robust analysis, through the learning plan, and an integrated solutions strategy. Recent efforts include Army level forums that allow dialogue on CWMD challenges related to training and readiness and solutions to mitigate those gaps. The Combined Arms Maneuver in a Contaminated Operating Environment capabilities-based assessment executed in October 2017 was the capstone learning event that will shape the CBRNE Defense Force Modernization Strategy and redefine capability requirements for years to come. CWMD is a "whole of government" issue that requires collaboration not only across the Army but also across the Services, other government agencies, and allies in order to be effective and successful.

More information on the 20 AWFCs can be accessed at the milSuite Web site by searching Army warfighting challenges. Personnel with a valid common access card can log into the milSuite Web site to obtain up-to-date information, current status, and points of contact.

Endnotes:

[1]milSuite Web site, "Army Warfighting Challenges," p. 3.

[2]Joint Publication 3-40, *Countering Weapons of Mass Destruction*, 31 October 2014.

[3]"Army Warfighting Challenges," pp. 3–4.

Major Tsou is a maneuver support concepts officer for the Concepts, Organization, and Doctrine Development Division, Capability Development and Integration Directorate, Maneuver Support Center of Excellence, Fort Leonard Wood, Missouri.

CBRN Interoperability Between the United States and Poland

By First Lieutenant Micayla J. Westendorf and Sergeant Jack D. Johnson

Interoperability Training Experience

The arrival of the 4th Squadron, 10th Cavalry Regiment (4-10 CAV), Fort Carson, Colorado, to Swietoszow, Poland, in early January 2017 marked the initiation of a partnership with the Polish 10th Armored Cavalry Brigade. The 4-10 CAV chemical, biological, radiological, and nuclear (CBRN) staff began immediate coordination with the Polish chief of training and the CBRN platoon leader, 10th Armored Cavalry Brigade. The CBRN teams worked side by side for 3 months to build a mutual understanding of CBRN capabilities and to increase their readiness levels. The purpose of this article is to provide a brief summary of the training experience and the Polish CBRN capabilities in an effort to aid future interoperability and planning between U.S. and Polish forces.

Initially, U.S. and Polish forces were given time to familiarize themselves with each other's basic CBRN equipment and to compare features, strengths, and weaknesses. Polish contamination detection and decontamination equipment is very similar to U.S. Army equipment, simplifying the partnership. To test the capabilities of the radiac equipment, Soldiers from both armies—each with their respective radiac equipment—visited a Soviet bunker in Poland that once housed nuclear missiles. The procedures for completing a radiological survey were very similar, and the readings were compared for sensitivity.

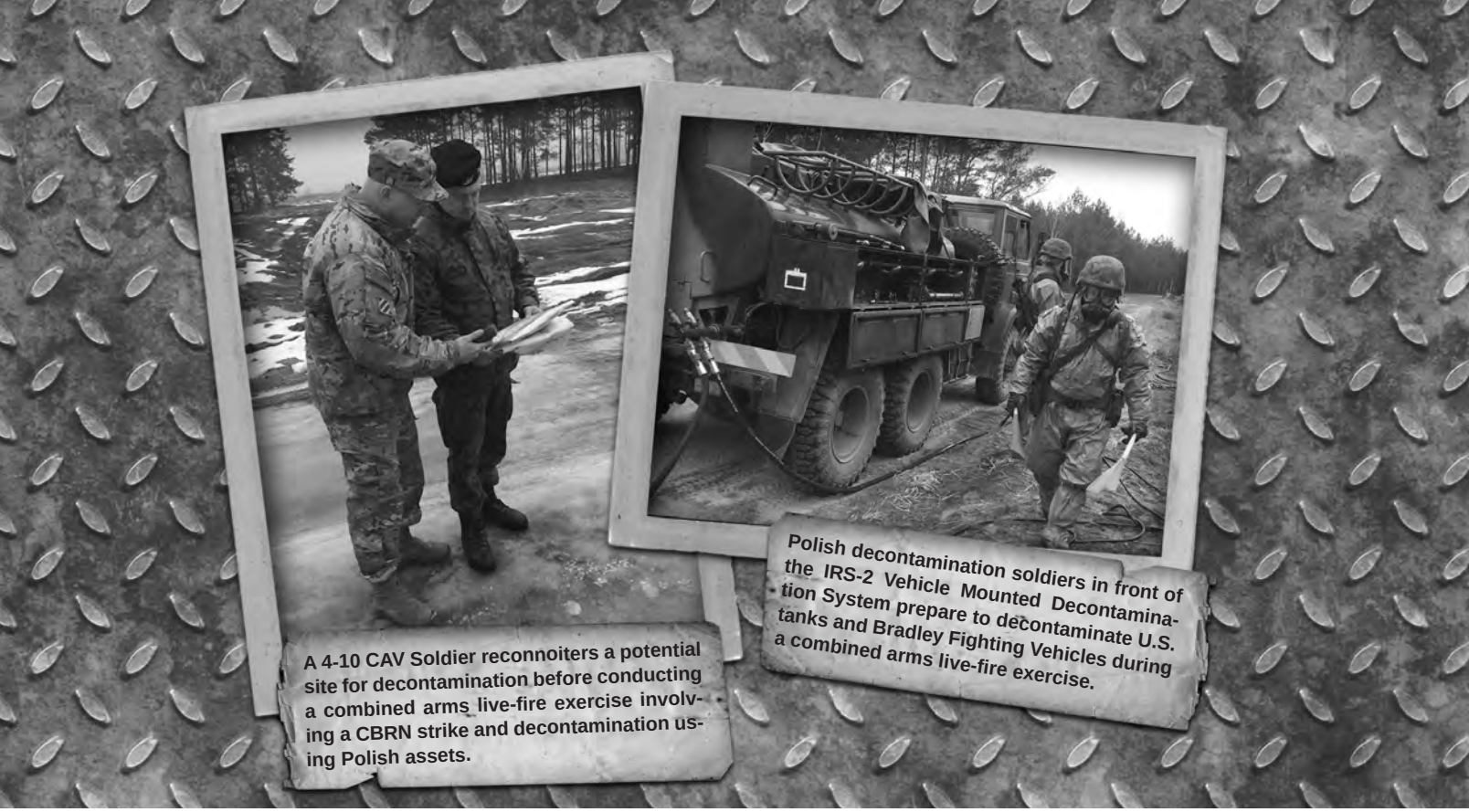
For the next stage of joint training, elements of the detection and decontamination equipment were combined at the Polish Risk of Contamination Day, which is a monthly event that serves as a drill in preparation for an air strike or CBRN attack. The siren alert system is tested, and Polish soldiers practice quickly entering designated bunkers. Each month, a different unit is tested on the assembly of vehicle decontamination systems, mask donning, written scenario reporting, and general CBRN knowledge. At the event, U.S. Soldiers became familiar with the use of Polish detection equipment and individual decontamination equipment. U.S. Soldiers practiced the timed assembly of the Polish vehicle decontamination kit and shared the U.S. personal decontamination kits with their partners. The Risk of Contamination Day also involved testing information transfer through scenario-based problems using the CBRN reporting system.

The final stage of joint training occurred during a combined arms live-fire exercise. Polish CBRN soldiers performed technical decontamination and personnel decontamination for U.S. troops after a simulated attack, a first for U.S and Polish CBRN training. This exercise allowed for the development of a standard operating procedure to facilitate future joint operations between the United States and Poland. U.S. Soldiers experienced and assisted in thorough equipment decontamination and conducted a walkthrough of personnel decontamination. Many Soldiers had no prior experience with decontamination; they learned about the extensive work and planning required for decontamination to be successful. The exercise also increased the confidence of both units in their ability to support one another during joint operations.

It is necessary for U.S. and Polish forces and other North Atlantic Treaty Organization (NATO) allies to understand the capabilities and limitations of partner formations. CBRN reconnaissance, decontamination, and dissemination of information to national partners will be necessary in the event of a major NATO military operation. Coordinating assets in a manner that capitalizes on each partner's respective strengths and minimizes its limitations increases the cohesion and lethality of NATO forces.

Current Polish Army CBRN Decontamination Equipment

Current Polish Army CBRN decontamination equipment includes the IRS-2 Vehicle-Mounted Decontamination System, the individual decontamination kit, the IZS Vehicle Decontamination System, the ZOD2 Tracked Vehicle



A 4-10 CAV Soldier reconnoiters a potential site for decontamination before conducting a combined arms live-fire exercise involving a CBRN strike and decontamination using Polish assets.

Polish decontamination soldiers in front of the IRS-2 Vehicle Mounted Decontamination System prepare to decontaminate U.S. tanks and Bradley Fighting Vehicles during a combined arms live-fire exercise.

Decontamination System, and the ZDMR Mass Casualty Decontamination Tent System. Additional information about these systems is provided in the following paragraphs.

IRS-2 Vehicle-Mounted Decontamination System

The IRS-2 Vehicle-Mounted Decontamination System is designed for liquid decontamination of chemical and radiological contaminants from combat equipment, vehicles, buildings, land, and roads. The system can also be used to decontaminate the personnel operating it. The decontamination system crew consists of two soldiers (a decontamination commander and a driver) belonging to the decontamination platoon. The unit requiring decontamination is obligated to provide 12 soldiers under the supervision and instruction of the decontamination system crew to assist with decontamination. The water tank has a capacity of 964 gallons and a working capacity of 793 gallons. The water in the tank can be heated to 140°F. The tank can also be used to pump liquids into other containers and to transport water to put out fires.

The tank is mounted on the frame of a truck. The basic elements of the system include the tank, mechanical pump, manual pump, hoses, suction hoses and connectors, 12 nozzles with brushes, four jet nozzles, a cap decontamination area, and a shower device with eight shower points.

Using the nozzles with brushes, the system can decontaminate up to 12 vehicles per hour. The system can also decontaminate an area of land with a width of 5 to 6 meters and a length of 350 meters with one fill. It can remove radioactive contamination with the use of jet nozzles at a rate of up to six vehicles per hour. Using the shower unit, personnel decontamination can be conducted at a rate of 96 people per hour, using a temperature range of 97 to 104°F. Tents for personnel decontamination are not included in this system.

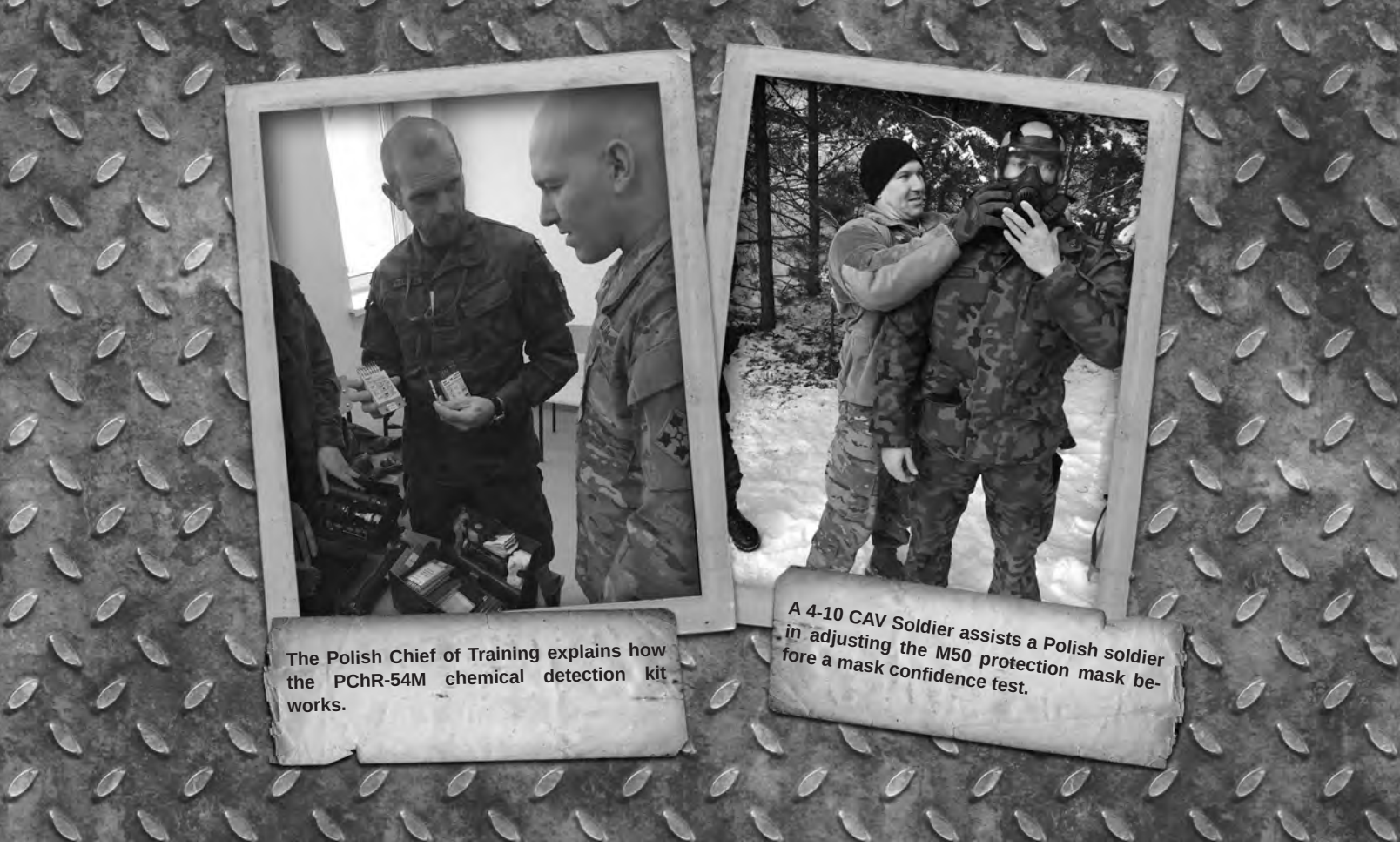
The IRS-2C is a variant that has a different water-heating process. The water heater is mounted at the rear of the tank, and it has two high-pressure devices that must be placed between the cab and the tank during transport. This variant allows for disinfection and chemical decontamination using hot steam at 410°F.

An additional component of the system variant is the bath field tent. The tent aims to secure the contaminated wastewater during the chemical and radiological decontamination of multiple personnel. The tent has an undressing room, a bathing room, and a dressing room. The rooms are kept at a low temperature, and heat is distributed by an external heating device (although it can be adapted to fit the IRS-2 or IRS-2C). The tent is divided into two parts (contaminated and uncontaminated), and the boundary is set between the bathing room and the dressing room.

The vehicle-mounted system is a great asset to the formation. It allows each Polish brigade to have dedicated decontamination equipment and personnel trained to use it in the CBRN platoon. The U.S. Thorough Decontamination Concept involves much of the same equipment with regard to jet nozzles and brushes; but it is not mounted on a truck, and the M26 pumps are separate entities. It was convenient and expedient to set up the decontamination line because the IRS-2 carries the water and does not need an external source.

Individual Decontamination Kit

The individual decontamination kit is a prepackaged kit designed to address preventative measures, and it contains



The Polish Chief of Training explains how the PChR-54M chemical detection kit works.

A 4-10 CAV Soldier assists a Polish soldier in adjusting the M50 protection mask before a mask confidence test.

the means for immediate decontamination of equipment and personnel. Carried by each solider in the mask carrier, the kit is used to protect from contamination and to remove contamination to prevent secondary contamination. Variants of the individual decontamination kit include—

- The IPP-95, which is a prophylactic designed to protect the exposed skin on the face, hands, and neck from chemical contamination and to eliminate liquid contamination. It is composed of a lotion packet, prophylactic ointment, and decontamination powder (three packages). The kit, which is kept in a plastic box with instructions, includes napkins for removing visible drops of contamination.
- The Individual Package Decontamination System (IPLS-1), which is intended for prophylactic protection against the effects of contamination and the removal of contamination from exposed skin (face, hands, neck) and individual equipment. The composition and amount of the IPLS-1 ointment allow preventative protection of the skin for up to 2 hours. The method of packaging is the same as the IPP-95, but the IPLS-1 also includes a spray bottle containing a solution of calcium hypochlorite for equipment decontamination.
- The Individual Auto-Injector Set-05, which is a set of pharmacological anticontamination auto-injectors contained in a plastic box. The blue auto-injector is designed to ease severe pain and relieve the traumatic symptoms of chemical poisoning. It contains 7.5 milligrams of diazepam. The green auto-injector is designed to counteract nerve or seizure agent poisoning. It contains 2 milligrams of atropine, 220 milligrams of reactivator acetylcholinesterase, or 600 milligrams of pralidoxime chloride. The yellow auto-injector is designed to support the actions of cholinesterase, and it contains 2 milligrams of atropine. The kit also includes two napkins, a head washer, a spray tank for decontamination, a preventive ointment tube, decontamination powder, and a glove.

The U.S. individual decontamination equipment and auto-injector set are not carried on a day-to-day basis, leaving many Soldiers unfamiliar with the uses and their operation. The U.S. kit includes the M-295 equipment decontamination charcoal glove, the reactive skin decontamination lotion sponge in lotion packet, and three auto-injectors that are very similar to those in the Polish sets. With increased familiarity of U.S. Soldiers with their own equipment, shared use of the kits is possible. In the future, exchange of individual kits in the field would increase the interoperability of U.S. and Polish units.

IZS Vehicle Decontamination System

The IZS Vehicle Decontamination System is found in all wheeled vehicles. The system is designed to decontaminate an area of 6 meters by 2 meters; therefore, the most critical areas of the vehicle should be decontaminated first since it is not possible to decontaminate the whole vehicle with this system alone. The tank holding the decontamination solution has a capacity of 20 liters (18 liters of water and 2 liters of decontamination enzymes). With a change in the

preparation of the decontamination solution, the system can also be used for radioactive decontamination. It operates at a pressure of 15.6 to 22.8 pounds per square inch. The components of the system include the storage box, the tank that holds the decontamination enzymes, hoses, a spray assembly with a scrub brush head, and a hand pump. The pressure can be obtained using the hand pump or the pneumatic vehicle pressure system. The system should be assembled within 12 minutes, but highly trained soldiers can have it operational in as little as 4 minutes.

ZOD2 Tracked Vehicle Decontamination System

The ZOD2 Tracked Vehicle Decontamination System is a variant of the IZS Vehicle Decontamination System found in tracked vehicles as a means of chemical agent decontamination. The tank holds 8 liters of an organic solvent solution that decontaminates the main battle tank. The tank is pressurized by carbon dioxide or nitrogen dioxide, or it can be attached to the pneumatic system of the vehicle. Due to the organic solvent solution, it can only be used for chemical decontamination.

The United States uses the M100 Sorbent Vehicle Decontamination System, a dry decontamination method. Again, due to lack of training aids and equipment on hand, U.S. Soldiers are vastly unfamiliar with the system and its use. Thankfully, it requires no assembly and is simple to use. The Polish system for wheeled and tracked vehicles is complex and contains many parts. It is not difficult to assemble once rehearsed, but is not an intuitive system and does require prior knowledge of assembly.

ZDMR Mass Casualty Decontamination Tent System

The ZDMR Mass Casualty Decontamination Tent System consists of three tents (with flooring and splash protection), benches, climate control, shower heads, soap, a water heater, baskets, and a weapons rack that are stored on an open-sided truck with canvas siding. There is no established time standard for assembly, but assembly takes approximately 3 to 4 hours.

Current Polish Army CBRN Detection Equipment

Current Polish Army CBRN detection equipment includes the AP2C Chemical Agent Warfare Detector, DPO Radiac Set, PChR-54M Personal Decontamination Kit, and FOO1 protective clothing. Additional information about these systems is provided in the following paragraphs.

AP2C Chemical Agent Warfare Detector

The AP2C Chemical Agent Warfare Detector detects nerve and mustard (blister) agents and identifies the venomous agent X (VX) nerve agent in liquid and vapor forms. It is a very sensitive detector, which can even identify low concentrations of sarin. The APC2 is employed for initial reconnaissance, and it provides capabilities for mass screening and monitoring of decontamination of causalities and equipment. The AP2C is used by military forces and emergency response teams worldwide, including organizations from Poland, France, Sweden, Israel, Australia, and the United States.

The AP2C is available with various accessories and interfaces for expanded use. These adaptations include special applications, test modules, and additional interfaces for expanded surveillance. Vehicular models, which function as portable alarms, are also available. The APC2 provides instant detection of chemical agents in liquid and vapor forms. It is engineered to simultaneously detect traces of nerve and mustard agents, even if the agents are not chemically pure.

DPO Radiac Set

The DPO Radiac Set measures alpha, beta, gamma, and X-ray radiation in adjustable scales. The radiac set is distributed at a rate of one per company.

PChR-54M Personal Decontamination Kit

The PChR-54M Personal Decontamination Kit is a company level detection asset. The components are the storage box, hand pump, and indicating tubes. The tubes, which are selected for agents being detected, are placed inside the hand pump, and vapors are pulled through the tubes to initiate a chemical reaction. The system can only test for one agent at a time, and the detection capabilities include nerve, mustard, and blood/choking gases. The kit also includes detection paper (similar to U.S. M8 detector paper) that reacts to liquid contamination, indicating its presence through color changes. It is used to detect the need for decontamination before decontamination operations. The kit can test the air, surfaces, and the ground.

FOO1 Protective Clothing

FOO1 protective clothing refers to protective over garments that include trousers, an overcoat with a hood, over boots, gloves, and an MP6 mask. The clothing provides 24-hour vapor protection and 8-hour liquid protection and can be laundered up to six times (if not contaminated) while retaining its serviceability. There is currently no timing standard for donning the protective over garment, but the standard mask-donning time is 9 seconds. The MP6 mask uses NATO standard C2 canisters.

Current Polish Army CBRN Warning and Reporting System

The Polish report CBRN activities per NATO Standardization Agreement 2130/Allied Tactical Publication (ATP)-45 (C), *Warning and Reporting and Hazard Prediction of Chemical, Biological, Radiological, and Nuclear Incidents*.[1] This standardized six-report format provides observer's data, evaluated data, immediate warning and predicted contamination hazard data, reconnaissance data, monitoring and survey results, information about areas of actual contamination, and detailed information in a specific format. Similar formatting is replicated in Army Techniques Publication 3-11.36, *Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological and Nuclear Aspects of Command and Control*.[2] The use of common

A Polish CBRN soldier demonstrates how to use the IZS-Vehicle Decontamination System.

doctrine regulating warning and reporting activities allows for coherent transfer of information between Polish and American forces.

Summary

The Polish Army executes CBRN training with a focus that the U.S. Army lacks. The Polish dedication to ensuring that each unit is ready, knows the procedures, can successfully decontaminate itself and its equipment, and report the attack is far beyond the minimal requirements mandated by the U.S. Army. The monthly Risk of Contamination Day dedicated to CBRN training is an example of the Polish Army acknowledgement of the devastating effects of an untrained army in the event of a CBRN incident.

Despite the differences in equipment, the essential procedures for response and detection system operations are the same, allowing for unified planning in joint ventures in support of combat elements. The methods of surveying and operation of the chemical and radiological equipment is so similar that U.S. Soldiers could operate Polish equipment with minimal training. The presence of U.S. Soldiers in Poland provides a great opportunity for the comparison of procedures and equipment and the strengthening of bonds between representatives of the profession of the Chemical Corps.

Endnotes:

[1]NATO Standardization Agreement 2130/ATP-45 (C), *Warning and Reporting and Hazard Prediction of Chemical, Biological, Radiological, and Nuclear Incidents*, 2014.

[2]Army Techniques Publication 3-11.36, *Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological and Nuclear Aspects of Command and Control*, 1 November 2013.

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Photographs and illustrations contribute a great deal to the visual appeal of an article. When submitting them with your article, please keep the following in mind:

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- **Size and resolution**—The ideal photograph or graphic for print reproduction is 5x7 inches at 300 dots per inch (dpi), but smaller sizes may be acceptable. If the photograph is a JPEG, it should be no smaller than 150 kilobytes (KB). A 5x7-inch, 300-dpi photograph saved as a TIF should be 1 MB to 3 MB in size. When taking photographs, use the highest resolution setting on your camera and save them at a resolution no lower than 200 dpi. Photographs appearing on the Internet usually have a resolution of only 72 dpi. They will look fine on a computer monitor, but do not reproduce well in print. However, photographs that are available for download as "high resolution" will probably meet the minimum requirements. Do not manipulate photographs by sharpening, resizing, retouching, or cropping the image. Using a graphics software program (such as Adobe® Photoshop) to increase the size and/or resolution of a small photograph will not increase the quality of the photograph so that it can be used in a printed publication. Do not compress photographs. We will do all postproduction work. We will not publish photographs that are pixilated or out of focus.
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231st Conducts Mass Decontamination Exercise in the Port of Baltimore

By Second Lieutenant Alex E. Belval

North Locust Point Marine Terminal in Baltimore's inner harbor became the site for a significant radiological release exercise. The 231st Chemical Company, Maryland National Guard, was responsible for evaluating, containing, and decontaminating any compromised areas. This exercise was a realistic test of the decontamination capabilities of the unit.

The scenario kicked off with a mock terrorist attack. The terrorist detonated weapons of mass destruction (WMD) containing chemical and radiological materials aboard the U.S. Ship Denebola prior to its departure from port. The WMD exposed an estimated 400 passengers on the Navy supply ship to hazmat. Baltimore's first responders initially responded to the attack, followed by the U.S. Coast Guard, who then handed off the responsibility for the incident to the 32d Civil Support Team, Maryland National Guard.

The 231st Chemical Company began planning in conjunction with the 251st Area Support Medical Company from the South Carolina National Guard, the U.S. Coast Guard, the Federal Bureau of Investigation, the U.S. Department of Homeland Security, the Maryland Department of Natural Resources, and the Maryland Transportation Authority. At the site, areas were established to treat and decontaminate role-playing passengers and to evaluate and mitigate contaminated areas of the ship. The different organizations worked together as a cohesive element to solve the problems presented by the scenario.

The Soldiers of the 231st Chemical Company spent the weekend executing one of three tasks in nuclear, biological, and chemical gear. The reconnaissance platoon took samples from the ship and quarantined affected areas. The two decontamination platoons assessed and decontaminated up to 400 casualties. The headquarters platoon provided support for the unit. The 231st Soldiers had just 2 hours to prepare and to set up decontamination areas in order to accomplish these tasks.

The reconnaissance platoon mitigated all risks of the identified hazmat (five sources of Cesium-137), prevented exposure to other areas, and safely transported the samples to the Maryland Transport Authority Police Department. It was also able to identify the possible targets of the attack and secure those locations.

The decontamination platoons processed the affected passengers through the mass casualty decontamination line. Platoon members had to undress, wash, rinse, monitor, and re-dress each individual until full decontamination was achieved and the victims were cleared to move on to the medical station established by the 251st Area Support Medical Company. Some individuals needed to be processed multiple times before they were free of all contaminants.

After two long days and many hours of stellar teamwork among the many forces on site, the mission was successful—all risks were mitigated, and all role players were decontaminated. This exercise was extremely important; it showed that the 231st Chemical Company is fully prepared to take on any level of chemical, biological, radiological, and nuclear (CBRN) catastrophe and that there are always areas for improvement. Members of the 231st went home to Camp Fretterd, Maryland, with an enhanced understanding of how to defend against disaster and a sense of pride that they accomplished the mission with excellence.

Second Lieutenant Belval is a CBRN officer for the 231st Chemical Company at Camp Fretterd and the incoming technical support force reconnaissance platoon leader for the Mission Command CBRN Response Element–B. He holds a bachelor's degree in applied psychology from Bryant University, Smithfield, Rhode Island.

Photograph credit: Airman 1st Class Sarah M. McClanahan.

Talent Management: Our Collective Responsibility

By Major Nicolas P. Bell

U.S. Army Training and Doctrine Command (TRADOC) Pamphlet 525-3-1, *The Army Operating Concept*, discusses the future environment and how we can "win in a complex world."[1] Key examples of future circumstances cited by the Army operating concept are dense urban areas, cyber considerations, and disinformation as well as the spread of information and technology to undermine U.S. technology strengths and chemical, biological, radiological, nuclear, and explosives (CBRNE) threats.[2] As a result, leaders need to understand and be able to operate in these circumstances. With an unknown future conflict, the question is: "Are we managing our personnel to maximize the talent to operate effectively in those circumstances?" To maximize talent within our ranks, we must learn about our personnel to identify future leaders. I had the fortunate experience of serving in the U.S. Army Talent Management Task Force (TMTF) for 12 months to help figure out how the Army can reach this goal. Most of my work in TMTF focused on officer management. Leaders at all levels can employ talent management techniques to better understand Soldiers in their formations and to apply their talents in different situations or mission sets.

The first thought that may come to mind when discussing talent management is the belief that the way in which U.S. Army Human Resources Command (HRC) assigns individuals will finally be fixed; however, that was not the intent behind TMTF. Neither was the intent to manage the top 10 percent of the talent. Although that is important, after my experience in the Army G-1 (assistant chief of staff, personnel), I would argue that managing the top 10 percent of talent is the responsibility of an officer's senior rater. TMTF was also not created to undermine how HRC operates. Quite the opposite, TMTF worked with HRC on a daily basis to determine how to implement new ideas or systems to help match the right person with the right assignment. The intent behind TMTF was to review ". . . gaps and shortfalls that challenge our ability to optimize the performance of our diverse talent in the total Army workforce."[3]

TMTF is not a stovepiped organization. Input from many senior leaders and the U.S. Army Center for Army Leadership, Fort Leavenworth, Kansas; the Office of the Chief of the Army Reserve, Washington, D.C.; and the Office of Economics and Manpower Analysis, West Point, New York, was integrated.

The TMTF strategy establishes a way for the Army to identify a Soldier's talent. Talent, as defined in the Army's Talent Management Strategy, is the intersection of one's knowledge, skills, and behaviors.[4] Imagine Army leaders who knew what cognitive and noncognitive skills you possess and how to employ those skills to the best of your ability. Promotion and centralized selection list boards (commands and schools) use the evaluation system (based on performance and potential) and other data such as deployments, degrees earned, awards, and official photographs.[5] Michael J. Colarusso and David S. Lyle state, "There is no interview to establish an officer's career goals or retention risks . . . no inventory of professional capabilities, no psychometric assessments of learning style or personality . . . ."[6] Army leaders do not yet have a way to differentiate talent; they are making big decisions for future Army leaders based on an incomplete picture of the individual that relies solely on a Soldier's record brief and evaluations. We need the ability to assess talent institutionalized across the professional military education system. The Army as an institution, including tactical units, can use existing tools such as standardized tests and assessment tools to help learn more about its people. An officer may do very well in the quantitative section of a standardized test, with analytical skills as his or her highest strength. Maybe becoming an operations research/systems analysis officer is the best fit for that officer, but maybe the officer does not know that is an option or does not fully realize how he or she could capitalize on those analytical skills for the Army. Several officers in the TMTF devoted their whole time to determining what specific assessments to use, when to use them in an officer's career, and what decisions would be made from those assessments. A pilot of this process began at the Aviation Captain's Career Course in 2017.

Many want to accuse HRC of not caring about matching an officer's preferences or talents with a position (although our branch is small enough that this is not as much of an issue as it is with larger branches). HRC must put the right faces in the right billets to meet Army manning priorities. This leads to disagreements between the assignment officer and the assigned officer, who may blame HRC for not caring about his or her assignment preference. The Army determines requirements and authorizations based on an analysis of what the Army needs to fight our Nation's wars. Units determine their mission-essential requirements, while assignment officers determine who is eligible to move. HRC is responsible for moving the right people to fill available priorities, keeping in mind the officer's preference and Family considerations. HRC currently does not have a way

to identify Soldiers' talents, but that is changing with the newly developed Assignment Interactive Module (AIM). I highly recommend that officers go to AIM-2 link under "Popular HRC Resources" on the HRC Web site at <www.hrc.army.mil> to learn more. Officers can list attributes that are not reflected on their officer record brief but may be beneficial to a unit. If we can maximize an officer's talent with the capabilities necessary to be successful in a position, then we can maximize talent.

I also advise every officer, regardless of rank or position, to understand and learn the assignment process. Many factors play a role in putting an officer at the right position at the right time. We have an obligation to understand AIM-2; however, we also need to understand the process so that we can explain the bigger picture to officers in our formations and develop our own realistic expectations. Our branch at HRC publishes a monthly newsletter containing the latest information to potentially help officers make career decisions. This also means knowing Department of the Army Pamphlet 600-3, *Commissioned Officer Professional Development and Career Management*, timelines and reviewing promotion board analyses so that we can reflect on ourselves and have candid conversations with subordinates.[7]

Early engagement by raters or senior raters is vital to managing the next steps in an officer's career. It is also incumbent upon the officer to approach the senior rater to have discussions on potential and what he or she wants to accomplish in the Army. You may be wondering what you, as a chemical, biological, radiological, and nuclear (CBRN) officer, can do; the process of counseling and developing subordinates, having candid discussions regarding performance and potential, and seeking out opportunities to learn more about yourself begins now. For example, take advantage of the standardized tests and assessment tools, which may help you determine if you want to pursue an advanced civil schooling opportunity or cultivate your identified strengths. You can explore the various functional areas to determine if they may be a better fit. Leaders at all levels can have their subordinates come prepared to discuss their skills, knowledge, and behaviors, as discussed in "Starting Strong: Talent-Based Branching of Newly Commissioned U.S. Army Officers."[8] When discussions like this occur, raters and senior raters have more information to help shape an officer's career.

When HRC offers you options for an assignment, ask questions to ensure that the assignment fits you as a person and an officer. For example: What is the performance history of CBRN officers in that position? What attributes does this job require? What assignments have CBRN officers traditionally received after this one? Will this assignment help me meet my next goal (CBRN battalion commander, small-group instructor, a broadening program participant)?

Investing in our talent through assessments, time, candid conversations, and more personal and involved engagements between raters and senior raters will always be vital for the growth of officers. The following tools can be useful in further exploring this topic and generating conversations within organizations:

- U.S. Army Talent Management Web site, <https://talent.army.mil/>.
- Army Talent Management YouTube Channel, <https://www.youtube.com/channel/UCXJPHjSjolwhys2oKw9PJ2A>.
- Tim Kane, *Bleeding Talent: How the U.S. Military Mismanages Great Leaders and Why It's Time for a Revolution*, Palgrave Macmillan, New York, 2013.
- Michael J. Colarusso and David S. Lyle, *Senior Talent Management: Fostering Institutional Adaptability*, Strategic Studies Institute and U.S. Army War College Press, February 2014, <https://talent.army.mil/documents/>.

The TMTF aims to institutionalize better talent management across the Army, but we do not have to wait for that to use the strategy in our current formations. Talent management is not simply making sure that the top 10 percent of officers are taken care of, but making sure that everyone's talents are known in order to ensure optimal performance and career placement. HRC has a responsibility to meet Army requirements with personnel who are available to move, and the more information available to an assignment officer about a Soldier's talents the better equipped the assignment officer is to make an informed decision.

Author's note: This article is not meant to convey everything that the TMTF has accomplished since it began in 2016. In my opinion, implementing talent assessments should be the main priority of the TMTF.

Endnotes:

[1]TRADOC Pamphlet 525-3-1, *The Army Operating Concept*, 31 October 2014, p. vi.

[2]Ibid., p. 11.

[3]Eric K. Fanning, Secretary of the Army, "Charter, Army Talent Management Task Force," Washington, D.C., 17 June 2016, p. 1.

[4]U.S. Army, "Army Talent Management Strategy Force 2025 and Beyond," 20 September 2016.

[5]Michael J. Colarusso and David S. Lyle, *Senior Talent Management: Fostering Institutional Adaptability*, Strategic Studies Institute and U.S. Army War College Press, February 2014, pp. 48–52, <https://talent.army.mil/documents/>, accessed on 10 April 2018.

[6]Ibid., p. 49.

[7]Department of the Army Pamphlet 600-3, *Commissioned Officer Professional Development and Career Management*, 3 December 2014.

[8]Michael J. Colarusso, et al., "Starting Strong: Talent-Based Branching of Newly Commissioned U.S. Army Officers," 7 April 2016, <https://ssi.armywarcollege.edu/pubs/display.cfm?pubID=1317>, accessed on 10 April 2017.

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Doctrine Update: FM 3-11, CBRN Operations

By Major Randall J. Adams and Captain Francisco Rincon Jr.

The Maneuver Support Center of Excellence chemical, biological, radiological, and nuclear (CBRN) doctrine writing team is conducting a substantial rewrite of Field Manual (FM) 3-11, *Multi-Service Doctrine for Chemical, Biological, Radiological, and Nuclear Operations*.[1] The revision end state will support the Chemical Corps readiness to enable the Army to fight and win in a CBRN environment, as part of a combined-arms team, in the conduct of large-scale ground combat against a peer threat.

The CBRN profession consists of a unique body of knowledge—policy, doctrine, training, and technical publications. FM 3-11 serves as the foundational body of knowledge and provides the professional language that guides CBRN Soldiers on how to perform tasks related to the Army role—the employment of land power to support joint operations.

FM 3-11 was last published on 1 July 2011. The key change revision factor for FM 3-11 is the alignment with newly published Army capstone doctrine, Army Doctrine Reference Publication (ADRP) 3-0, *Operations*, and FM 3-0, *Operations*.[2, 3] FM 3-11 also addresses the enduring and vetted outcomes from the Combined Arms Maneuver in a Contaminated Operating Environment experimentation and Army Warfighting Challenge No. 5 (Countering Weapons of Mass Destruction); CBRN lessons learned trends from combat training centers; and the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS) vision and commandant's guidance.

The revision of FM 3-11 will provide a taxonomy for leaders and Soldiers to organize thoughts about the conduct of operations. The taxonomy will provide a conceptual framework to help leaders and Soldiers visualize and understand the anticipated CBRN operational environment; to organize and guide thinking about CBRN support to operations; to derive the tasks, missions, and other responsibilities to units; and to assess plans and execution of operations.

The CBRN taxonomy established a role that defines the broad and enduring purpose for which the Corps was established. The core functions of the Chemical Branch (assess, protect, and mitigate) comprise a practical organization of tasks and systems grouped by a common purpose. The overall purpose of the taxonomy is to serve as an aid for thinking about and conducting operations. It will establish the content of FM 3-11 for addressing CBRN functions and tasks to support combined-arms operations and enable freedom of action in large-scale ground combat.

FM 3-11 augments CBRN tactics in support of the Army capstone and other key doctrine that supports the conduct of unified land operations. It is imperative that CBRN leaders read and understand ADRP 3-0; FM 3-0; ADRP 3-90, *Offense and Defense*; ADRP 3-07, *Stability*; and ADRP 6-0, *Mission Command*, which enable CBRN contributions to shape the operational environment, prevent conflict, conduct large-scale ground combat, and consolidate gains against a peer threat.[4, 5, 6, 7, 8]

The next opportunity for the CBRN community to provide comments on the initial draft is in early June 2018. Your review and expertise is valuable for producing a quality product that will lead the Chemical Corps in providing expertise and support to the conduct of Army and joint operations. Dragon Soldiers proudly serve our Nation's CBRN counterforce through competence, braveness, and readiness, and they are on point!

Endnotes:

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

[2]ADRP 3-0, *Operations*, 6 October 2017.

[3]FM 3-0, *Operations*, 6 October 2017.

[4]ADRP 3-0.

[5]FM 3-0.

[6]ADRP 3-90, *Offense and Defense*, 31 August 2012.

[7]ADRP 3-07, *Stability*, 31 August 2012.

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

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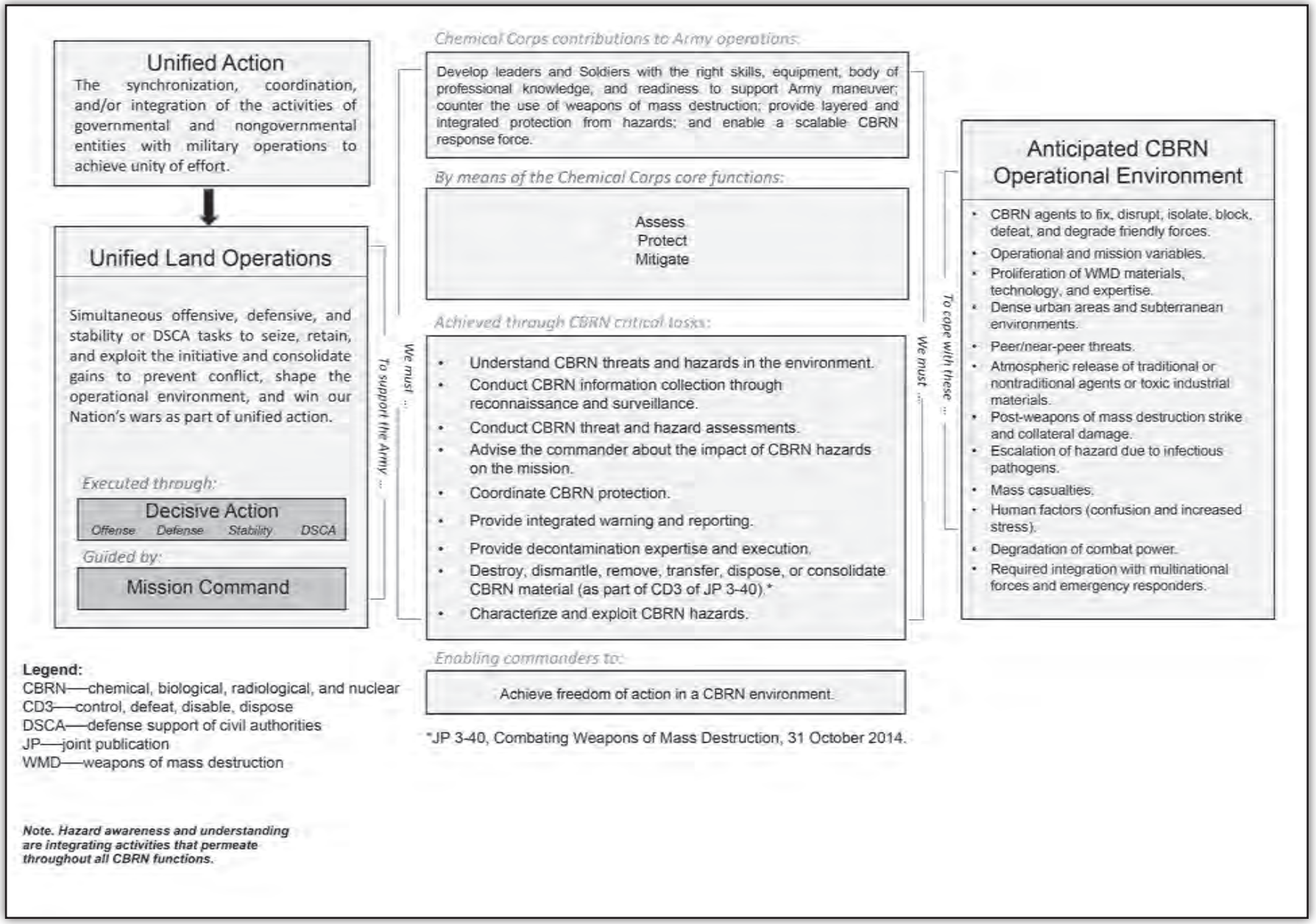

Draft Logic Chart for FM 3-11.

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	Under revision.
JP 3-11 focuses on maintaining the joint force ability to conduct the range of military operations in a CBRN environment. The revised JP 3-11 will reference a classified appendix on nontraditional agents that will be available on the secure Internet protocol router.			
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	Under revision.
JP 3-40 provides an activities construct for countering weapons of mass destruction (WMD). Tasks to counter specific WMD threats are grouped within the activities of understand the operational environment, threats, and vulnerabilities; cooperate with and support partners; control, defeat, disable, and dispose of WMD threats; and safeguard the force and manage consequences.			
JP 3-41	*Chemical, Biological, Radiological, and Nuclear Response*	9 Sep 16	Current.
The newly published revision of JP 3-41 changes *consequence management* to *CBRN response* to highlight the unique Department of Defense (DOD) response capability and responsibility to minimize the effects of a CBRN incident. It incorporates the new DOD integrated CBRN response enterprise capabilities and joint force matrix and clarifies supporting roles during international CBRN response (previously foreign consequence management).			
Multi-Service Publications			
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	Under revision.
Field Manual (FM) 3-11 is the only FM for which the USACBRNS is the lead agent. The revision of FM 3-11 will focus on integrating the core functions of the Chemical Corps into the large-scale combat operations of the new FM 3-0, *Operations.* FM 3-11 will no longer be multi-Service and will be the keystone doctrine for operations to assess CBRN hazards, protect the force, and mitigate the entire range of CBRN threats, hazards, and effects.			

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	Change 1 will be published May 2018.
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 3-11.25) contains 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. Change 1 published.
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. ATP 3-11.37 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. Under review with the creation of a new publication, ATP 3-11.42, *Domestic Chemical, Biological, Radiological, and Nuclear Response*.
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 3-11.42	*Chemical, Biological, Radiological, and Nuclear Domestic Response*	TBD	Under development.
ATP 3-11.42 will combine guiding principles to multi-Service forces within the CBRN Response Enterprise (CRE) and conducting domestic CBRN response operations in support of Department of Defense missions and national objectives. It will focus on planning, preparation, and execution at the tactical level.			
ATP 3-11.46 AFTTP 3-2.81	*Weapons of Mass Destruction–Civil Support Team Operations*	20 May 14	Current. Under review with the creation of a new publication, ATP 3-11.42, *Domestic Chemical, Biological, Radiological, and Nuclear Response*.
ATP 3-11.46 serves as the foundation for WMD–Civil Support Team (CST) doctrine. ATP 3-11.46 will be revised to incorporate changes in doctrine from updated JP 3-11, JP 3-28, and JP 3-41 and explain how the WMD-CST concept of operations is integrated into the CBRN Response Enterprise (CRE) structure.			

Number	Title	Date	Status
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. Under review with the creation of a new publication, ATP 3-11.42, *Domestic Chemical, Biological, Radiological, and Nuclear Response*.
ATP 3-11.47 contains detailed tactical doctrine and TTP and sets the foundation for the tactical employment of the CERFP and HRF. It will be consolidated into a multi-Service CRE manual, incorporating revisions of JP 3-41, ATP 3-11.41, and ATP 3-11.46 in the near future.			
Army-Only Publications			
USACBRNS is the U.S. Army proponent for five 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. A change will be published in the near future to address the change in capabilities, including the removal of reference to CBRN obscuration units.			
ATP 3-90.40	*Combined Arms Countering Weapons of Mass Destruction*	29 Jun 17	Current.
ATP 3-90.40 provides tactical-level commanders, staffs, and key agencies with a primary reference for planning, synchronizing, integrating, and executing combined arms countering weapons of mass destruction.			
ATP 3-37.11	*Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) Command*	TBD	Under development.
ATP 3-37.11 is intended to facilitate the operations and training requirements of the CBRNE command. It will also provide commanders, staffs, key agencies, and Service members with a key reference on the CBRNE command for operational and tactical planning and CBRN and explosive ordnance disposal structure, capabilities, and principles of employment.			
Technical Manuals			
USACBRNS is the proponent and approving authority for three 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*	15 May 17	Current. Change 1 published.
TM 3-11.32 provides reference material for CBRN warning messages, incident reporting, and hazard prediction procedures. A change to correct errors and add Air Force designations will be made in FY 18.			
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*	13 Dec 17	Current.
TM 3-11.91 serves as a comprehensive manual for information to help understand the CBRN environment. It includes 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 also includes basic educational information and the field behavior of CBRN hazards (including riot control agents and herbicides). The appendixes contains scientific CBRN data.			

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 [R1] [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 Anthony Anderson at (573) 563-7757 or <anthony.p.anderson10.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[T]) 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. Training can 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 is a prerequisite for attending CBRN ALC, CBRN SLC, and the CBRN Transition Course.	
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 <http://totalforcevlc.golearnportal.org> 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 Anthony Anderson, at (573) 563-7757 or <anthony.p.anderson10.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. This phase covers chemical and biological agent effects, defense concepts, raidiological operations, consequence management, live toxic agent training, and the basics of the Joint Warning and Reporting Network used within the Maneuver Control System.
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 before attending Phase IV. Those who encounter problems should contact Master Sergeant Anderson at (573) 563-7757 or <anthony.p.anderson10.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 decision-making 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; prospective students may be 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

CBRN Responder Operations Course (School Code 031, Course 4K-F30/494-F34(MC))
This 4-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 operations level.
CBRN Responder Technician Course (School Code 031, Course 4K-F24/494-F29)
This 6-day course is appropriate for C2CRE members. All students attending the course must be International Fire Service Accreditation Congress (IFSAC) DOD Awareness- and operations-certified before arriving. Students who successfully complete the course receive certification at the technician level.
Civil Support Skills Course (CSSC) (School Code 031, Course 4K-F20/494-28)
This 8-week course is appropriate for Army National Guard and U.S. Army Reserve 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 Jeremy Mann at (573) 596-6221 or <jeremy.a.mann.mil@mail.mil>.

Contact Information

VACANT (DAC–AR), (573) 563-8050.

Sergeant Major Phillip D. Pennington (CBRN USAR Sergeant Major), (573) 563-4026 or <phillip.d.pennington2.mil@mail.mil>.

Master Sergeant Anthony Anderson (Training Development NCO–AR), (573) 563-7757 or <anthony.p.anderson10.mil@mail.mil>.

Major Audrey J. Dean (DAC–NG), (573) 563-7676 or <audrey.j.dean.mil@mail.mil>.

Sergeant First Class James W. Mars (Proponency NCO–NG), (573) 563-7667 or <james.w.mars.mil@mail.mil>.

Sergeant First Class Walter Espinoza (RC–LNO), (573) 596-3226 or <molina.w.espinoza.mil@mail.mil>

Reference:

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

USACBRNS CATS Update

The table below lists the combined arms training strategies (CATSs) for which the Collective Training Division, Directorate of Training and Leader Development, U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS) is responsible.

Unit Title	TOE/TDA Number	Date Published to DTMS
CBRNE Command	37600K000	17 April 2018
HHC, CBRN Operational Headquarters	37601K000	5 April 2018
Nuclear Disablement Team	37611KA00	5 April 2018
WMD Coordination Element	37621KA00	5 April 2018
CBRN Brigade	03492R0FF	28 February 2018
CBRN Brigade	03492K0FF	22 March 2018
HHC, CBRN Brigade	03492R000	6 March 2018
HHC, CBRN Brigade	03492K000	6 March 2018
HHC, CBRN Battalion	03396R000	30 November 2016
HHC, CBRN Battalion	03396K000	22 March 2018
CBRN Company (Area Support)	03420R300	6 March 2018
CBRN Company (Biological)	03470R000	6 March 2018
CBRN Company (Hazard Response)	03310R000	6 March 2018
CBRN Company (Obscuration)	03440R100	23 March 2015
CBRN Coordination Detachment	03579RA00	6 March 2018
CBRN Reconnaissance Detachment	03520R000	23 March 2018
CBRNE Company	03323K000	6 March 2018

Legend:

CATS—combined arms training strategy

CBRN—chemical, biological, radiological, and nuclear

CBRNE—chemical, biological, radiological, nuclear, and explosives

DTMS—Digital Training Management System

HHC—headquarters and headquarters company

TDA—table of distribution and allowances

TOE—table of organization and equipment

WMD—weapons of mass destruction

Note: CATSs are reviewed and updated on an annual basis to ensure that they include unit input and remain current.

Digital Archives

Scan the QR code below the image to access the digital version of past issues of *Army Chemical Review*.

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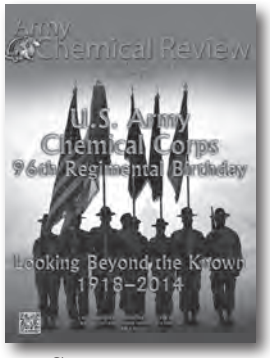
Summer 2013

Winter 2013



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