Army Chemical Review

The Professional Bulletin of the Chemical Corps

Winter 2018

U.S. Army Chemical Corps

100 Years

Honoring the Past **1918–2018** Preparing for the Future

HEADQUARTERS, DEPARTMENT OF THE ARMY
Approved for public release; distribution is unlimited.
PB 3-18-2

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(573) XXX-XXXX
DSN 676-XXXX (563 prefix) or 581-XXXX (596 prefix)

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Army Chemical Review (ACR) (ISSN 0899-7047) is published biannually in June and December by the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS), Fort Leonard Wood, Missouri. The *ACR* highlights unique Army chemical, biological, radiological, and nuclear technical-response capabilities for supporting national countering weapons of mass destruction operations and conducting all-hazmat mitigation across the range of military operations anytime, anywhere. The objectives of *ACR* are to inform, motivate, increase knowledge, improve performance, and provide a forum for the exchange of ideas. This publication presents professional information; but the views expressed herein are those of the authors, not the Department of Defense or its elements. The content does not necessarily reflect the official U.S. Army position and does not change or supersede any information in other U.S. Army publications. The use of news items constitutes neither affirmation of their accuracy nor product endorsement.

Articles to be considered for publication are due 15 February and 15 August. Send submissions by e-mail to <usarmy.leonardwood.mscoe.mbx.mdotacr@mail.mil>, or send an electronic copy in Microsoft® Word on a CD and a double-spaced copy of the manuscript to Army Chemical Review, 14010 MSCoE Loop, Building 3201, Suite 2661, Fort Leonard Wood, MO 65473-8702. Due to the limited space per issue, we normally do not print articles that have been published elsewhere.

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UNIT SUBSCRIPTIONS are available by e-mailing <usarmy.leonardwood.mscoe.mbx.mdotacr@mail.mil> Please include the complete mailing address (including unit name, street address, and building number) and the number of copies per issue.

DIGITAL SUBSCRIPTIONS are available by e-mailing <usarmy.leonardwood.mscoe.mbx.mdotacr@mail.mil>.

POSTMASTER: Send unit address changes to Army Chemical Review, 14010 MSCoE Loop, Building 3201, Suite 2661, Fort Leonard Wood, MO 65473-8702.

By Order of the Secretary of the Army:

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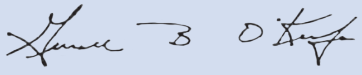

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Administrative Assistant to the
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Army Chemical Review

The Professional Bulletin of the Chemical Corps

PB 3-18-2, Winter 2018

Cover photographs: U.S. Army photos, 2018 U.S. Army Chemical Corps Regimental Week

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

I deeply appreciate everyone who took time to celebrate the 100th Anniversary of the U.S. Army Chemical Corps. The tremendous pride and excitement that I witnessed across the Army and at the U.S. Army Chemical, Biological, Radiological, and Nuclear School left me confident in the health of our Regiment as we embark on the next 100 years. I would like to personally thank everyone who helped make this historical celebration memorable.

Brigadier General Andy Munera

I'm very proud of the teams that competed in the 2018 Best Chemical, Biological, Radiological, and Nuclear (CBRN) Warrior Competition. They truly are leading by example to ensure our Corps' continuing reputation for excellence. Please join me in congratulating the top three teams of the 2018 Best CBRN Warrior Competition:

- 1st Place—Captain W. Parker Mangold and Captain Shawn Meyer, 84th Chemical Battalion, 3d Chemical Brigade, Fort Leonard Wood, Missouri.
- 2d Place—First Lieutenant David Stults and First Lieutenant Joseph Bennett, 2d and 3d Brigades, respectively, 82d Airborne Division, Fort Bragg, North Carolina.
- 3d Place—First Lieutenant John Gray and Staff Sergeant Travon Biggers, 71st CBRN Company and 303d Explosive Ordnance Disposal Battalion, respectively, Schofield Barracks, Hawaii.

This year, there was another close competition for the coveted Major General William L. Sibert Award. This prestigious award recognizes the achievements of the top CBRN companies in the Regular Army, Army National Guard, and U.S. Army Reserve. These units exhibit the highest standards of excellence across our Corps. The 2018 recipients are—

- Regular Army: 95th CBRN Company, Fort Richardson, Alaska.
- Army National Guard: 690th CBRN Company, Mobile, Alabama.
- U.S. Army Reserve: 342d CBRN Company, Urbana, Illinois.

While the Best CBRN Warrior Competition is rooted in camaraderie and friendly competition, we must not forget that the standards upon which these events are executed are inherently linked to our operational readiness. Lessons learned in competition and training help prepare our force for the next conflict. I encourage each individual and unit to take these competitions just as seriously next year.

While reflecting on the history of the Chemical Corps and continued examples of great individual and unit accomplishments, I thought about the fact that our Soldiers have provided whatever capability was required for every conflict throughout the course of our history. The Chemical Corps—

- Delivered chemical munitions during World War I.
- Delivered smoke and flame during World War II and the Korean War.
- Served as tunnel rats in Vietnam.
- Focused on CBRN defense for much of the Cold War.
- Focused on protection during recent counterinsurgency operations.

Ever flexible, we have enabled the warfighter to operate in any environment to complete the mission. Our ability to provide readiness and enable lethality for our Army has always been at the core.

As you know, our Army is growing its capability and capacity to conduct large-scale, ground combat operations. As our Nation faces a very real and evolving CBRN threat, our Regiment, a team of more than 18,000 Soldiers across both components, remains agile and adaptive. Dragon Soldiers are trained and ready CBRN operators and experts who provide critical capability to enable our Army to fight and win in a complex CBRN environment.

We cannot afford to prepare to fight our Nation's past wars. Experiences from previous conflicts can guide the path forward but cannot provide the measuring stick for success in the next war. New threats continue to evolve. Current and emerging threats are, in many ways, unlike what we have faced before. We must be prepared to support multi-domain

operations in the execution of large-scale, ground combat operations in complex operating environments by providing our Army with CBRN reconnaissance, hazard mitigation, and expertise to ensure freedom of action at home and abroad. CBRN leaders and formations at every level must also work with our partners to counter weapons of mass destruction across all domains.

Our enduring priorities are—

- **Readiness.** Help ensure that America's Army is ready to fight tonight and win in a CBRN environment. Train and educate Soldiers and leaders so that they contribute to our Army's readiness.
- **Improvement.** Acquire, build, and improve our Chemical Corps and our Army. Ensure that CBRN elements and Army units are structured, equipped, trained, and ready as part of the joint force to fight and win our Nation's wars in a contaminated environment—now and in the future.
- **Leader development.** Strengthen the Army profession and develop leaders who are trusted Army professionals, doctrinally sound, and physically tough; foster a positive command climate; and lead with a philosophy of mission command.
- **Risk management.** Advise commanders of the risk relating to operations in a contaminated environment, ways to protect the force, and ways mitigate that risk. Teach and enable junior leaders to do the same.

We must work together to build the Chemical Corps that our Army requires for the next conflict. We must all understand how CBRN formations and staff support brigade combat teams and echelons above brigade in accordance with Field Manual (FM) 3-0, *Operations*, and the multi-domain operational concept across the warfighting functions.[1] The updated FM 3-11, *Chemical, Biological, Radiological, and Nuclear Operations*, augments FM 3-0 and plays an integral part to ensure that our Army can "fight and sustain" in a contaminated environment.[2] We must develop the most effective set of doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy (DOTMLPF-P) solutions in support of brigade combat team and echelons above brigade formations and in accordance with the recently published *CBRN Operations Force Modernization Strategy*.[3]

Working across the CBRN enterprise, we are leveraging a combined and synchronized approach across science and technology, advanced development, and requirements determination to deliver the best capability to the force with an eye toward game-changing technology and long-term sustainability of programs. As we adapt for the future, we will always focus on our three core doctrinal functions (assess, protect, and mitigate) to ensure freedom of action in complex CBRN environments.

I charge each of you to make a personal commitment to build readiness and prepare our force for the next conflict. I also ask each of you to assist me with strategic messaging—tell our story (see Figure 1, page 4). True readiness comes from the energy and effort of each leader. Everyone must be engaged to ensure that our Army is prepared to fight and win our Nation's wars.

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

Elementis regamus proelium!

Endnotes:

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

[2]FM 3-11, *Chemical, Biological, Radiological, and Nuclear Operations*, to be published.

[3]*CBRN Operations Force Modernization Strategy*, July 2018.

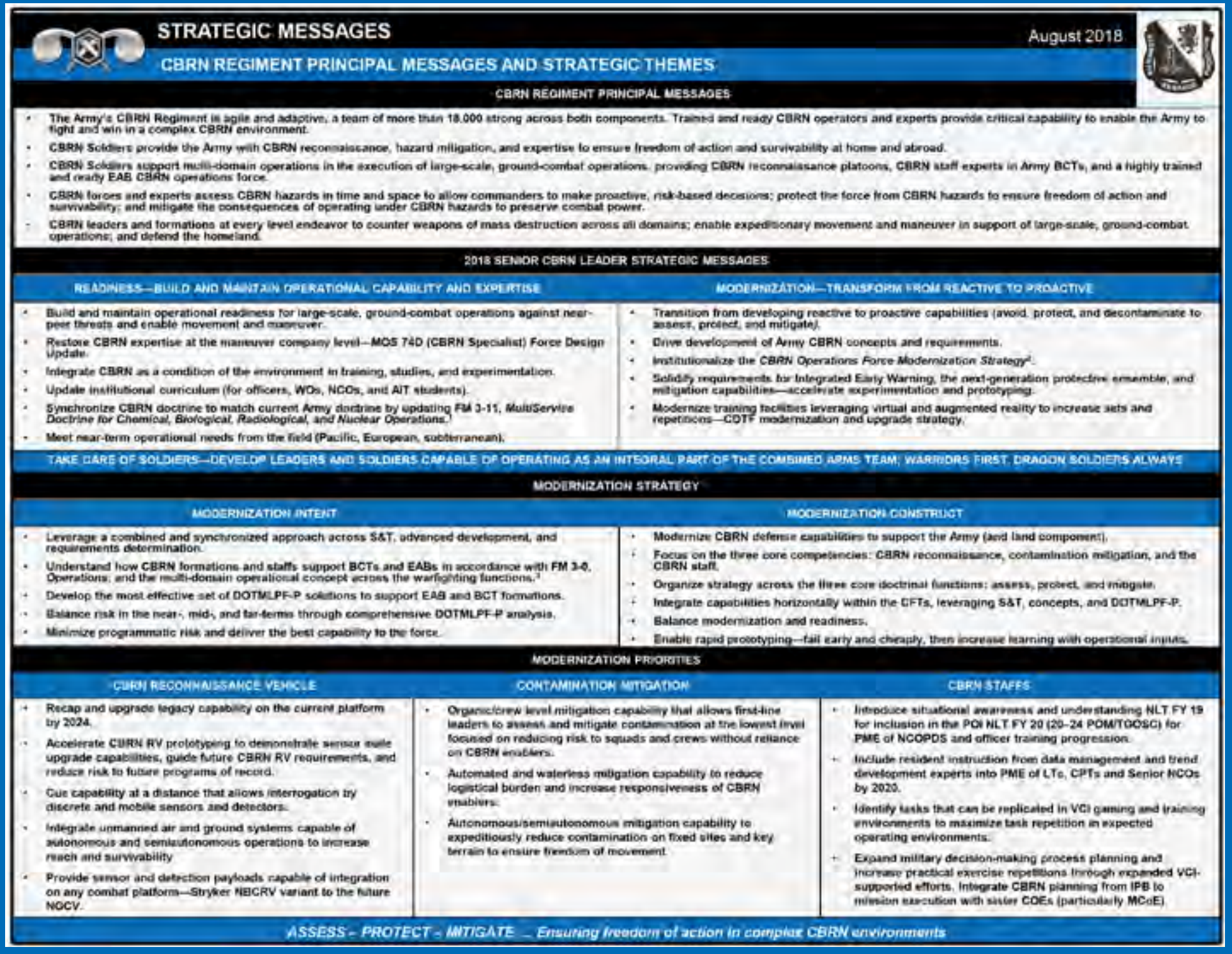

STRATEGIC MESSAGES
August 2018
CBRN REGIMENT PRINCIPAL MESSAGES AND STRATEGIC THEMES
CBRN REGIMENT PRINCIPAL MESSAGES
The Army's CBRN Regiment is agile and adaptive, a team of more than 18,000 strong across both components. Trained and ready CBRN operators and experts provide critical capability to enable the Army to fight and win in a complex CBRN environment.
CBRN Soldiers provide the Army with CBRN reconnaissance, hazard mitigation, and expertise to ensure freedom of action and survivability at home and abroad.
CBRN Soldiers support multi-domain operations in the execution of large-scale, ground-combat operations, providing CBRN reconnaissance platoons, CBRN staff experts in Army BCTs, and a highly trained and ready EAB CBRN operations force.
CBRN forces and experts assess CBRN hazards in time and space to allow commanders to make proactive, risk-based decisions; protect the force from CBRN hazards to ensure freedom of action and survivability; and mitigate the consequences of operating under CBRN hazards to preserve combat power.
CBRN leaders and formations at every level endeavor to counter weapons of mass destruction across all domains; enable expeditionary movement and maneuver in support of large-scale, ground-combat operations; and defend the homeland.
2018 SENIOR CBRN LEADER STRATEGIC MESSAGES
READINESS—BUILD AND MAINTAIN OPERATIONAL CAPABILITY AND EXPERTISE
Build and maintain operational readiness for large-scale, ground-combat operations against near-peer threats and enable movement and maneuver.
Restore CBRN expertise at the maneuver company level—MOS 74D (CBRN Specialist) Force Design Update.
Integrate CBRN as a condition of the environment in training, studies, and experimentation.
Update institutional curriculum (for officers, WOs, NCOs, and AIT students).
Synchronize CBRN doctrine to match current Army doctrine by updating FM 3-11, MultiService Doctrine for Chemical, Biological, Radiological, and Nuclear Operations.[1]
Meet near-term operational needs from the field (Pacific, European, subterranean).
MODERNIZATION—TRANSFORM FROM REACTIVE TO PROACTIVE
Transition from developing reactive to proactive capabilities (avoid, protect, and decontaminate to assess, protect, and mitigate).
Drive development of Army CBRN concepts and requirements.
Institutionalize the CBRN Operations Force Modernization Strategy[2].
Solidify requirements for Integrated Early Warning, the next-generation protective ensemble, and mitigation capabilities—accelerate experimentation and prototyping.
Modernize training facilities leveraging virtual and augmented reality to increase sets and repetitions—COTF modernization and upgrade strategy.
TAKE CARE OF SOLDIERS—DEVELOP LEADERS AND SOLDIERS CAPABLE OF OPERATING AS AN INTEGRAL PART OF THE COMBINED ARMS TEAM; WARRIORS FIRST, DRAGON SOLDIERS ALWAYS
MODERNIZATION STRATEGY
MODERNIZATION INTENT
Leverage a combined and synchronized approach across S&T, advanced development, and requirements determination.
Understand how CBRN formations and staffs support BCTs and EABs in accordance with FM 3-0, Operations, and the multi-domain operational concept across the warfighting functions.[3]
Develop the most effective set of DOTMLPF-P solutions to support EAB and BCT formations.
Balance risk in the near-, mid-, and far-terms through comprehensive DOTMLPF-P analysis.
Minimize programmatic risk and deliver the best capability to the force.
MODERNIZATION CONSTRUCT
Modernize CBRN defense capabilities to support the Army (and land component).
Focus on the three core competencies: CBRN reconnaissance, contamination mitigation, and the CBRN staff.
Organize strategy across the three core doctrinal functions: assess, protect, and mitigate.
Integrate capabilities horizontally within the CFTs, leveraging S&T, concepts, and DOTMLPF-P.
Balance modernization and readiness.
Enable rapid prototyping—fail early and cheaply, then increase learning with operational inputs.
MODERNIZATION PRIORITIES
CBRN RECONNAISSANCE VEHICLE
Recap and upgrade legacy capability on the current platform by 2024.
Accelerate CBRN RV prototyping to demonstrate sensor suite upgrade capabilities, guide future CBRN RV requirements, and reduce risk to future programs of record.
Gas capability at a distance that allows interrogation by discrete and mobile sensors and detectors.
Integrate unmanned air and ground systems capable of autonomous and semiautonomous operations to increase reach and survivability.
Provide sensor and detection payloads capable of integration on any combat platform—Stryker NBCRV variant to the future NGCV.
CONTAMINATION MITIGATION
Organic/crew level mitigation capability that allows first-line leaders to assess and mitigate contamination at the lowest level focused on reducing risk to squads and crews without reliance on CBRN enablers.
Automated and waterless mitigation capability to reduce logistical burden and increase responsiveness of CBRN enablers.
Autonomous/semiautonomous mitigation capability to expeditiously reduce contamination on fixed sites and key terrain to ensure freedom of movement.
CBRN STAFFS
Introduce situational awareness and understanding NLT FY 19 for inclusion in the POI NLT FY 20 (20–24 POM/TGOSC) for PME of NCOPDS and officer training progression.
Include resident instruction from data management and trend development experts into PME of LTs, CPTs and Senior NCOs by 2020.
Identify tasks that can be replicated in VCI gaming and training environments to maximize task repetition in expected operating environments.
Expand military decision-making process planning and increase practical exercise repetitions through expanded VCI-supported efforts. Integrate CBRN planning from IPB to mission execution with sister COEs (particularly MCoE).
ASSESS - PROTECT - MITIGATE – Ensuring freedom of action in complex CBRN environments

Figure 1.

Endnotes:

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

[2]*CBRN Operations Force Modernization Strategy*, July 2018.

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

Legend:

AIT—advanced individual training

BCT—brigade combat team

CBRN—chemical, biological, radiological, and nuclear

CDTF—Chemical Defense Training Facility

CFT—cross-functional team

COE—center of excellence

CPT—captain

DOTMLPF-P—doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy

EAB—echelon above brigade

FM—field manual

FY—fiscal year

IPB—intelligence preparation of the battlefield

LT—lieutenant

MCoE—U.S. Army Maneuver Center of Excellence

MOS—military occupational specialty

NBCRV—Nuclear Biological Chemical Reconnaissance Vehicle

NCO—noncommissioned officer

NCOPDS—Noncommissioned Officer Professional Development System

NGCV—next-generation combat vehicle

NLT—no later than

PME—professional military education

POI—program of instruction

POM—program objective memorandum

RV—reconnaissance vehicle

S&T—science and technology

TGOSC—Training General Officer Steering Committee

VCI—virtual, constructive, and interactive

WO—warrant officer

Figure 1. (continued)

Regimental Command Sergeant Major

It has been my distinct pleasure to serve as your Regimental Command Sergeant Major. This has been an absolutely incredible experience. I've had the opportunity to serve alongside many extraordinary professionals who have accomplished many remarkable feats, to include the Best Chemical, Biological, Radiological, and Nuclear (CBRN) Warrior Competition; the Chemical Corps Centennial Birthday; the Green Dragon Ball; and countless day-to-day operations that improved our Corps as a whole. As I move to my next assignment, I would like to thank all Dragon Soldiers and civilians for this most amazing experience.

Command Sergeant Major
Henney M. Hodgkins

This is an exciting time for the Chemical Corps as we advance into the future. You will see the reimplementation of Military Occupational Specialty 74D (CBRN Specialist) in companies, troops, and batteries of brigade combat teams. This will increase the readiness of our CBRN force and enhance the capabilities of our maneuver counterparts. During this process, we will continue to capture lessons learned to evaluate and evolve Soldiers and the units they serve. Along with the reimplementation, the programs of instruction for the Advanced Leader Course and the Senior Leader Course will be reviewed to evaluate the effectiveness of professional military education for our enlisted leaders. We will be focused on adding physical and mental rigor to the programs of instruction; this will ensure that our training is realistic and more challenging. I am absolutely confident that these initiatives will continue to increase our Corps capabilities while developing future Dragon Soldiers and leaders.

I would ask that we constantly strive for excellence and continue to be the competent leaders and team members necessary to master our skills as CBRN warriors. Continued growth and development are essential as we transition back into large-scale, ground combat operations. We want to ensure successful and effective operations in contaminated environments. We must continue to be brave in our approach, having the courage to ask questions when needed and to provide the hard answer, even when it's not popular. As CBRN Soldiers, we must remain ready and accountable to ourselves and those with whom we serve. We have an obligation to remain mentally and physically fit as well as technically and tactically proficient. We must remain on point for our Nation, the Army, and our Corps. We must meet challenges head-on and continue moving forward.

I am Command Sergeant Major Henney M. Hodgkins, and I am a Dragon Soldier—**C**ompetent, **B**rave, **R**eady and o**N**-point for our Nation.

Elementis regamus proelium!

Regimental Chief Warrant Officer

Chief Warrant Officer Three
Robert A. Lockwood

Greetings, Dragon Soldiers! It is my great honor to address you as the third Chemical Corps Regimental Chief Warrant Officer. It has been an exciting year for the Chemical Corps; the chemical, biological, radiological, and nuclear (CBRN) warrant officer cohort; and the warrant officer cohort at large.

First and foremost, the centennial anniversary of our beloved Corps was on 28 June 2018. We celebrated the occasion at Fort Leonard Wood, Missouri, and across many other installations in a way fitting a milestone of this magnitude. Here at the Home of the Corps, we started off with the return of the Best CBRN Warrior Competition, which pitted motivated CBRN teams from installations across the globe against one another in a grueling, 4-day event. My hat is off to the winners and to all of the competitors for displaying intestinal fortitude, showing that inside of every CBRN Soldier there beats the heart of a warrior. A few CBRN warrant officers represented the cohort in the Best CBRN Warrior Competition, but I hope to see an expanded representation from the cohort next year—perhaps even a CBRN warrant officer team. We continued the week by honoring our fallen, sharing the State of the Regiment, and inducting new members into the Hall of Fame and Distinguished Member of the Corps. We then capped it off with what will now be considered the new standard for the Green Dragon Ball. Thanks to all the past and present leaders, Soldiers, and supporters who attended or helped us in some fashion to make it a worthy celebration for 100 years.

We followed the Corps birthday with another centennial celebration on 9 July—the 100th Anniversary of the U.S. Army warrant officer. "Born" as mine planters in the Coast Artillery Corps during World War I, warrant officers are now the undisputed technical experts in more than 40 military occupational specialties across the Army. In our next 100 years, the Army will count on the warrant officer cohort more than ever to operate, integrate, and maintain increasingly complex equipment and systems. Happy 100th Anniversary to all U.S. Army warrant officers!

Lastly, we marked some major milestones for the CBRN warrant officer cohort with the promotion of several warrant officers to chief warrant officers three and the first assignment of a CBRN warrant officer as our career manager at the U.S. Army Human Resources Command (HRC). The promotion of our first field grade warrant officer is indicative of the hard work and effort put forth by everyone involved with the CBRN warrant officer program during the past 13 years. I fully expect that, as of the publication of this article, we will have several more warrant officers promotable to chief warrant officer three, and our new career manager at HRC (Chief Warrant Officer Three Humphrey Hills) will be ensuring that they are positioned to do the most for the Army. I'd like to thank our engineer comrades (Chief Warrant Officer Five Jerome L. Bussey, Chief Warrant Officer Four Simone Davis [Retired], Chief Warrant Officer Four Richard Ibanez, and Chief Warrant Officer Four Willie Gadsden), who did the heavy lifting at HRC for us while we grew our young cohort.

Throughout the many celebrations this year, we have maintained our laser focus on preparing the Corps for the next fight—large-scale, ground combat operations against a peer threat. The last 25 years makes for a poor lens through which to anticipate the next 25, and our recently released *CBRN Operations Force Modernization Strategy* embraces this mindset.[1] The *CBRN Operations Force Modernization Strategy* describes the need for a culture shift in our thinking as we develop the doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy (DOTMLPF-P) solutions that will enable us to assess, protect, and mitigate.[2] It recognizes that these solutions must not simply be the means for us to fight but, rather, capabilities that allow us to seize the initiative and win. CBRN warrant officers along with our technical expertise make up one of these capabilities. Commanders will look to the CBRN warrant officer to provide technical advice in the most challenging moments that will be brought on by operating semiautonomously in a contested CBRN environment. Without the option of immediate resupply or external support, CBRN warrant officers will be charged with the operation, integration, and maintenance of CBRN equipment. We must be prepared to use our technical knowledge to develop adaptive and creative solutions as a bridge for equipment that may be rendered ineffective or destroyed. Our *CBRN Operations Force Modernization Strategy* states that we will "develop CBRN warrant officers as master technicians of equipment operation, maintenance, and capability development."[3] This is what we must strive to do in order to meet the challenge of future engagements. As we forge ahead with innovative DOTMLPF-P solutions for multi-domain, large-scale, ground combat operations, we also acknowledge that the timing of the next conflict may not be of our choosing. Therefore, I charge all CBRN warrant officers to aggressively pursue and develop the technical ability, skills, and knowledge that will help lead us to victory on tomorrow's battlefield.

I am Rob Lockwood, and I am a Dragon Soldier—**C**ompetent, **B**rave, **R**eady, and o**N**-point for our Nation.

Elementis regamus proelium!

Endnotes:

[1]*CBRN Operations Force Modernization Strategy*, July 2018.

[2]Ibid.

[3]Ibid.

Reference:

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

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.

Panama joined the Chemical Weapons Convention (CWC) in 1998 and was subsequently required to destroy all chemical weapons on its territory. At the request of GOP in 2001,

Round 5 was an AN-M79, 1000-pound phosgene munition.

OPCW conducted a technical assistance visit to San Jose Island, followed by an initial inspection in 2002 to access eight munitions potentially filled with chemical agents. OPCW recommended that the chemical munitions be declared "old chemical weapons" and destroyed under CWC.

Bilateral discussions on possible U.S. assistance with the destruction of the eight chemical munitions that had originated with the United States began, but no agreement was reached at that time. In May 2013, GOP requested renewal of the bilateral discussions and officially requested assistance from the United States to destroy the eight declared chemical munitions. The U.S. Department of Defense (DOD) and Department of State (DOS) began a phased approach to determine the best destruction options consistent with CWC.

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 (RRE) and CMA were tasked to conduct a site assessment (Phase II) of the munitions. Concurrent to these efforts, DOD, DOS, and GOP representatives held extensive discussions on the terms of U.S. assistance, while DOD and DOS representatives consulted Congress to seek authorization and funds necessary to carry out the destruction effort. In 2017, an initial agreement was reached with the United States on the terms of assistance to be provided; GOP submitted a joint verification and facility agreement that was approved by the OPCW Executive Council (the 41-country policy-making portion of OPCW). GOP also submitted a general plan for destruction to the Executive Council, laying out the planned destruction operation. With the assistance of the United States, the destruction of the eight World War II-era chemical munitions was initiated under international verification protocols (Phase III). 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.

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 RRE, 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

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

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, DOD, 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.

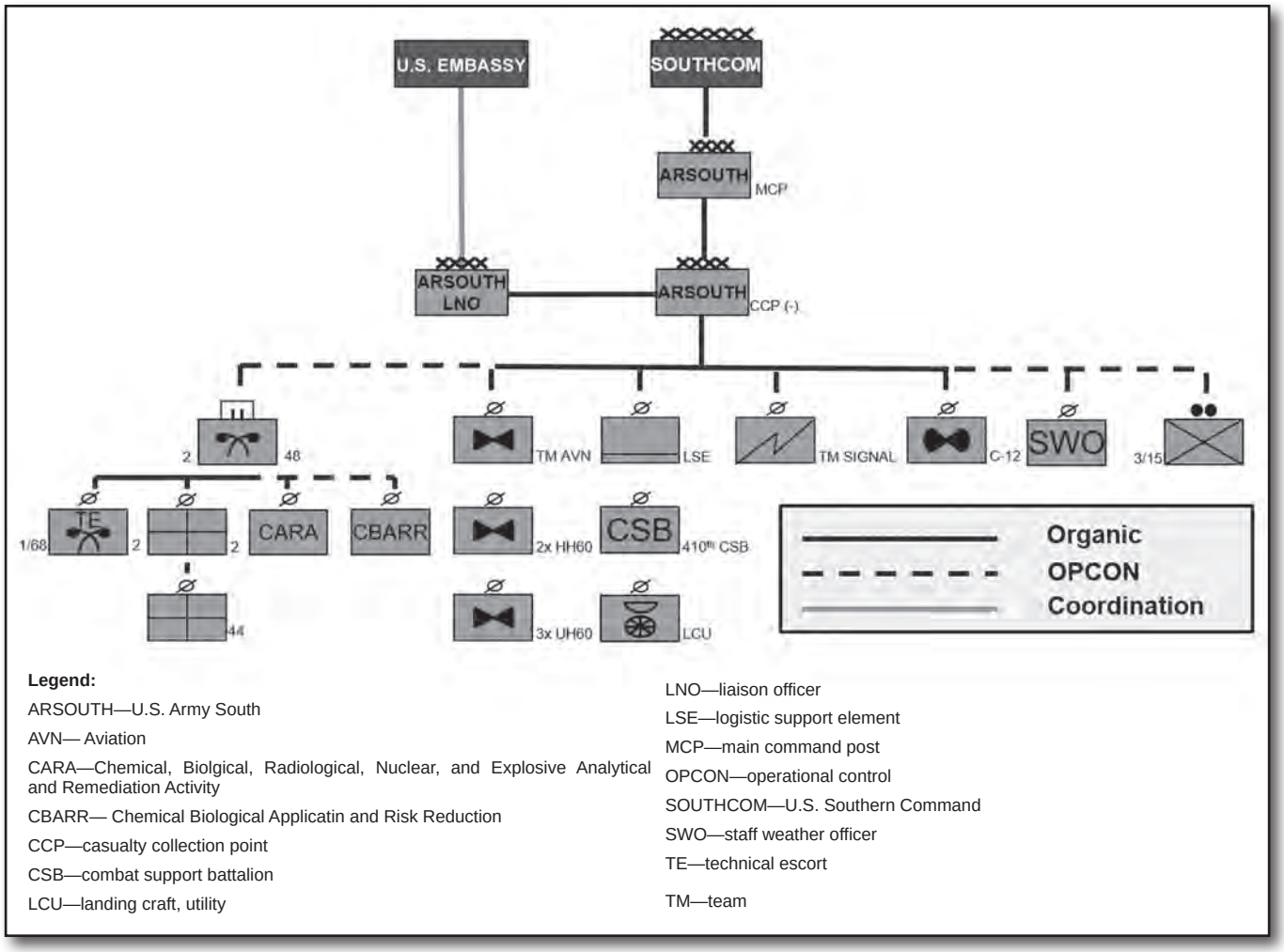
Phase III

In developing plans for Phase III, negotiations with GOP and OPCW were led by DOS with expert participation by the Office of the Secretary of Defense, JPEO-CBD, ECBD, 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 RRE. 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, page 12, 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



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.

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, GOP presented its general plan for destruction to the OPCW Executive Council. The plan called for the use 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 adherence to the joint verification and facility agreement that was approved by the OPCW Executive Council and the general

plan for destruction for San Jose Island. 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 documents submitted by GOP to OPCW and under international 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 CWC and host nation environmental and safety regulations and coordination with GOP 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 RRE; 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.

Endnotes:

[1]James E. Bonner, Commander, 20th CBRNE Command, discussion on the San Jose Island effort, personal communication, 30 December 2017.

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

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Maneuver Support, Sustainment, Protection, Integration Experiment

By Mr. Dennis G. Hutchinson

In 2017, the Army Capability Integration Center (ARCIC) initiated a new, live, prototype experiment venue–the Maneuver Support, Sustainment, Protection, Integration Experiment (MSSPIX). This article describes how government and private-sector organizations can participate in this new experiment.

The venue is one of four integration experiment venues organized under the Army Capability Integration Center Live Prototype Assessment (ALPA) effort. The other three are the Army Expeditionary Warrior Experiment at Fort Benning, Georgia; the Maneuver Fires Integration Experiment at Fort Sill, Oklahoma; and Cyber Quest at Fort Gordon, Georgia. All of these venues are intended to execute an annual assessment of prototype technologies that provide Soldiers with new or improved capabilities. As noted in the *Army Campaign of Learning, Annual Planning Guidance for FY19–23*, "ALPA assesses the recommended solution approaches to solve/mitigate the Army's most critical capability gaps identified in the capability development community's [capability needs analysis]."[1]

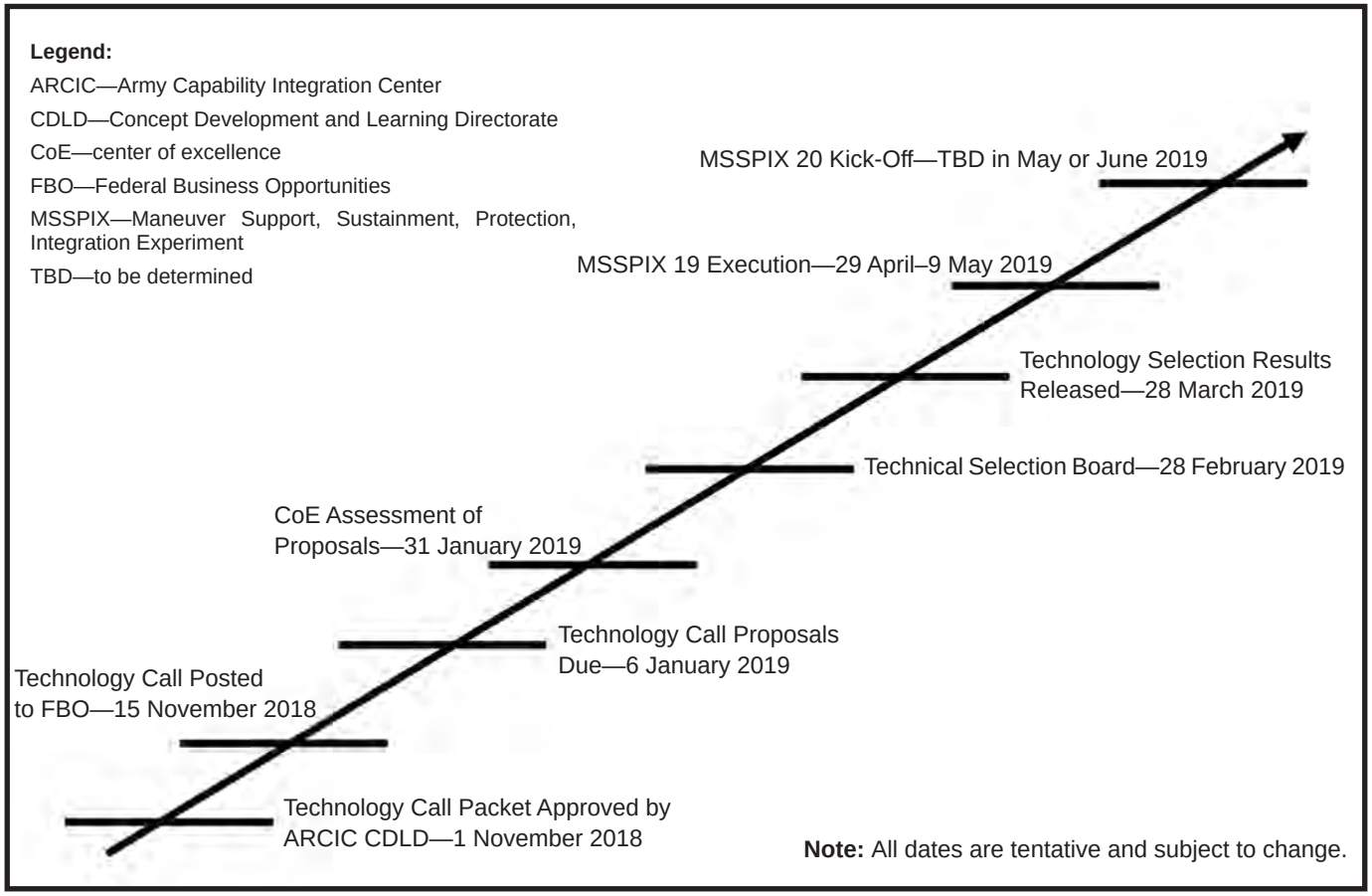
A CBRN Soldier puts an unmanned aerial vehicle into operation.

MSSPIX differs from the other venues; it is a collaboration between the Maneuver Support Center of Excellence (MSCoE), Fort Leonard Wood, Missouri, and the Sustainment Center of Excellence (SCoE), Fort Lee, Virginia. Both centers of excellence leverage their battle laboratories (the Maneuver Support Battle Laboratory [MSBL] and the Sustainment Battle Laboratory [SBL], respectively) to plan, execute, and report/document the experiment each year.

A crawl-walk-run approach was adopted to build MSSPIX. The "crawl" phase, which was executed in 2017, was led by the U.S. Army Training and Doctrine Command (TRADOC) Capability Manager–Maneuver Support. This effort consisted of six individual experiments simultaneously conducted at Fort Leonard Wood. The results were captured in a single report. Some of the assessed technologies included a fire control system, leader-follower technology, an explosive ordnance disposal common robotic system, and a training package for operation of a base camp.

In 2018, responsibility for planning and execution at MSCoE shifted to MSBL. MSBL personnel introduced the "walk" phase. U.S. Army Research, Development, and Engineering Command and Engineer Research and Development Center, U.S. Army Corps of Engineers, elements were asked to provide research or engineering efforts that were mature enough for a prototype assessment and appropriate for the venues and proponents involved. The elements also needed to be willing to provide resourcing for inclusion in the assessment.

By the execution on 3 April 2018, nine technologies from the government and private-sector organizations were included in the experiment. The capabilities assessed included the integration of chemical, biological, radiological, and nuclear (CBRN) sensors on robotic platforms; an additive manufacturing capability used to build structures; software to enable the informed identification of base camp and airfield site selection; software to aid in planning the design and operations of base camps; a remote bridge assessment tool; and a render-safe technology for explosive ordnance disposal Soldiers. Additionally, there was one technology that leveraged the venue for the conduct of a limited objective assessment. This limited objective assessment was included on short notice at the request of the Requirements Determination Division, Capabilities Development and Integration Directorate, MSCoE.



Draft timeline for MSSPIX 2020 future operations

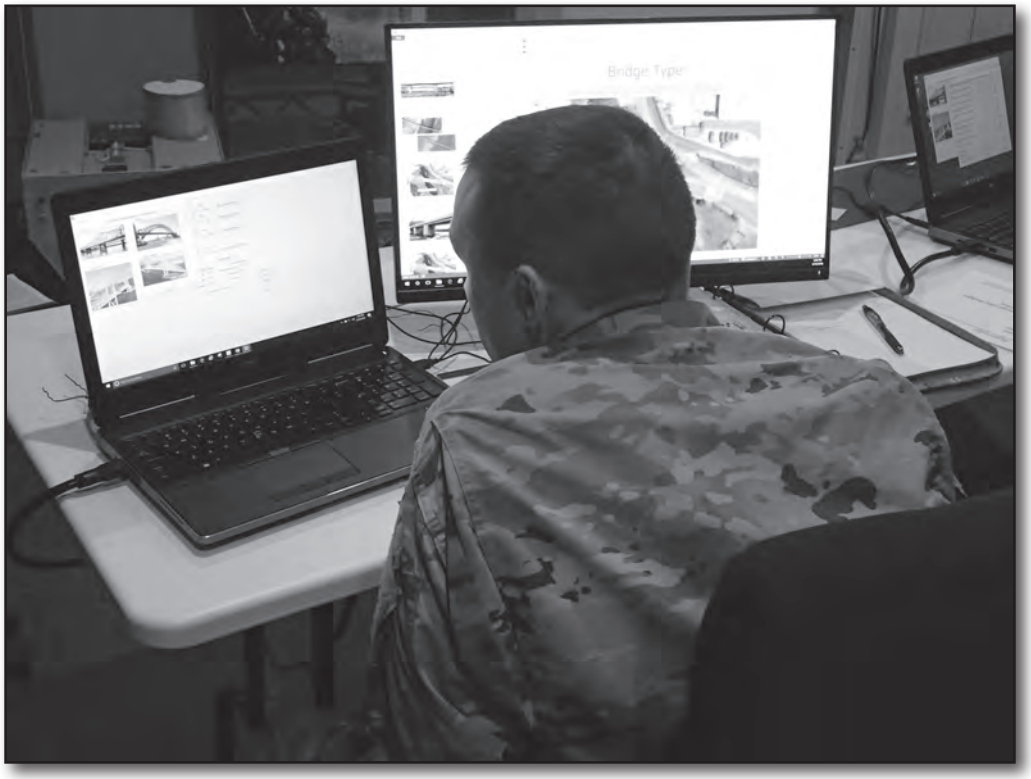
The "run" phase, MSSPIX 2019, will be executed in April 2019 at Fort Leonard Wood. In October 2017, the Concept Development and Learning Directorate, ARCIC, sought proposals and sent a technology call memorandum through formal channels to Army organizations. The U.S. Army Contracting Command, Redstone Arsenal, Alabama, then posted a Broad Agency Announcement to the Federal Business Opportunities Web site at <www.fbo.gov>, seeking proposals from the private sector. Currently, MSSPIX 2019 is slated to assess 26 technologies—15 from government organizations and 11 from private-sector organizations.

For MSSPIX 2020, the desire is to sustain the process to receive proposals and conduct technology selection activities. The five overarching experiment objectives, which will remain unchanged, answer the following questions:

1. How does the Army better enable Force 2025 and Beyond Soldiers to understand the operational environment (conditions, circumstances, and influences) in support of the employment of capabilities that enable commanders' decisions? (MSCoE)
2. How does the Army conduct shaping activities to influence the local population, enemy forces, and other actors as well as the terrain within the operational environment? (MSCoE)
3. How does the Army better mitigate the effect of obstacles designed or employed to impede freedom of movement? (MSCoE)
4. How can maneuver support forces be better enabled to provide enhanced technical protection capabilities? (MSCoE)
5. How does the Army provide the capability to extend endurance and operational reach, increase operational readiness, reduce demand, and execute responsive sustainment to widely dispersed units in support of multidomain battle operations? (SCoE)

Although the objectives never change, the desired focus areas are subject to change each year based on changing priorities. The focus areas provide technology providers with a clearer view of what MSCoE and SCoE are interested in assessing. As an example, gap crossing could be a focus area under Objective No. 3 above.

The execution date for MSSPIX 2020 has not been determined but will likely fall in the April–May 2020 timeframe. After the technology call memorandum is signed by the Concept Development and Learning Directorate, another Broad Agency Announcement will be posted to the Federal Business Opportunities Web site by the Army Contracting



An engineer Soldier works with the Remote Bridge Assessment Tool.

Command. This is expected to happen in October or November 2018. For private-sector organizations that have search filters set to monitor postings, the recommended subject will be "MSSPIX 20 Technology Call." Additionally, the North American Industry Classification System code previously used was 541 (Professional, Scientific, and Technical Services)/541990 (All Other Professional, Scientific, and Technical Services).

To participate in MSSPIX, technology providers (government or private-sector organizations) can expect to incur travel expenses for their organization to attend limited planning events and the assessment, costs for the development and delivery of training for their users to fully understand the technology, costs associated with attaining a safety release, and shipping costs to transport the technology to the assessment location. As a general practice, safety releases require funding only if an item requires testing. Testing may be avoidable if the U.S. Army Test and Evaluation Command, Aberdeen Proving Ground, Maryland, is provided sufficient information from historical records to assess a technology. The MSSPIX team will connect technology providers with points of contact in the Army Test and Evaluation Command early in the current-operations stage. The assessment and analysis, as well as access to Soldiers who will use the technologies, are provided at no cost to technology providers. Building the assessment is a cooperative effort between the MSSPIX team, technology providers, and technology sponsors. A sponsor (typically a TRADOC representative from a center of excellence/capability developer) represents Soldiers employing a capability.

It's important to note that MSSPIX is not a test. In Army acquisition language, tests are used to support acquisition decisions. While testers can certainly leverage MSSPIX results, this does not alleviate developmental or operational testing requirements. MSSPIX will not provide a comparative analysis of systems, regardless of their status (fielded Army equipment or capability from the private sector.)

In summary, if you have a technology that you believe is a good fit for MSSPIX and would like for it to be used by Soldiers during an assessment, watch for the technology call each fall on the Federal Business Opportunities Web site. While there are some limits to what can be assessed, every attempt is made to accept all proposed technologies that show a clear alignment to the experiment objectives and subordinate focus areas.

Endnote:

[1]TRADOC, *Army Campaign of Learning, Annual Planning Guidance for FY19–23*, 18 October 2017, p. 7.

Mr. Hutchinson is a capability development experimentation analyst for MSBL, Fort Leonard Wood. He holds a bachelor's degree in business administration from Columbia College, Missouri; a master's of business administration degree from Webster University; and a master's degree in project management from Western Carolina University, North Carolina.

Gas Chromatography/Mass Spectrometry

By Warrant Officer One Brian W. Moore

If you belong to an agency that responds or reacts to chemical hazards, you understand the importance of equipment and technology that provide the best chance of success in identifying unknown compounds. This article discusses the importance of the gas chromatograph and mass spectrometer as tools in chemistry and the technology that makes them important.

A gas chromatograph and mass spectrometer are two different instruments connected by a transfer tube. The process starts with gas chromatography, an analytical technique used for compound mixtures. The gas chromatograph separates the mixture and identifies the compounds. The fairly short process involves heating the mixture to its boiling point and adding about 1 microliter of a normal solvent such as acetone, cyclohexane, or even water. The solvent is added to the mixture with a syringe through the insertion column of the gas chromatograph. When the solvent enters the insertion column, it is vaporized. (Each compound in the mixture will reach its boiling point and become a gas.) The solvent, now a gas, is pushed to the next phase of the process by an inert gas such as helium or hydrogen so as not to affect the signature of the compound. The inert gas pushes the vaporized material through a coil (a spiral tube that looks something like a slinky).

The boiling point for each substance relates to the order the substances flow through the coil. The coil serves as a means to separate the mixtures as they flow; molecules of the same size and weight travel together. They are collected at the end of the coil and matched to known substances through an internal database. The resulting information is displayed as a chart or spectrum, with peaks and valleys depicting the amount of substance.

The limitation of this analysis is that the spectrum is based on how much of the substance actually reaches the detector. The purity and volume of the substance could affect the accuracy of the match. The gas chromatograph is a great tool for separating compounds, but is not reliable for identifying materials by itself. Pairing data collected from gas chromatography with that collected from mass spectrometry provides the most reliable results.

A pure gas sample is required in order for the sample to be analyzed by the mass spectrometer, which ionizes the molecules and identifies the ions produced. This is the amazing part of the process; the mass spectrometer can determine what is in the mixture based on the charge/mass ratio. It sounds like a confusing process; but once we break it down, it becomes clearer.

Connecting the mass spectrometer to the gas chromatograph with a transfer tube supplies the mass spectrometer with the necessary pure sample. The temperature of the inlet chamber is maintained at about 400°F to keep the sample in a gaseous state. When the sample enters the ionization chamber, it is hit with a beam of electrons to break apart the element and give it a positive charge. This creates an ionized particle of the original element that is sent on its way at an accelerated rate through the transfer tube. The bigger the mass of the particle, the faster it moves along the tube. The path on which the particle is traveling starts off straight, and the particle builds up speed based on its mass. The particle reaches the curved portion of the tube, and a magnet pushes the particle around the curve. Lighter particles turn the curve faster and are picked up by the detector. Heavier particles travel wider around the curve and end up on the other end of the detector. The force in which the particle travels is called the charge, and where it makes the turn on the curve is due to the mass. The magnet pushes lighter particles around faster. Think of the curve as nothing more than a turn for your vehicle. A heavier vehicle is harder to turn and takes longer to get around a turn or curve. Therefore, a heavier particle goes a little farther before it is pushed around the curve by the magnet.

The final location of the isotope on the detector is used to determine the identity of the sample. The more fragments that end up in the same spot, the higher the peak on the mass spectrum.

The problem with mass spectrometry is that if the particles get too close together while traveling, they could combine and form a new particle, which could give a false reading on the mass spectrum. The mass spectrometer also requires frequent calibration for continuous use. Furthermore, if the

(Continued on page 20)

CBRN Operations Force Modernization Strategy– A Pathway to the Future

By Colonel Scott D. Kimmell (Retired)

As the Chemical Corps enters its second century of service in the U.S. Army, we must review our past and develop new concepts to guide our next century of service. Our past is replete with developing incremental improvements to core chemical, biological, radiological, and nuclear (CBRN) operations capabilities with little departure from established norms or practices. We address the CBRN threat as we have the last 100 years, through the capabilities of avoid, protect, and decontaminate. These three insular capability areas provide, in linear fashion, a focused reaction to an adversary action. Hazard avoidance focuses on the detection of existing hazards to identify CBRN "obstacles" and navigate the safe passage of forces. Protection, our most developed capability, leverages cumbersome, physical-barrier material to shield forces from a hazardous environment. Decontamination still requires water and pressure to remove contamination. While changes in military doctrine and technology have advanced to meet evolving threats, CBRN operations have remained virtually unchanged over the past 100 years. It is time for us to change how we view the threat.

As stated in the Chemical Corps mission statement, we exist to enable movement and maneuver to conduct large-scale, ground combat operations in a CBRN environment.[1] The desired end state consists of friendly forces retaining freedom of action in a CBRN environment. The capabilities currently provided by our Corps are not congruent with those required for movement and maneuver forces to be successful in their mission in a CBRN environment.

The latest edition of Field Manual (FM) 3-0, *Operations*, and the Army concept of multi-domain operations outline several new characteristics that are paramount to success against peer adversaries.[2] We must understand how the Army intends to fight into the future and match the development of our core capabilities to ensure success in a CBRN environment. We must provide commanders with the ability to leverage the qualities of assess, protect, and mitigate to make proactive, risk-based decisions in a CBRN environment.

As part of the Army's modernization efforts, the *CBRN Operations Force Modernization Strategy*, patterned after the *Maneuver Force Modernization Strategy*, provides the critical modernization path for our CBRN formations and capabilities in support of our primary customer—the brigade combat team—in the execution of decisive-action operations, ultimately closing with and defeating the enemies of our Nation on any battlefield in any environment.[3, 4] This path meets near-term requirements and modernized CBRN operations capable of supporting brigade combat teams and echelons above brigade conducting combat operations in complex CBRN environments.

Modernization Construct

The purpose of the force modernization strategy is to modernize CBRN operations capabilities. These capabilities will support the Army (and land component) to conduct cross-domain maneuver, fight semi-independently, and execute continuous cross-domain reconnaissance and security as part of the joint force. The core capabilities are enabled by CBRN reconnaissance, contamination mitigation, and the CBRN staff. These capabilities are linked together by our core functions—assess, protect, mitigate—across the spectrum of science and technology; concepts; and doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy (DOTMLPF-P).

The *CBRN Operations Force Modernization Strategy* balances modernization and readiness, providing immediate improvements to near-term readiness and a bridge to long-term modernization across our core competencies and capabilities. Enabled by a new requirements determination process and existing programmatic procedures (the Army Requirements Oversight Counsel, the Army Requirements and Resourcing Board, the Joint Capabilities and Integration Development System), the *CBRN Operations Force Modernization Strategy* guides the Army Program Objective Memorandum (POM) and the Joint Chemical Biological Defense Program POM to expeditiously achieve evolutionary and revolutionary capabilites to close capability gaps and reduce risk for the joint force to operate successfully in the complex CBRN environment of the future.[5]

Future CBRN Operations Required Capabilities

The use of weapons of mass destruction (WMD) is increasing, with no indication that the trend will change in the future. We have witnessed the suspected surgical employment of WMD in assassinations on two continents and in large scale to kill large populations. Current and future adversaries continue to develop and maintain formidable stockpiles of WMD. Countries are researching, developing, and pursuing nuclear capabilites of varying

degrees. Nonstate actors continue to pursue proliferation agendas, making the use of WMD a global challenge in many areas involving U.S. interests. We must prepare to operate in this complex environment while maintaining our freedom of action to achieve political, strategic, operational, and tactical objectives.

To achieve freedom of action, increase lethality, and enable movement and maneuver in the execution of large-scale, ground combat operations in the complex CBRN environment, the following future CBRN operations capabilities are required:

- **Real-time understanding**. As early as possible, create a functionally integrated framework that enables commanders to achieve the level of understanding required to make informed, risk-based decisions to protect the force while retaining freedom of action in a CBRN environment. The force requires—
  - Expanded access to all sources of information and the integration of CBRN information requirements into a commander's intelligence, surveillance, and reconnaissance collection plan.
  - A CBRN-centric sensing and detection capability integrated with all source information receptors and collectors.
  - The capability to assess and analyze information from intelligence, surveillance, and reconnaissance sources to establish knowledge of CBRN threats and hazards in the operating environment.
  - Machine learning and artificial-intelligence tools to help commanders and staffs determine the behavior threat patterns and operations that typically precede CBRN use.
  - The capability and capacity to analyze and integrate decision support products into the commander's decision cycle to provide a risk-based, real-time understanding of a complex CBRN environment.
  - The capability and capacity to exploit information to create windows of opportunity and advantages against adversaries.
- **Inherent survivability**. Individually and collectively enable with integrated protection. The force conducts large-scale, ground combat operations without degradation in a CBRN environment. The force requires—
  - Integrated personal protective equipment and physiological monitoring to protect from CBRN threats and hazards without physical degradation or loss of combat effectiveness.
  - Adaptive collective protection that allows mission command and medical activities to sustain operations without individual personal protective equipment in a CBRN environment.
  - Vaccines to protect the force from known chemical and biological hazards to reduce reliance on individual protective equipment and collective protection.
  - Flexible and adaptable protection options against biological agents, leveraging an understanding of the operating environment and atmospheric conditions.
- **Negation of hazard effects.** Provide commanders the flexibility to make risk-informed decisions on the mitigation of residual CBRN contamination without reduction of combat power or unnecessary expenditure of time and resources. The force requires—
  - Organic/crew level mitigation capabilities that allow first-line leaders to assess and mitigate contamination at the lowest level, focusing on reducing risk to their squads and crews without reliance on CBRN enablers.
  - Automated and waterless mitigation capabilities to reduce the logistical burden and increase the responsiveness of CBRN enablers.
  - Forward diagnostic capabilities coupled with therapies to reduce reliance on specialized medical enablers and to maintain forward combat power.

These capabilities and the learning associated with their employment serve as pathways for the modernization of CBRN operations capabilities and achievement of freedom of action in a CBRN environment. These capabilities must be applicable across the range of military operations, against adversaries, and in all environments. While the goal is to prevent the force from operating among CBRN hazards through a robust understanding of the CBRN environment, we must be prepared to operate in a CBRN environment and exploit future adversary use of WMD.

Conclusion

The mission of the Chemical Corps now and in the future will be to enable movement and maneuver in the execution of large-scale, ground combat operations in a CBRN

environment. Across our three core functions of assess, protect, and mitigate, we will generate near-real-time understanding of the CBRN environment, provide integral protection at individual and collective levels, and negate CBRN hazard effects, thus facilitating assessment, protection, and mitigation of CBRN hazards at a distance and in stride with no degradation to operations. The desired end state is retaining freedom of action through movement and maneuver in the complex CBRN environment.

To achieve this end state, we must provide near-real-time understanding of the CBRN environment. We must also expand our sources of information beyond traditional means. CBRN-centric sensing and detection capability must be integrated with all-source information receptors and collectors to conduct holistic assessments of available information and to develop trends. Achieving near-real-time understanding of the CBRN environment may not negate the requirement to operate in a known CBRN hazard; thus, integral protection from the individual to collective level is paramount to mission success. The force must be able to freely operate in a CBRN environment rather than avoid it. This allows the force to exploit opportunities currently considered vulnerabilities. And as a consequence of operating in a CBRN environment, residual contamination must be mitigated effectively, efficiently, and expeditiously.

Fundamental to accomplishing our modernization strategy is a vigilant focus on what we are for and who we support—enabling movement and maneuver in the execution of large-scale, ground combat operations in the complex CBRN environment to 2028 and beyond. The strategy provides vision and direction for modernizing CBRN operations and countering WMD capabilities to meet the requirements for movement and maneuver formations executing large-scale, ground combat operations. The strategy will be continuously assessed and adjusted to meet the demands imposed by changes in funding, the operational environment, and senior-leader priorities. In doing so, the strategy maintains relevancy and serves as a useful guide for future senior-leader decisions.

Endnotes:

[1]U.S. Army Chemical, Biological, Radiological, and Nuclear School Web site, "Chemical Corps Mission," <https://home.army.mil/wood/index.php/units-tenants/USACBRNS>, accessed on 7 November 2018.

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

[3]*CBRN Operations Force Modernization Strategy*, July 2018.

[4]*Maneuver Force Modernization Strategy*, January 2018.

[5]*CBRN Operations Force Modernization Strategy*.

Colonel Kimmell (Retired) is the deputy commandant of the U.S. Army Chemical, Biological, Radiological, and Nuclear School. He retired from the U.S. Army and has more than 32 years of combined military and federal service. He holds three master of science degrees, including a master's degree in military arts and science from the School of Advanced Military Studies, Fort Leavenworth, Kansas.

("Gas Chromatography . . . ," continued from page 17)

vacuum pressure in the ionization chamber is off, a false reading could result. An even bigger issue is that, due to the complexity of the mass spectrum, a trained professional is usually required to make an educated guess regarding the data produced. A typical worker cannot read the data and distinguish between a false reading and a true reading.

The need for portable gas chromatography/mass spectrometry technology was identified in the late 1990s, when teams were developed for weapons of mass destruction response. The problem with the laboratory gas chromatographs/mass spectrometers was that a chemist with years of experience in working with the technology was required in order to interpret the results. So a portable version was developed. The early portable versions were good, but not nearly as sensitive as laboratory systems—and the users were not as well trained as chemists.

The most common instrument that uses portable gas chromatography/mass spectrometry technology is the Hazardous Air Pollutants on Site (HAPSITE®) portable gas chromatograph/mass spectrometer. Over the years, HAPSITE has been modified and updated with new ovens, vacuum pumps, and detectors to bridge the gap with the laboratory version. The equipment has become lighter, more sensitive, and more user friendly. Different versions and updates of HAPSITE have been produced since 1996, with the last update in 2008. One major downside to this technology is cost; depending on the version, a portable system costs $110,000 to $135,000 to purchase and the annual maintenance cost is $5,000 to $7,000. (Again, the equipment requires frequent calibration to ensure accurate results.)

Gas chromatography/mass spectrometry is one of the most important technologies in the field of chemistry. It has become the gold standard for identifying mixtures and isotopes in the field. The technology is a big part of weapons of mass destruction response and everyday police work. It is used for forensic work in the United States and abroad on a daily basis. With advances in the field, we can only imagine the potential benefits of this technology for years to come.

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The Significance of the First Army Broadening Experience

By Captain Jeffery R. DeVaul-Fetters and Captain Avery D. Fulp

The Army National Guard (ARNG) is the only branch of the military whose existence is required by the Constitution, and the U.S. Army Reserve (USAR) is composed of a select group of Soldiers who dedicate a portion of their time to serving our Nation. In the beginning, these Soldiers were not just Soldiers; they were builders of homes, churches, schools, and businesses. They provided the foundation of what would become the United States. Both of these institutions provide citizens an opportunity to serve in the military while contributing to the same communities in which they serve. As a vital part of the total Army, these institutions integrate skills, abilities, and attributes from the civilian sector and the battlefield, providing synergy for both.

When Soldiers discuss broadening, they often think of assignments outside the Army as ideal developmental assignments that build leaders who can interact with organizations outside of the Army, whether civil servants, members of the other Services, or representatives of foreign governments. As such, broadening in its most effective form expands thought.

It is worth examining the value of assignments that integrate the Army as a total force, and there is no better unit to examine than First Army. The First Army mission involves the integration of the Army Total Force Policy (ATFP). ATFP directs the integration of the U.S. Army, ARNG, and USAR as a total force. We refer to these entities as components (Active Component and Reserve Component). The partnership construct provides observer, coach, trainers (OCTs) from the Regular Army, ARNG, and USAR the opportunity to gather observations and lessons learned while advising and assisting ARNG and USAR Soldiers.

First Army provides an intellectually demanding assignment that requires an understanding of both components. It is not uncommon to see detachments of ARNG or USAR Soldiers integrated into Regular Army teams. In order to effectively integrate the components, it is necessary to develop leaders who understand both components.

An OCT with the 157th Infantry Brigade teaches a mortarman with the 1st Battalion, 296th Infantry Regiment, Puerto Rican Army National Guard, how to adjust the aim on a mortar system. U.S. Army photograph by Sergeant Jarred Woods.

We offer the following suggestions for First Army leaders to support the organizational development, manning, and training of Regular Army, USAR, and ARNG units as an integrated force:

- Accomplish the mission as a team.
- Develop cultural connections and mutual respect.
- Build a bond through connection.
- Communicate effectively.

Accomplish the Mission as a Team

The Army values great teams over individuals. In order for ATFP to be successful, the star of the show must be the

team. However, this is difficult for leaders to achieve. In order to ensure team success, managing the differences in culture, egos, professional background, skill, and other dissimilarities is crucial.

To become a true team, leaders must identify and integrate individual elements from the different components. Leaders must assist those individual elements in thinking in terms of "us," rather than "them." Teaching individuals to put the welfare of the team ahead of their own can be a challenge when the natural instinct is to watch out for your own.

As the Army becomes more complex and times become exceedingly competitive, the free exchange of knowledge, experience, and new ideas with others throughout the Army becomes crucial for success. First Army provides leaders with the opportunity to gain experience and become comfortable integrating the components.

Develop Cultural Connections and Mutual Respect

The OCT role requires developing the proper tact when communicating with USAR and ARNG units during after action reviews. An OCT is responsible for improving the readiness of ARNG and USAR units. First Army has established the Total Force Partnership Program, which allows its units to become familiar with assigned partners and promotes effective and innovative methods to connect with USAR and ARNG partners. The partnership also enables OCTs to develop lasting relationships with USAR and ARNG units, which facilitates shared learning. Integrated training allows ARNG and USAR commanders the ability to provide predictable, recurring, and sustainable capabilities to combatant commanders globally.

One of the overarching goals of an OCT is to reduce the overall number of postmobilization training days for USAR and ARNG units. This is possible by working directly with partner units to help develop a training plan that enables effective utilization of training time during limited battle assemblies throughout the calendar year. When OCTs understand the challenges and time constraints of partner units, they provide better input and feedback to enhance training plans. Demonstrating an understanding of the supported unit challenges and strengths allows an OCT to effectively improve readiness, facilitate shared learning, and earn the respect of partner units.

Build a Bond Through Connection

Connecting the different components stimulates imagination and allows us to see ourselves from diverse fields of knowledge. The Army's core value of respect is derived from the Golden Rule: "Treat others the way you would want to be treated." This maxim takes us away from ourselves and toward what we can learn from others. It requires that we imagine ourselves in others' shoes. Soldiers are more likely to buy into the team concept if they feel that their voice is heard and respected. This is especially true of the First Army experience, where Regular Army, ARNG, and USAR Soldiers work together daily.

An OCT from the 4th Cavalry Brigade, First Army Division East, advises and assists Soldiers from the 10th Mountain Division during a recent training event. U.S. Army photograph by Staff Sergeant Stephen Crofoot.

The Army requires the development of leaders who understand and can balance the needs of Soldiers in both components. The normal training year for ARNG and USAR units is 39 training days, but units identified as priority units receive 45 days in the second year and 60 days in the third and fourth years. Although readiness is the No. 1 priority, the increased readiness requirements require leaders who can balance the needs of the Regular Army and Reserve Component Soldiers, Families, and employers.

Major General Todd McCaffrey, right, commanding general of First Army Division East, meets with Army Reserve Captain Ciera Jackson, commander of the 208th Transportation (Palletized Loading System) Company during Combat Support Training Exercise 91-17-03. U.S. Army photograph by Master Sergeant Anthony L. Taylor.

It is important for leaders to communicate in a manner that allows some predictability for Reserve Component Families and employers. For leaders in positions that require the management of the cultural differences of the components, this can be more art than science—and it normally requires a higher degree of trust, openness, and risk. ATFP integrators must understand this distinction and plan accordingly.

OCTs assigned to the 4th Cavalry Multifunctional Training Brigade conduct recertification training at Fort Knox, Kentucky. U.S. Army photograph by Sergeant Rakeem Carter.

Respect and goodwill strengthen the bond of those who are led and facilitate strong communication up and down the chain.

Communicate Effectively

The ability to communicate effectively with Soldiers in either component starts with trust. In order to build trust, the message must be consistent. When a leader receives a constant flood of information, it can be difficult to distinguish what is important and relevant from what is unimportant. Consequently, important, relevant information is sometimes missed. Leaders must identify priorities and eliminate unimportant information in order to reduce confusion.

Communication is critical to the synchronization of the Total Army, particularly in this time of change. Communication must be clear, concise, and relevant; time is at a premium. Understanding the audience and what and how to communicate are key. Although both components have the same mission, each element is unique. Leaders must be cognizant of barriers in communication—an ability best learned through experience.

First Army provides the opportunity to experience the best communication practices of the components. A breakdown in communication at any point can result in conflict and a slowdown in productivity. In a complex and fast-paced environment, communicating developments and decisions within the broader mission of the Total Army is critical and one of the most challenging requirements.

Conclusion

The total force must be part of the Army strategy and planning phase in order to fulfill the rapidly increasing and dynamic needs of the military. Integration of the components requires leaders who practice openness, build trust, prioritize time, and accept prudent risks. Units require leaders who understand and can build teams and integrate the units with existing cultural norms and subcultures. Failure to understand the differences in the components can have a negative impact on morale and attitudes toward leaders.

Understanding the components does not make integration easy. It requires leaders who appreciate both components, have an ability to identify friction points, and can create solutions to complex challenges. There is no better way to learn the strengths, weaknesses, and nuances of the components than through experience. First Army OCTs are exposed to friction points and diversity of thought on a daily basis. First Army OCTs are the leaders of ATFP and total force integration—and "First In Deed."

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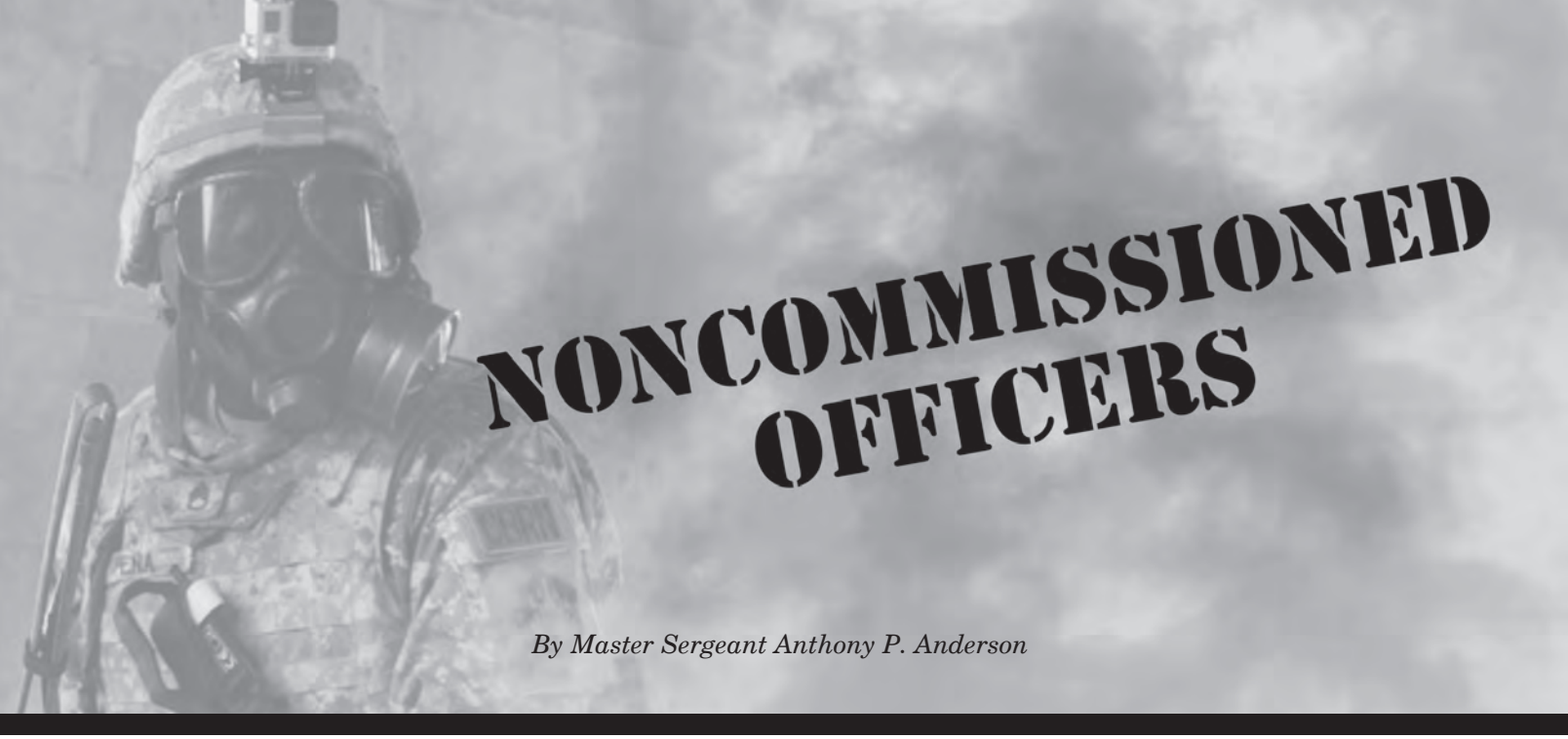
Captain Fulp is the military intelligence team chief for the 1-410 Brigade Engineer Battalion and a Project Warrior candidate. He holds a bachelor's degree in business (marketing) from the University of Southern Mississippi and a master's degree in business and organizational security management from Webster University.



NONCOMMISSIONED OFFICERS

By Master Sergeant Anthony P. Anderson

U.S. Army Reserve (USAR) Command Sergeant Major Ted L. Copeland visited Fort Leonard Wood, Missouri, 19–20 September 2017. He met with Advanced Leader Course (ALC) Class 007-17; U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS); while the class was conducting a situational training exercise with the Incident Response Training Department. The situational training exercise was designed to challenge chemical, biological, radiological, and nuclear (CBRN) Soldiers in their technical skills, specifically in providing assistance to first responders, while responding to a defense support to civil authorities event. Command Sergeant Major Copeland also met with the first CBRN ALC instructor to receive the Gold Instructor Badge, Sergeant First Class Nicole Thomas, 3d Brigade, 102d Training Division. Sergeant First Class Thomas is a USAR Soldier who has been on an Active Duty for Operational Support tour for the last 3 years, supporting the Maneuver Support Center of Excellence Noncommissioned Officer (NCO) Academy to become One Army School System-compliant. Command Sergeant Major Copeland stated that he was extremely impressed with Sergeant First Class Thomas' hard work and dedication.

Command Sergeant Major Copeland also conducted a leader professional development session with USAR Soldiers at Fort Leonard Wood. He discussed the hard work and dedication required to be an NCO and focused on getting NCOs back to the basics of the Corps. NCOs are trainers, mentors, advisors, and communicators. They are the primary trainers of enlisted Soldiers, crews, and small teams. They take broad guidance from their leadership and execute operations in multiple types of environments. NCOs are responsible for maintaining and enforcing standards with a high degree of discipline within formations. As culture and technology change, we must adapt and change with them to effectively communicate with our Soldiers. To maintain a strong force,

we must instill ethics and values in our junior Soldiers and we must be able to effectively communicate with them.

It is a privilege and an honor to lead Soldiers. According to the NCO creed, we have two basic responsibilities of leadership: mission accomplishment and the welfare of our Soldiers. Being an NCO in today's Army is not easy, and it should not be treated as such. Soldiers want to train and follow effective leaders. NCOs need to take ownership, get back to the basics of training Soldiers, and hold these Soldiers accountable, just as we expect to be held accountable by our superiors.

Master Sergeant Anderson is the training development NCO for USACBRNS. He holds a bachelor's degree in military management and a master's degree in emergency and disaster management from the American Military University.

U.S. ARMY INDIVIDUAL TERRORISM AWARENESS COURSE

By Mr. Anibal Melendez

The U.S. Army Corps of Engineers, on behalf of the Department of the Army, hosts the U.S. Army Individual Terrorism Awareness Course (INTAC). Training is located south of Washington, D.C., in Montross, Virginia. The purpose of the course is to enhance the overall antiterrorism and protection awareness posture of attendees through a combination of lectures and hands-on training modules. Attendees include members of the U.S. Army, other U.S. military Services, the Office of the Secretary of Defense, joint staff, military dependents, and contractors (as applicable). Occasionally, personnel from other federal agencies attend as well. The personnel who receive training are considered to be at medium to high risk for acts of terrorism and/or criminal activity relative to their official travel (permanent change of station, temporary change of station, or temporary duty outside of the Continental United States in support of our Nation's foreign policy). By enhancing their overall terrorism and force protection awareness posture, the attendees' ability to prevent, deter, and respond to acts of terrorism and criminal activity is enhanced. The program curriculum meets the mandated training requirements of Army Regulation 525-13, *Antiterrorism*, and policy requirements of the Department of Defense, the U.S. Army, and other Services.[1]

INTAC, which always begins on Sunday, is a 5 1/2 day course that covers an introduction to jihad and terrorism throughout the six combatant commands; surveillance, detection, and route analysis; firearms training and familiarization with weapons systems, including the AK47; evasive and defensive driving; and hostage survival and restraint defeat.

To register for the course, units must contact their school noncommissioned officer or equivalent and fill out the INTAC registration form. The form is sent to the INTAC program manager who registers individuals for the course in the Army Training Requirements and Resource System (ATRRS). Once an individual is registered, he or she receives a registration confirmation for the course. There are 12 INTAC classes per year, with a maximum of 30 students per class (Figure 1).

Endnote:

[1]Army Regulation 525-13, *Antiterrorism*, 17 February 2017.

Mr. Melendez is the antiterrorism officer and INTAC program manager for the U.S. Army Corps of Engineers, Washington, D.C. He can be contacted by e-mail at <anibal.melendez@usace.army.mil> or by telephone at (202) 761-5641.

Class Number	Travel Date	Class Dates
701	3 November 2018	4–9 November 2018
702	8 December 2018	9–14 December 2018
703	5 January 2019	6–11 January 2019
704	2 February 2019	3–8 February 2019
705	23 Februrary 2019	24 Februrary–1 March 2019
706	13 April 2019	14–19 April 2019
707	4 May 2019	5–10 May 2019
708	1 June 2019	2–7 June 2019
709	22 June 2019	23–28 June 2019
710	20 July 2019	21–26 July 2019
711	17 August 2019	18–23 August 2019
712	7 September 2019	8–13 September 2019

Figure 1. Fiscal Year 2019 INTAC Course Dates

A Deadly Shell Game:

Faulty Fuzes and the 4.2-Inch Chemical Mortar in World War II

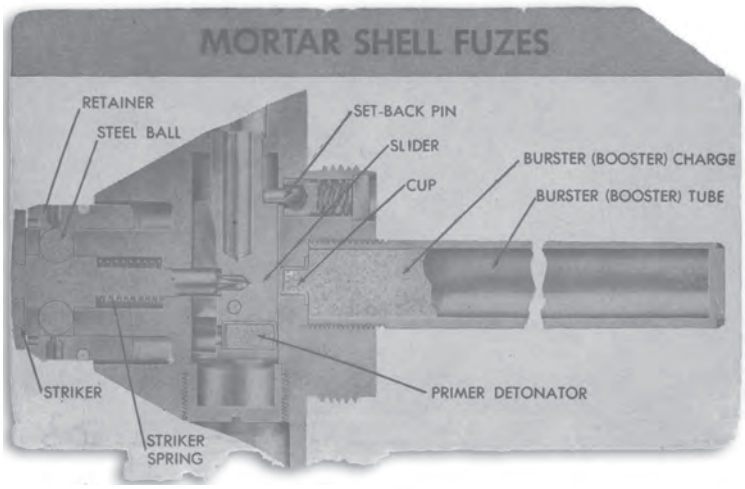
By Mr. Kip Lindberg

At 1430 hours on 2 May 1945 near Torbole, Italy, 3d Platoon, Company C, 84th Chemical Mortar Battalion, responded to a call for harassing fire on enemy positions. Methodically, the men sent high-explosive rounds arching through the air toward targets more than 3,000 yards away. The men had performed fire missions nearly every day of the 502 days they had been fighting in Italy, so this was not unusual—until a round exploded within the tube of Sergeant Joseph Weiler's mortar. The explosion shredded the half-inch, hardened-steel tube, instantly killing Sergeant Weiler and severely wounding two other Soldiers. Surviving members of the mortar crew extinguished the unused powder charges that had been thrown nearby, evacuated the wounded, and recovered Weiler's remains before assisting the other crews in completing the mission. Shortly after, still in shock from the incident, Company C learned through official channels that Adolph Hitler was dead and that all German troops stationed in Italy had surrendered. Hostilities in Italy should have ended 2 1/2 hours earlier.[1]

Sergeant Weiler was the last of 61 men to be killed while serving in the 84th Chemical Mortar Battalion in World War II. This sad distinction was made more tragic when later investigations suggested that he was the last of approximately 38 chemical Soldiers to be killed by the very weapons they served—the 4.2-inch M2 chemical mortar.[2]

The origin of the M2 chemical mortar can be traced back to the first mortar used by the 1st Gas Regiment in World War I, the 4-inch Stokes mortar. The Stokes mortar was a British invention, designed to be man-portable, yet capable of extended operation, delivering quantities of poison gas-, smoke-, or incendiary-filled rounds to distances of up to 1,000 yards. Throughout the 1920s and 1930s, the American Chemical Warfare Service (CWS) evaluated and improved the Stokes mortar and ammunition, eliminated perceived flaws, and improved weapon performance. By 1939, as war clouds formed in the Pacific and once again over Europe, CWS fielded the new M2 chemical mortar. Heavier and more robust than the Stokes mortar, the M2 featured a rifled barrel with spiral grooves that imparted a spin to the mortar round when fired; the spin stabilized the flight of the mortar and increased accuracy.

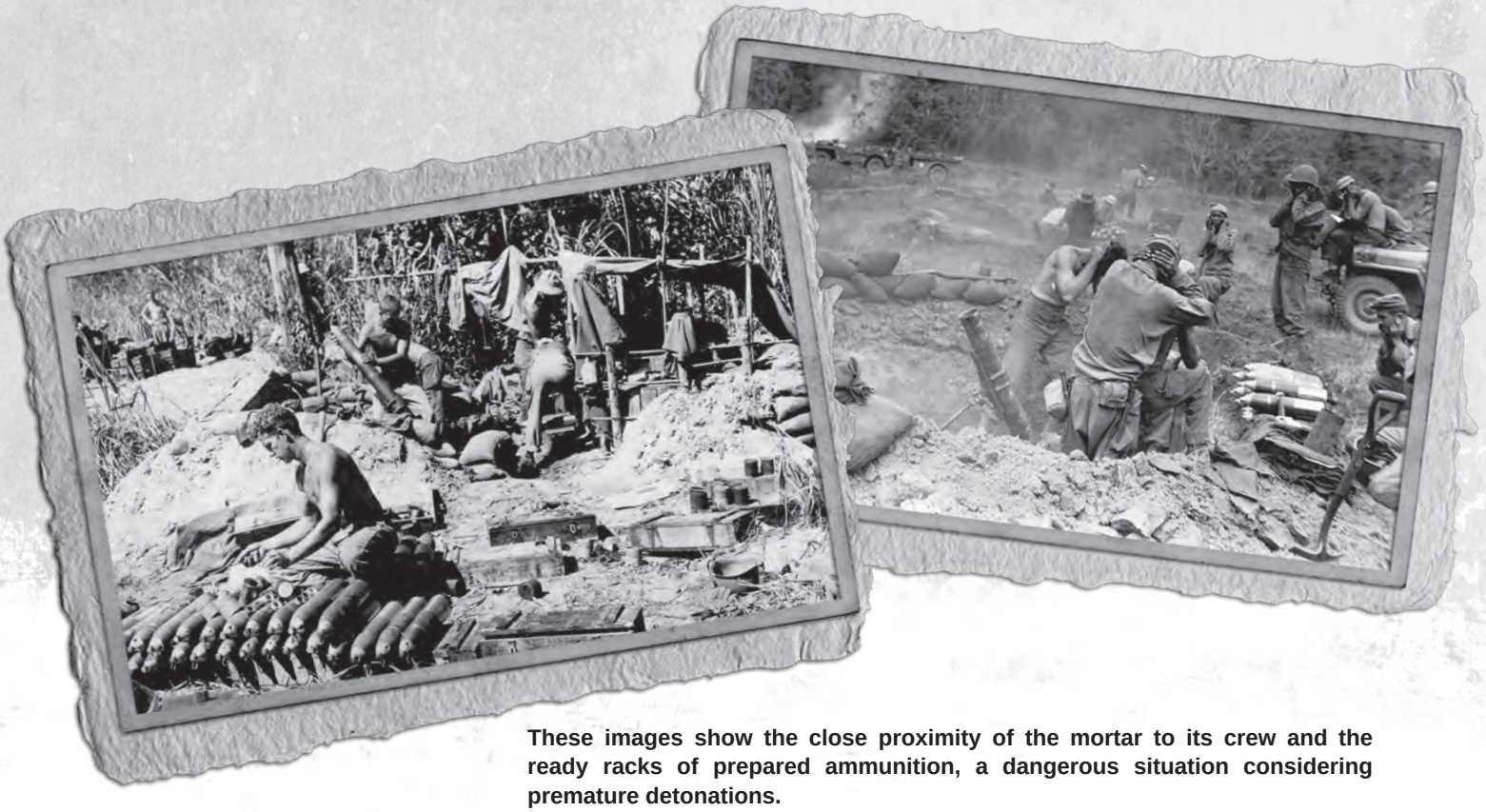
The ammunition was also improved, with a more aerodynamic shape and a brass expansion disc at the base to act as a gas seal, which gripped the rifling on discharge. The interior of the mortar round was separated by perforated panels. The panels allowed the liquid chemical agent fill to slowly move within the round when fired and prevented the liquid from being forced to one side by centrifugal force generated by the spinning flight—a condition that caused the shell to wobble and lose accuracy.



Cutaway diagram of a fuze showing parts suspected in premature explosions

A new form of propellant was also produced. Gone were the small, silk bags of cordite employed by the Stokes mortar; the new American propellant came in small, square sheets, each looking like an individually wrapped slice of processed cheese, but with a 1-inch hole in the center. Squares could be quickly added to, or removed from, a tube on the base of the round, depending on the range of the desired target. Together, these improvements increased accuracy and range, which tripled to 3,200 yards.

Development of the M2 chemical mortar did not end with the entry of the United States into World War II in December 1941. Perhaps the most important addition to



These images show the close proximity of the mortar to its crew and the ready racks of prepared ammunition, a dangerous situation considering premature detonations.

the weapon was one envisioned by Major General William Porter, chief of CWS. While CWS Soldiers were trained and ready to fight on a chemical battlefield, their role on a conventional battlefield was limited. Therefore, in early 1942, Porter ordered the design and production of high-explosive (HE), 4.2-inch rounds. This was done in relative short order, with contracts for production issued to eight private corporations. The new HE round weighed 25 pounds; 8.5 pounds of that was the explosive TNT fill, which gave the projectile a bursting and fragmentation effect greater than that of the standard 105-millimeter howitzer shell, with an effective fragmentation zone of 60 yards in diameter. In the same vein, the propellant was improved, eventually allowing the mortar to reach targets at distances of 4,400 yards, or roughly 2.5 miles.[3]

In operation, the M2 chemical mortar was a straightforward weapon. First, the crew assembled the mortar—setting the baseplate, inserting and pinning the tube breech into a ball socket receptacle in the base, and attaching the bipod standard (which provided the traversing and elevation functions) to the mortar tube. While assembly was underway, the rest of the crew prepared the ammunition for use. Rectangular wooden boxes contained two rounds and cylindrical cardboard containers for the square propellant charges and igniter cartridges, essentially 12-gauge shotgun shells containing a blank charge of powder. Once the mortar was assembled, the crew "laid the gun" by compass and set out aiming stakes to provide the basis for accurate fire. The crew slid full packets of propellant squares on a perforated threaded tube attached to the base of the round, inserted the ignition cartridge into the perforated tube, and screwed a striker cap onto the tube (which covered the cartridge and secured it in the tube). The prepared rounds were stacked nearby, ready for the next fire mission.

When called for fire, the mortar gunner sighted the mortar, corrected the traverse and elevation, and called for the desired number of propellant charges. Depending on his experience, the gunner might consult the mortar table of fire, which delineated the number of propellant charges required at any degree of tube elevation and for any munition type to hit a target at any given range. Responding to the order, the crew removed enough propellant squares to reach the required number. When ordered to fire, a ringed cotter pin was pulled from the nose of the round, removing one of the safety features designed to prevent premature detonation. The round was placed in the muzzle and released; gravity and the weight of the round caused it to quickly slide into the base, or breach, where the striker cap slammed onto the striker pin. The impact transferred through the striker cap onto the ignition cartridge primer, which ignited and exploded the blank powder charge. The blast from the igniter cartridge escaped through the perforations of the threaded tube, igniting the surrounding propellant squares. The resulting explosive gases compressed the brass expansion disc on the base of the round, expanding the edge into the barrel rifling and sealing the windage gap between

the shell body and the grooves of the rifling. Thus, the gas was trapped behind the round, where all of the force was harnessed to propel the round from the tube and toward the target.

The spin imparted on the round by the mortar rifling caused it to rotate, much like a football spirals when thrown, stabilizing flight. A moving retainer, driven down into the nose by the force of firing, severed a shear wire, the second safety feature incorporated into the fuze. A third safety feature (two steel ball bearings fitted into half recesses in the striker body) was released by the movement of the retainer and the centrifugal force of the spinning projectile, allowing the spring-loaded striker to move into the armed position. On release of the third safety feature, the movement of the striker freed a slider to move the primer detonator to a new position directly beneath the striker.

As the round reached the apex of its trajectory, it began to arc, nose down, to the target. Hitting the target, the striker was driven into the fuze to smash the detonator, which was filled with fulminate of mercury, a friction- and impact-sensitive chemical. The detonator exploded, sending the blast down a booster tube extending from the fuze into the shell body, igniting the TNT contained within, and detonating the round. The detonation that was produced using the "point detonating" fuze was nearly instantaneous; the round exploded before it could be buried in the target, throwing razor-sharp fragments in all directions but losing very little blast to ground absorption. Observers referred to this fragmentation blast pattern as its "daisy-cutting" effect.[4]

The rate of fire of the M2 chemical mortar varied greatly based on the crew's level of training, the number of prepared rounds available, and the urgency of the fire mission. Harassing fire might involve firing one or two rounds a minute, while urgent missions might require up to 20 rounds every minute for a short period. For urgent missions, the crew worked furiously, ripping unneeded propellant squares from the rounds and forming a "bucket brigade" to pass the heavy rounds from the ammunition stacks to the mortar. Most often, when the extraneous propellant squares were removed under these conditions, they were simply tossed aside to be recovered later.

The M2 chemical mortar and the CWS battalions that fielded it were first deployed in early 1943 and were slowly accepted by their infantry counterparts who were uncertain as to how a chemical weapon could help on a conventional battlefield. After the first combat operations in Sicily, the CWS battalions and their mortars began to amass a reputation for mobility, quick response to fire missions, and amazing accuracy. The mortars were more maneuverable than artillery in mountainous terrain, their high rate of fire was unparalleled by any other weapon in use, and the combination of white phosphorous and HE quickly made enemy positions untenable. In addition, the maneuverable mortars were adaptable for deployment in landing craft and gliders, making supporting fire available during amphibious and airborne invasions. By the summer of 1944, these men and their mortar had proven invaluable to combat operations in Europe and the Pacific theaters. Standing orders prohibited infantry units from engaging in combat operations without at least a company of chemical mortars attached for fire support. For most of the war, chemical mortar battalions fielded a headquarters detachment and four field companies, each having 12 mortars for a total of 48 mortars per battalion. Because of the urgent and constant requirements for combat support, the companies rarely served together. Instead, they were attached to different infantry commands, sometimes over a 100-mile front. Additionally, because the men and their mortars were deemed essential for combat operations, they could only be pulled from front line support when another company or battalion was available for replacement, a rare instance indeed. Because of this, most chemical mortar units continually remained on the front line, while the units they supported were rotated to the rear for rest and replaced with fresh infantry units. To meet this ever-growing demand for continual support and to provide replacement units to allow battle-weary mortarmen to rotate to the rear, 32 chemical mortar battalions and four chemical mortar companies had been deployed or were undergoing stateside training by the end of the war.

On 13 September 1943, the M2 chemical mortar was included in a demonstration of Army weapons being conducted by the Field Artillery Board at Fort Bragg, North Carolina. After firing several rounds, the crew was stunned when the last round exploded in the air just seconds after leaving the muzzle. Fortunately, no one was injured, the mortar was secured, and the demonstration moved on to other weapons, while the remaining 4.2-inch HE rounds were quarantined for inspection. Questions were asked, and the ammunition lot number was noted so that the munition could be traced back to its manufacturer. A report was sent to the Ordnance Department for investigation.

Just a little more than 2 months later in Italy, where the 3d Chemical Mortar Battalion was heavily engaged in combat, reports began to filter back to battalion headquarters. Over a 3-week period between 23 November and 13 December 1943, five men were killed and 12 were severely wounded by what appeared to be premature detonations of HE mortar rounds at or near the muzzle of their mortars. More questions were asked; and again, lot numbers were recorded and included in a report to the CWS Headquarters in Washington, D.C.

On 15 December 1943, 2 days after the last incident in Italy, another incident occurred at the Assault Training Center, North Devon, England, where Allied troops were being trained for the invasion of mainland Europe. Company C, 81st Chemical Mortar Battalion, was conducting a fire mission under observation of several field grade officers. This time, however, the round in question exploded inside the tube, killing four crew members and wounding six others, including two of the observing officers. The battalion commander, Lieutenant Colonel Thomas H. James, made his report to CWS Headquarters, stating clearly that there

were no obvious reasons for the explosion if not a fault in the HE ammunition used.[5]

With several reports describing similar events in differing locations, but with recurring lot numbers, the CWS Headquarters traced the ammunition in question to that produced by the Erie Basin Metal Products Company. Ammunition in storage and in theaters of combat was ordered impounded until the issue could be investigated. CWS inspectors descended on the Erie Basin Metal plant but could find nothing wrong with the shell bodies being produced there. Meanwhile, inspections of the impounded munitions began to reveal a serious issue with the point-detonating fuzes. Many had been assembled incorrectly. The steel ball bearings that were located in the fuze, and helped lock the striker in the "safe" position until fired were, in many cases, installed incorrectly—and, in some cases, not installed at all. Without these, only a sheer wire prevented the striker from being forced into the fulminate primer and igniting the booster tube, detonating the round. In these cases, the shock generated by the force of firing was certainly enough to force a premature detonation. Production of the fuzes noted was traced to an Erie Basin subcontractor, the National Fireworks Company of West Haven, Connecticut. Production was halted, and corrections were made in the assembly instructions. In addition, a narrow cut was ordered made into all new fuzes; this would allow Soldiers to visually inspect the fuze before firing to ensure the safety ball bearings were in place. Suspect fuzes were ordered impounded for inspection and replacement, seemingly settling the matter.

In March 1944, while conducting a fire mission on the Pacific island of Bougainville, four men of the 82d Chemical Mortar Battalion were killed in action. Although enemy counterfire was initially suspected, the survivors swore there was no enemy fire before or after the explosion; the round seemed to have burst on its own soon after leaving the mortar tube.

On 6 June 1944, the Allied Army invaded mainland Europe, storming five beachheads in Normandy, France. Included in the initial invasion forces were the 81st and 87th Chemical Mortar Battalions, which provided the first land-based, close-fire support for American combat troops. Over the next 2 weeks, these men fired hundreds of missions, using thousands of rounds of 4.2-inch HE and white phosphorous rounds, seemingly without incident. Certainly they were taking losses, but they were due to German mines, snipers, patrols, and counterfire—and that was to be expected. The largest loss to these units came on 19 June, when the men of Company C, 87th Chemical Mortar Battalion, were unloading a truckload of mortar ammunition. The truck exploded in a terrific roar, hurling damaged rounds and parts of the vehicle through the air as far as 500 yards. Twelve men were killed, and at least 24 others were severely wounded. Perhaps it was a lucky enemy mortar or artillery round that caused the explosion, although none of the survivors noted hearing anything before the explosion. Perhaps it was a German landmine, although the truck was stationary at the time.

Soon the 81st and 87th Chemical Mortar Battalions were joined by the 86th and 92d Chemical Mortar Battalions. Through the summer of 1944, the four battalions continued to amass a fine record of action in support of the Allied liberation of France. No further instances of premature mortar round bursts were reported.

On 12 October 1944, Lieutenant Colonel Thomas James, who had commanded the 81st Chemical Mortar Battalion in December 1943 when four of his men had been killed by a premature burst in England, was on recuperative leave in Washington, D.C., having been seriously wounded in the D-Day landing. Visiting a friend in the CWS Headquarters, James asked about his report on the issue with the 4.2-inch mortar rounds and was told that the issue "had been taken care of a long time ago."[6]

A crew from the 897th Chemical Mortar Battalion in Normandy, France, June 1944, drop a 4.2-inch round (the fuze is slightly visible in the muzzle).

A chemical mortar was fired during the Battle of the Bulge, January 1945, with a stack of sand bags enclosing the mortar, protecting the crew from premature detonations. The number of empty shipping tubes shows the volume and urgency of the mortar fire requested.

Meanwhile, additional chemical mortar battalions were undergoing training for overseas service. The 80th Chemical Battalion, Camp Swift, Texas, was conducting firing on 17 October 1944, when two men were killed and 11 wounded by an HE round that exploded just a few yards from the muzzle. Two similar incidents occurred at Camp Shelby, Mississippi, the following month, killing three and wounding four. One of these involving a platoon from B Company, 93d Chemical Mortar Battalion, occurred on 10 November. Hearing a loud explosion, Second Lieutenant George Poos ran to the mortar position, which was enveloped in smoke and flames. Jumping in among the discarded propellant charges, which had been ignited by the blast, Poos dragged two injured men from the flames surrounding a stack of prepared HE rounds and began administering first aid.[7]

Another training explosion at Fort A. P. Hill, outside Petersburg, Virginia, cost the lives of two CWS officers and severely wounded another. With the issue of fuze safety balls seemingly fixed, were these explosions the result of faulty fuzes that were still in circulation or were there other issues?

In December 1944, after the initial success of the Allied liberation of France, the war in Europe began to stagnate. In Western Europe, the Allied advance was severely limited by an ever-increasing unsustainable supply line. In Italy, the advance was blocked by strong German resistance in the mountains. The onset of winter, which would be the coldest on record for nearly 50 years, added to the struggle; the Allied Army seemed content to hold in place until warmer weather arrived.

On 16 December, the calm was shattered by a German counteroffensive launched through the frozen Ardennes forest of Luxemburg and Belgium. Called Operation *Wacht an Rhein*, the German assault was meant to split the American and British armies and allow the Germans to seize the Allied supply port of Antwerp. In what would become known as the Battle of the Bulge, the German attack caught the Allies by surprise. The Allied lines broke, and it was a race to establish a new line of defense to limit the German breakthrough.

The men and mortars of CWS were key to the Allied defense. Over the next month, the mortarmen fought in subzero temperatures, without proper winter clothing, and fired at all points of the compass as the German offensive encircled them. Urgent requests for supporting fire against German infantry and armor were a constraint on the mortarmen, as was the reoccurrence of muzzle and tube bursts.

For the mortar units fighting in the Battle of the Bulge, trouble with the rounds was suddenly a near-daily occurrence. Not only were the HE rounds again exploding too soon and with fatal effect, but now the white phosphorous rounds were also becoming an issue, with many developing cracks when fired. During flight, the white phosphorous left a flaming trail that pointed back to the mortar position. The men's morale, already shaken by the shock of the German attack and the horrible winter weather, was further challenged by the uncertainty of whether or not the next round fired would bring their own death. The two options were to cease mortar support until the issues could be corrected or continue to provide the supporting fire that was so desperately needed.

In truth, the only option was to push forward and conduct the requested fire missions. Ceasing to accept fire missions would lead to greater Allied casualties and possibly allow the German offensive to succeed. So the men continued to prepare the rounds and fire missions, while at the same time, initiating some changes for their own preservation.

This image shows mortar crews from the 82nd Chemical Mortar Battalion and the ready racks of prepared ammunition near Manila, Philipines, in 1945.

The first change involved surrounding the mortar tubes with sandbags. While sandbags had been used on the M2 before, they had been limited to a layer or two on the baseplate to help prevent the plate from jumping or skidding on the frozen ground from the effect of firing. Now, the height of the bags was increased, providing maximum protection from a barrel burst while still allowing access to the traverse and elevation control. The second change involved how the round was fired. A man dropping the round would have little time to distance himself from the mortar before a round might explode in the barrel, so a method of firing "by lanyard" was quickly designed and introduced. First improvised by the Soldiers themselves, then recommended by the CWS Headquarters for general use, the lanyard consisted of a length of cotton cord to which a brass, U-shaped plate was attached. Now, instead of manually releasing the round to drop inside the tube, the round was partially inserted and the U-shaped plate slid around the projectile, retaining it in place at the muzzle. The crew then took cover some distance away before the cord was tugged, freeing the retaining plate and allowing the round to slide down the barrel as usual. While effective, the use of the lanyard took more time than manual firings; in fact, the combat rate of fire was reduced 90 percent, from 20 rounds per minute to just two.

While safer than firing without these measures, the men serving the mortars were still sustaining casualties. Complaints from CWS and infantry commanders, whose troops urgently needed the rapid and accurate 4.2-inch mortar fire, quickly reached the ears of General Omar Bradley, commander of the American Army fighting in the Battle of the Bulge. In a telephone conversation with the chief of CWS, Major General William Porter, Bradley urged that the issues surrounding the faulty munitions be speedily corrected, as the "4.2[-inch] mortar had done as much, or more, to stop the German push" than any other weapon in the allied inventory.[8]

In January 1945, while mortarmen were still struggling to provide rapid and accurate fire support, the CWS held an emergency meeting with the engineering representatives of the various contractors and subcontractors involved with manufacturing fuze components of the 4.2-inch chemical mortar shell. They were told that the issue would now and forever be resolved and that teams of inspectors would check the manufacturing procedures at fuze production sites. In addition, agents from the Federal Bureau of Investigation would check plant personnel for evidence of possible sabotage.

By the time the Battle of the Bulge ended on 25 January 1945, at least 16 men had been killed and more than 30 had been wounded by premature bursts. By the end of January, the fuze factory inspection reports were received. The Federal Bureau of Investigation found no evidence of sabotage; however, CWS inspectors found damning instances of substandard quality and discovered multiple failures to follow the original fuze specifications among several subcontractors, to include the previously identified National Fireworks Company. Although the issue with the safety ball had not recurred, inspectors noted that safety shear wires (another measure to ensure that the striker did not activate prematurely) were, in many cases, made of thinner or weaker wire or, in some cases, entirely absent. In addition, it was noted that many of the booster tubes were machined too thin and the threads that retained them in the fuze body were cut too shallow. If they suffered a severe shock (like that which would occur during firing), the booster tube could possibly break loose and initiate a sympathetic explosion of the surrounding TNT, even if the fuze did not initiate the detonation. This supposition was confirmed by later testing. The National Fireworks Company, which manufactured only 21 percent of the total number of fuzes used, was found to have incorrectly produced more than 51 percent of those.

Another conclusion reached by studying fuze production and fuzes from lots identified as containing questionable rounds was linked to the initial design of the fuze. When smashed by the striker initiating ignition of the booster tube, the fulminate of the mercury primer detonator was mechanically pinned in place by a small metal stake. Inspectors found that, over time and with vibrations from movement, the fulminate powder could work free and filter around the primer, spreading around the body of the slider and into other areas of the fuze. Fulminate, being

friction- and pressure-sensitive, could spontaneously ignite just by being caught between any two moving parts of the fuze. Measures were taken to begin cementing the fulminate primers in place, thus securing and sealing the fulminate from migration into the fuze itself. Orders were once again issued to inspect ammunition stockpiles and replace the fuzes in question.[9]

Other investigations found that many of the 12-guage ignition cartridges contained as much as 25 percent more powder than the maximum load required by specifications. This, coupled with the increased pressure of the propellant charges when used in extreme cold weather, was indicated in the possible fracture of the weaker white phosphorous shell bases, causing them to leak in flight.

While January 1945 would prove to be the peak of premature detonations of the 4.2-inch mortar rounds, it did not mark the end. More CWS Soldiers, along with a 3-year-old Alsatian boy who had befriended a mortar crew of the 83d Chemical Battalion, were killed in February. The deaths continued until May 1945, culminating with the death of Sergeant Weiler. Although additional instances of premature detonations occurred and more men were wounded, no further deaths resulted.[10]

At the end of the war in Europe, approximately 500,000 4.2-inch mortar rounds were disassembled and inspected by Chemical Depot company personnel. Also, the fuzes were replaced and the rounds were reassembled and prepared for shipment to the Pacific. As Japan surrendered in August 1945, another 600,000 rounds were still being refurbished at the Pine Bluff Arsenal, Arkansas.

While the occurrences of premature detonations ended with the war, the interest in the cause and effect did not. A Senate investigation initiated in 1946 brought the matter to public attention. The investigation involved testimony from veterans and the chief of CWS, Major General Alden H. Waitt. The final report concluded that the issue was related to the design and manufacturing problems previously mentioned. The report stated that 38 Soldiers were killed and 127 Soldiers were wounded by faulty 4.2-inch rounds; the men served in 13 different mortar battalions in the European and Pacific theaters. Out of the 4 million rounds fired in training and combat, 46 separate premature detonations were identified by eyewitness reports—a failure rate of 1.5 rounds for every 100,000 fired, or 0.0015 percent, which was no more than the failure rate of any other type of artillery ammunition used in World War II. The Chemical Corps fielded the M2 chemical mortar for another 7 years, until 1953, without any apparent reoccurrence of premature detonations.[11]

The M2 chemical mortar was an important combat weapon of World War II; it was used in every theater of war and highly praised by infantry commanders dependent on fire support. Its effectiveness as a close-support weapon was unparalleled, but the rush to develop an HE round for use on a conventional battlefield meant that it was placed in action before the ammunition could undergo more thorough testing. CWS Soldiers who served the mortars did so with valor and honor; their selfless service was especially significant when that service required that they use faulty ammunition to accomplish their mission.

Author's Note: The majority of the information in this article is derived from the "Report on Malfunctions of the 4.2-inch Chemical Mortar Ammunition, Their Cause, Effect and Measures Taken to Correct the Deficiencies," Volumes 1 to 14, files of the Office of the Chief, CWS, regraded unclassified by order of the Secretary of the Army, by the U.S. Army Military History Institute per 90030-17, 21 August 1990.

Endnotes:

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[3]Chemical Corps Association, "The Chemical Warfare Service in World War II: A Report of Accomplishments," Reinhold Publishing Corporation, New York, 1948, pp. 125–151.

[4]Technical Manual 3-320, *Mortar, Chemical, 4.2-Inch*, June 1945, pp. 63–75 (obsolete).

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[6]Ibid.

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[10]Lee Steedle, editor, *Mark Freedom Paid: A Combat Anthology*, 83d Chemical Mortar Battalion Veterans Association, 1997, pp. 113–115.

[11]Hanson W. Baldwin, "The 4.2-Inch Mortar; Army Report Says Disputed Weapon Was One of Most Effective in War," *The New York Times*, 8 September 1946, p. 19.

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

2018 Honorees of the U.S. Army Chemical Corps

Compiled by Ms. Christy Lindberg

Hall of Fame Inductees

The U.S. Army Chemical Corps Hall of Fame award is the highest form of recognition offered by the Regiment. This coveted award honors those who have made landmark contributions to the overall history and traditions of the Chemical Corps. These individuals have distinguished themselves through advances in science and technology, a lifetime of service and devotion to the Corps, or gallantry in battle. Four individuals—Sergeant Raymond E. Nicoli, Technician 5th Grade Felice J. Savino, Private Donald F. McLaren, and Private Benton Lee Porter—were inducted into the Hall of Fame on 28 June 2018.

On D-Day, 6 June 1944, the 81st Chemical Mortar Battalion (Motorized) was among the first of the waves to land on Omaha Beach, Normandy, France, spearheading the liberation of Europe from Nazi control. The primary mission of the 81st was to use 4.2-inch chemical mortars to provide fire support to the attacking infantry. The 4.2-inch chemical mortar and the cart on which it was transported weighed nearly 500 pounds, with each high-explosive shell weighing an additional 26 pounds. The 81st was tasked to provide fire support for the 29th Infantry Division until that division's artillery arrived the following day.

Four members of Company D, 81st Chemical Mortar Battalion, were recognized for exceptional heroism for their actions that day when their landing craft was hit by enemy fire and sank just short of the beach. All four were wounded, but ignored their wounds and made repeated trips to the submerged landing craft, attaching inflatable life belts to the mortar and ammunition carts in order to safely float them ashore and put them into action.

When heavy enemy fire, high surf, and an abundance of beach obstacles caused the landing craft to discharge their cargo far from the beach, the men of the 81st Chemical Mortar Battalion tied their own life belts to the mortar carts and swam their weapons ashore. When machine gun fire shredded the life belts and one cart sank, the four Soldiers from Company D launched a determined effort to recover the mortars and ammunition. All were wounded repeatedly as they struggled against the tide, reattached life belts to the cart, and floated it ashore. All four men refused medical attention until they achieved their goal—getting their mortar ashore and into action against Hitler's "Fortress Europe." Their subsequent mortar fire was the first fire support mission by American forces on the European continent.

For their personal courage, self-sacrifice, and devotion to duty on Omaha Beach on 6 June 1944, these men were awarded the Distinguished Service Cross. Their actions on D-Day reflect great credit upon themselves, the 81st Chemical Mortar Battalion, and the Chemical Corps.

Sergeant Raymond E. Nicoli

Sergeant Raymond E. Nicoli was born in Kansas on 24 September 1919. He died in Lenexa, Kansas, on 6 January 1983.

Although his hand was painfully wounded as the landing craft approached Omaha Beach, Sergeant Nicoli refused first aid and remained with his squad. He directed his squad in the recovery of the mortars and ammunition from the landing craft and the transportation to shore. With complete disregard for his own safety, he made numerous trips across the beach under intense enemy fire before completing the mission. Although anxious to be reunited with his men, his wound proved serious enough to require his evacuation.

Technician 5th Grade Felice J. Savino

Technician 5th Grade Felice J. Savino was born in Italy on 2 February 1914 and immigrated with his family as a child to New York City, New York. He died on 9 January 1996 in Brooklyn, New York.

Shrapnel fire exploded directly on Technician 5th Grade Savino, and his face was seriously wounded and his nose nearly severed. Reaching the beach, he refused to be evacuated. With total disregard for his own safety, he made numerous trips across the fire-swept beach, helping to move the mortars and ammunition from the sunken landing craft to shore. With the mortars finally in position to be fired, Savino continued to act as ammunition bearer until he was unable to carry the ammunition and only then did he consent to be evacuated.

Private Donald F. McLaren

Private Donald F. McLaren was born in South Dakota on 26 July 1921. He died on 6 February 2009 in Dade County, Florida.

As Private McLaren left the landing craft, it came under direct enemy fire. Private McLaren, seriously wounded in the hips, refused to be evacuated. Although in pain, he made several trips across the beach under intense machine gun and mortar fire to assist in the recovery of the mortars and ammunition from the landing craft and the transportation to shore. Only when the gun had been placed in a position to fire did Private McLaren, who was extremely weak from blood loss, consent to be evacuated.

Private Benton Lee Porter

Private Benton Lee Porter was born in Lincoln, Mississippi, on 29 March 1919. He died on 29 April 1976 in Franklin County, Mississippi.

As his landing craft was approaching Omaha Beach, it came under enemy fire and was sunk. Flying shrapnel lacerated Private Porter's forehead, seriously injuring him. Reaching shore, he refused medical treatment and, despite his painful wound and the blood flow that was limiting his vision, made repeated trips across the fire-swept beach to aid in the removal of the mortars and ammunition from the landing craft and the transportation to shore. With the gun finally in place, Private Porter, extremely weak from blood loss, consented to be evacuated.

Distinguished Members of the Corps Inductees

The award of the Distinguished Member of the Chemical Corps title signifies that an individual has not only contributed a lifetime of service in the Corps, but also supported the Chief of Chemical in implementing the Corps vision. Two individuals, Colonel Patrick J. Sharon (Retired) and Lieutenant Colonel Dee D. Morris (Retired), were inducted into the 2018 Distinguished Members of the Chemical Corps on 28 June 2018.

Colonel Patrick J. Sharon (Retired)

Upon completion of his bachelor of science degree from Jacksonville State University, Colonel Patrick J. Sharon (Retired) started his military career as a platoon leader with the 31st Chemical Company, 4th Infantry Division, Fort Carson, Colorado. Moving up through battalion and brigade positions, Colonel Sharon was responsible for training and leading our most precious asset—Chemical Corps Soldiers. His units were counted as disciplined, highly trained warriors capable of meeting the challenge of facing a weapons of mass destruction (WMD) event on the battlefield. As a battalion commander, Colonel Sharon was singularly focused on our most important task—developing future leaders of the Corps. In his 2 years of command, he was heralded for his innovative and thorough approach to developing leaders of incredible technical competence and sound moral character. His determined effort has provided our Corps with capable and competent leaders who execute duties at the levels of colonel and above.

Upon completion of battalion command, Colonel Sharon immediately deployed to our Nation's capital and began to engage the Army, Joint, and Secretary of Defense staffs on the importance of our mission and the need for consistent, predictable funding. As the deputy director of the Joint Requirements Office (JRO), he singularly championed the programs to establish and deliver improved chemical, biological, radiological, and nuclear (CBRN) reconnaissance capabilities to the joint force. His efforts resulted in the development and eventual fielding of the Nuclear, Biological, Chemical Reconnaissance Vehicle and Dismounted Reconnaissance Sets, Kits, and Outfits. These two systems are arguably the most important CBRN materiel solutions fielded to the joint force in the last 2 decades. Colonel Sharon's determined effort and wise review of the requirements for these systems have shaped the CBRN defense posture worldwide and improved the ability of CBRN forces to win in a complex world.

As a retired officer, Colonel Sharon continued to serve at the highest levels. He served as the vice president of the Lieutenant General Thomas W. Spoehr Chapter of the Chemical Corps Regimental Association, Washington, D.C., for 8 years. In this capacity, he was a key contributor to all fundraising events, which resulted in continued care for the Soldiers of our Regiment through charitable activities. Additionally, Colonel Sharon has been a quiet professional and personal mentor to many CBRN officers serving in the National Capital Region. His dedication to providing quality materiel solutions to our Soldiers is evident in his service as the chairman of the NBC Industry Group. In this capacity, he served as spokesperson and a focal point to coordinate efforts to build readiness in our Corps through civilian industrial partnership.

Some of his significant assignments include Deputy Director, JRO, CBRN Defense; military assistant for Counterproliferation Policy, Office of the Under Secretary of Defense for Policy; CBRN defense staff officer; and commander, 84th Chemical Battalion, Fort Leonard Wood, Missouri. In addition to his bachelor of science degree, he holds a master of science degree in administration from Central Michigan University, Mount Pleasant, and a master of science degree in military arts and sciences from the Command and General Staff College, Fort Leavenworth, Kansas.

Colonel Sharon's awards include the Legion of Merit, Bronze Star Medal, Defense Superior Service Medal, Defense Meritorious Service Medal with three oak-leaf clusters, and the Ancient Order of the Dragon.

Colonel Sharon (Retired) is currently the director of business development for the Tauri Group, Alexandria, Virginia.

Lieutenant Colonel Dee D. Morris (Retired)

Upon completion of her degree in textile chemistry from Virginia Polytechnic Institute and State University, Blacksburg, Lieutenant Colonel Dee D. Morris (Retired) served as a plans officer and chief escort and disposal officer for a U.S. Army technical escort unit. Following a variety of staff and leadership positions in Texas and Germany, Lieutenant Colonel Morris served as the Chemical Corps and Ordnance (Munitions) Branch advisor to the Army National Guard and U.S. Army Reserves. She then served a tour with the U.S. Army Tank and Automotive Command, where she was the warranty weapons system manager for the Nuclear, Biological, and Chemical Reconnaissance System (Fox) chassis. She served two tours at the U.S. Army Chemical Activity, Johnston Island, Pacific Ocean—first as the chemical surety officer, supervising the then largest chemical personnel reliability program and the safe and secure destruction of chemical weapons and later as executive officer. Between her tours on Johnston Island, Lieutenant Colonel Morris was the treaty liaison officer for the Conventional Armed Forces in Europe and the chemical weapons agreements mission commander with the on-site inspection agency.

In 2012, Lieutenant Colonel Morris spearheaded the Department of Defense (DOD) Countering Weapons of Mass Destruction Graduate Fellowship Program. This program was a partnership between the Center for the Study of Weapons of Mass Destruction, National Defense University, Washington, D.C., and the Department of Defense and Strategic Studies Program, Missouri State University, Springfield, Missouri.

Lieutenant Colonel Morris served in multiple management positions in the Office of the Deputy Assistant Secretary of Defense for Force Health Protection and Readiness and predecessor organizations, beginning with the Office of the Special Assistant for Gulf War Illnesses. She led a small team that identified lessons learned from the investigation of events and exposure conditions experienced during the first Gulf War and the handling of veterans' subsequent illnesses by DOD. Through this work, commanders were encouraged to listen to and destigmatize Service members seeking necessary medical and psychological care. This culture shift resulted in the earlier identification of traumatic brain injury and its impact on readiness.

Lieutenant Colonel Morris managed a military and contractor staff that identified health protection lessons learned and issues associated with battlefield or domestic use of CBRN materials and CBRN protection and detection equipment from past and ongoing deployments, exercises, and operational tests. She also worked with the Defense Medical Readiness Training Institute, Joint Base San Antonio, Fort Sam Houston, Texas, to develop targeted CBRN medical training for medical professionals. She led a DOD research team that assembled, declassified, and published medically relevant information concerning chemical and biological agent offensive and defensive testing in support of Department of Veteran's Affairs claims.

Lieutenant Colonel Morris's education includes a juris doctorate degree from the University of Detroit School of Law, Detroit, Michigan; graduation from the Command and General Staff College, Fort Leavenworth, Kansas; a master's degree in public health from the Milken Institute School of Public Health, Washington, D.C.; and a master's degree in laws in health care from the George Washington University Law School, Washington, D.C.

Morris's awards include the Secretary of Defense Meritorious Civilian Service Award, Defense Superior Service Medal, Defense Meritorious Service Medal, Meritorious Service Medal (6th Award), and the Joint Service Commendation Medal.

Throughout her 42-year career, Lieutenant Colonel Morris (Retired) exemplified the finest traditions and standards of the U.S. Army Chemical Corps. Morris currently serves as Chief of Staff, JRO for CBRN Defense, Resources and Assessment (J-8). As the chief of staff, she manages the day-to-day activities of a 60-person, chairman-controlled activity. With her keen financial management skills, the JRO for CBRN Defense continues to lead the development of critical chemical and biological protection and detection systems and shepherd advanced capabilities through procurement. She is the office subject matter expert on chemical weapons demilitarization and human experimentation.

Ms. Lindberg is the regimental historian at the U.S. Army Chemical, Biological, Radiological, and Nuclear School, Fort Leonard Wood, Missouri.

Nominations are being accepted for the 2019 Chemical Corps Regimental Honors Program for the Hall of Fame.

This award is extended to chemical, biological, radiological and nuclear personnel (living or deceased) who spent their professional careers serving the Chemical Corps in an exceptional manner or who performed a significant act of heroism. Nominations are open to military and Department of Defense civilian personnel who have been retired from active federal service for at least 2 years. Their service to the Corps must have been extraordinary.

Nominations packets should be sent to—Commandant, USACBRNS, ATTN: ATSN-CM-H (Regimental Historian), 401 MSCoE Loop, Suite 1041, Fort Leonard Wood, MO 65473-8926

All packets must arrive on or before 28 February 2019. For more information, see the Chemical Corps Regimental Association Web site at <http://www.ccrassn.org>, call 573-563-7339, or e-mail <christy.l.lindberg.civ@mail.mil>.

Lessons Learned

From Deploying a MEB to a DSCA Operation

By Colonel Jan K. Behn, Colonel Craig W. Strong, Lieutenant Colonel James R. Hewitt, Major Jeremy D. Chancellor, Major Jonathan D. Wymer, and Major Alex M. Zeller

"This is not a time to think about your house; a time to think about your earthly possessions. This is a time to think about securing your life, the lives of your children, the lives of your neighbors"[1]

Hurricane Irma ripped through the islands of Saint Thomas and Saint John on 6 September 2017, with wind speeds of more than 140 miles per hour.[2] Within weeks, Hurricane Maria, a second Category 5 storm, hit Saint Croix, Saint John, and Saint Thomas, wiping out what Hurricane Irma had missed. This was an unprecedented disaster for the Virgin Island Territories, leaving them flooded, powerless, and damaged beyond imagination.[3] Support forces under the Emergency Management Assistance Compact[4] arrived in the territories within days after the hurricanes hit, and a joint task force (JTF) was established on 26 September 2017. An infantry brigade combat team (BCT) stood up and initially commanded the JTF until the arrival of the 67th Maneuver Enhancement Brigade (MEB), Nebraska Army National Guard, on 14 October 2017.[5] This article summarizes the 67th MEB experiences and lessons learned during the mission. The 67th identified key points for advanced planning for the JTF and the addition of MEB capabilities.

Advanced Planning Considerations

Supporting fellow Americans in disaster relief is an honor and responsibility. It is an honor to work with the best military and civilian leaders in the world and a responsibility in that it provides an opportunity to offer input for improved response capabilities in the future. This specific experience indicated that three advanced planning considerations need to be implemented now.

First, the assigned JTF should come from an inland state that is not affected by the storm. For hurricane relief in U.S. territories, this specification does not include coastline states that have experienced or are preparing to experience the hurricane season themselves. Assistance should come from farther inland. Being at the epicenter of a disaster significantly reduces the capabilities of the JTF. For example, JTF members may have limited access to equipment, which may have been damaged, or they may have Families who need their Soldiers and civilian leaders home with them. The JTF is responsible for giving the supported area a chance to "catch their breath" until the transition phase, when the impacted area can take over its own hurricane relief.

"A commander with the right tools is prepared to evolve with the mission to ensure that the needs of the operational phases are anticipated and that unforeseen needs arising . . . can be engaged in a smart manner."

Second, with assets (including commercial assets) such as airlift and sealift in short supply, the economy of planning and assigning an appropriate JTF should not involve multiple rotations of units during limited timeframes of operational need. The JTF for the Virgin Island mission consisted of two separate brigades that executed all levels of mission planning and mission execution and a transition of authority weeks into the disaster. Imagine a race car driver stopping his or her car in the middle of the racetrack to change drivers with only a few laps to go. The lesson to be learned from this metaphor is that the transition of authority from one brigade to another within weeks of the initial unit's defense support of civil authorities (DSCA) assignment is akin to stopping a race car mid-race to change not only the driver but also the motor and pit crew.

Third, assigning the right size and appropriate JTF for DSCA missions is important. The transition between a BCT and MEB would be appropriate in a combat zone as forces move through phase lines within a division area of operation. A MEB would not be the right size of unit to assign to forward line operations at the start of a combat mission; however, the initial assignment of an infantry BCT was essentially the wrong tool for the DSCA operation. MEBs "provide an economy of force capability so that BCTs or maneuver units can focus on combat operations."[6] This does not mean that a BCT is not capable or that the unit assigned to the mission is not able to execute in an honorable and professional manner. MEBs are literally designed to support missions such as domestic disaster relief. According to Lieutenant Colonel

Trevor J. Mann (Virgin Island Counterdrug Coordinator), "The BCT brought an infantry mission command. The difference is the MEB was more uniquely designed to command here because of the mission of a MEB."[7]

Memorandums of agreement should be established between specific units/JTFs and territories as soon as possible and in advance. Once in place, the framework to identify needs, capabilities, and response actions could be planned ahead of time. Proactive efforts taken under a memorandum of agreement with a previously assigned territory partner establish a networked relationship and, more importantly, a level of trust that affects open, honest communication and shared expectations and goals from the start of mobilization to the stand-down. Agreements and plans include provisions for regional training with territorial partners, reconnaissance, and terrain familiarization. They should also include advanced monitoring/awareness of factors that might result in deployment, such as weather conditions and the identification of advanced-party needs for transitioning to the zone prior to the disaster strike, preplanning for the movement of equipment and personnel to and from the site, and evaluating the equipment and personnel needed for the anticipated mission (including linking/relationship building with on-site points of contact required to execute assignments before arrival).

Design of the JTF

The JTF assigned to a DSCA mission can expect the following operational requirements when considering key tasks for disaster operations:

- Security.
- Medical support.
- Chemical hazards detection.
- Route clearing and debris removal.
- Supply distribution.
- Joint reception staging and integration.
- Personnel tracking.

For environments like those of the islands, aviation and sea movement capabilities should be included. The assigned JTF must be multifunctional and able to bring together multiple capabilities to work in unison and in coordination with civilian leaders. The JTF also needs to plan for transitions within the mission as the environment begins to stabilize between the response and recovery phases.[8] Improved response time by local authorities can reduce immediate security issues related to looting. Transition to a more robust distribution operation may occur as roadways are cleared. The JTF commander must have access to unit resources and an understanding of how

Personnel from the 67th MEB arrive in Saint Croix.

Soldiers from the 67th MEB help clean up a school in Saint Croix.

transitioning capabilities can and should be used, if available. Should a cook be assigned to control traffic? Should a military police Soldier be used to deliver supplies? Should either be assigned to clear roadways with construction equipment? How much risk can a commander assume if the needs start to outweigh the availability of troops in the assignment of tasks? The more knowledge and practice the JTF commander has with multifunctional support options, the easier it will be to anticipate the needs of the mission and thoughtfully advise civilian authorities about the capabilities and limitations of available resources.

The 67th MEB also significantly benefited from the assignment of joint personnel, such as a U.S. Air Force strategic air planner and an Army aviation liaison. The Nebraska National Guard is blessed to have the capabilities of its own internal air wing (155th Air Refueling Wing) for air assets and subject matter experts. Other areas that integrated and worked seamlessly with the staff were the judge advocate general and the chaplain. The assignment of a contingency contracting team and public affairs officer was deemed vital for establishing long-term resource support and assisting in telling the "Guard story" in the area of operations.

Being a multifunctional Army National Guard brigade ensured that not only could staff fill key roles, but their civilian skills could also be called upon as well. In the 67th MEB example, the adjutant for the unit was also a reporter for a local news station, enabling public affairs officer support. A commander with the right tools is prepared to evolve with the mission to ensure that the needs of the operational phases are anticipated and that unforeseen needs arising from chaotic disaster sites can be addressed in a smart manner.

MEB Capabilities

The MEB is uniquely structured to handle all tasks that might potentially be assigned to a BCT, but with added expertise in key DSCA operations-related fields such as engineering; military police; hazmat; and chemical, biological, radiological, and nuclear areas. As a modular brigade headquarters, the organization can track and control operations in the operational environment and be prepared to request and receive force structure to augment mission success. Lieutenant Colonel Mann asks, "What's one of the first boots on the ground we want? We want military police and engineer assets. The MEB has military police and engineers . . . that are in your table of organization and equipment. The MEB has military police and engineers assigned to you. They are units that you know how to command and control and you employ in your fight, so it should come natural."[9] In a division support area, the MEB is responsible for—

- Managing terrain.
- Collecting information.
- Informing and influencing activities.
- Controlling air and ground movement.
- Targeting.
- Clearing fires.
- Conducting security.
- Recovering personnel.
- Considering environmental impacts.
- Conducting minimal essential stability tasks.

The MEB controls the terrain within its assigned area of operations, which allows freedom of mobility for operational and tactical commanders.[10] In DSCA operations, the primary

tasks include chemical, biological, radiological, and nuclear operations; support to civilian law enforcement agencies; and other tasks that ensure the success of disaster relief efforts during postincident response. The MEB is designed to provide mission command over chemical, biological, and radiological nuclear and military police units that can support typical disaster relief tasks.

The 67th MEB oversaw aviation operations to help transport personnel and equipment throughout the three islands, provided logistical resupply to include refueling the generators that kept emergency personnel able to operate equipment, and provided military police support to the local Virgin Island police departments. The MEB has an advanced understanding of military policing operations, which allowed the command post to more effectively battle-track operations on the ground and provide more expertise to subordinate units augmenting the local Virgin Island police departments. Additionally, the MEB provided support to other units such as medical professionals who augmented local hospitals and preventative medicine personnel who inspected areas for significant hazards, such as mold and disease. The multifunctional headquarters of the MEB was able to adjust to changing tasks throughout its time as the mission command nexus during operations.

Placing liaison officers (including one Airman who was a subject matter expert in Federal Emergency Management Agency operations and related incident command system documents and requirements) alongside Virgin Island territorial emergency management agency personnel also paid dividends. The relationships built with civilian leadership in the emergency management arena improved mission success and provided networking opportunities that should be built upon so that lessons learned and best practices are not lost and preparations for future hurricane seasons can be made.

Conclusion

According to Mr. David Haas, Federal Emergency Management Agency Deputy Chief for the Virgin Island mission, "We couldn't have done it without the [Army] National Guard or Department of Defense, especially early on in the disaster. You are the 911 force; you are who we rely on significantly to fill capability gaps early on in any disaster, as responders are overwhelmed."[11] Assuming this statement to be true (and we do), how are we capitalizing on this belief? The hurricane planning season for next year is now. Partnerships need to be formally established, and units need to be begin initial planning and training. We have experienced the *what*, *when*, *where*, *why*, and *how*, but the *who* needs to be solidified in a more timely and thoughtful fashion before we find ourselves too deep within the eye of the next storm.

Endnotes:

[1]Don Buchanan, "Governor Says Territory Must Prepare for Maria," *The Source,* 17 September 2017, <https://stcroixsource.com/2017/09/16/governor-says-territory-must-prepare-for-maria/>, accessed on 31 July 2018.

[2]A. J. Willingham, "A Look at Four Storms From One Brutal Hurricane Season," 21 November 2017, <http://www.cnn.com/2017/10/10/weather/hurricane-nate-maria-irma-harvey-impact-look-back-trnd/index.html>, accessed on 31 August 2018.

[3]Cory Schouten, "The Caribbean's Long Hard Road to Normalcy after Irma," 13 September 2017, <https://www.cbsnews.com/news/hurricane-irma-caribbean-islands-severe-damage/>, accessed on 29 July 2018.

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[5]Don Walton, "Guard Unit From Nebraska Headed to Virgin Islands," 13 October 2017, <http://journalstar.com/news/local/guard-unit-from-nebraska-headed-to-virgin-islands/article_b3fca12c-07f0-51d5-99da-f1fbef622e69.html>, accessed on 29 July 2018.

[6]Field Manual (FM) 3-81, *Maneuver Enhancement Brigade*, 21 April 2014.

[7]Trevor J. Mann, personal interview with Second Lieutenant Rachel Hofstra, 11 November 2017.

[8]Joint Publication 3-28, *Defense Support of Civil Authorities*, 31 July 2013.

[9]Mann, 2017.

[10]FM 3-81.

[11]David Haas, personal interview with Second Lieutenant Hofstra, 10 November 2017.

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USACBRNS CWMD Senior Staff Planners Course

By Mrs. Jacqueline Woodson

In April 2018, 24 students from across the U.S. armed forces and other U.S. government agencies attended the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS) Countering Weapons of Mass Destruction (CWMD) Senior Staff Planners Course at the Maneuver Support Center of Excellence, Fort Leonard Wood, Missouri. The course aids current and future planners with the analytical framework for CWMD planning. This course is valuable for those who have never been part of a planning cell or need a refresher or an update on current strategic CWMD guidance. The course aims to bridge the gap between CWMD strategic guidance, doctrine, CBRN capabilities across the military branches, and operational execution.

A student conducts mission analysis at the CWMD Senior Staff Planners Course.

Attendance at the dynamic 2-week-long CWMD Senior Staff Planners Course requires a secret clearance. The course is the first multiorganizational course of its kind offered by USACBRNS. Service members from the U.S. Army, U.S. Marine Corps, and U.S. Air Force (ranging from O-6 to E-7) and Department of Defense (DOD) civilians from Joint Staff/Intelligence; the Department of the Army Deputy Chief of Staff Operations, Plans, and Training; and the DOD Joint Program Executive Office for Chemical Biological Defense attended the April 2018 iteration of the course.

The students were greeted during their first day by the USACBRNS Commandant, Brigadier General Antonio (Andy) Munera, and Assistant Commandant, Colonel Thomas A. Duncan II. Brigadier General Munera discussed DOD strategies for CWMD and the significance of breaking down strategic guidance to operational execution. Colonel Duncan fervently spoke on the importance of deliberate planning, preplanning, and predeployment site surveys and on understanding the operational environment, threats, and vulnerabilities. Colonel Duncan sparked a robust discussion among the students. The students asked him questions about current capabilities and networking with other assets to assist in planning CWMD. He stressed the importance of conducting research, reading doctrine, and engaging with other planners of different specialties and Services.

Week 1 of the course covered information ranging from CWMD concepts and doctrine to DOD guidance and strategy for CWMD and more. The students actively engaged with briefers and each other, and the discussions were vigorous, educational, and eye-opening. The diversity in experience among the instructors and the students revealed the intricacies of the joint operational planning process and its significance. Course facilitators were highly knowledgeable subject matter experts. As days passed, it was clear that the students were acquiring a practical understanding of CWMD planning and its importance.

During Week 2, information taught during Week 1 was applied. Combined tabletop exercises comprised the evaluating and culminating events. After dividing the class into diverse groups, the students were assigned specific and detailed planning missions. Some groups initially struggled to integrate their individual planning expertise; however, once group members figured out how to pool their efforts, they created impressive and sound mission analyses, courses of action, assessments, and selection briefings. During the tabletop exercises, the dynamic student body bombarded course staff and faculty with requests for information, conducted after action reviews after each exercise, and provided valuable feedback to be implemented in the next course.

Based on the course objectives and student feedback, the USACBRNS CWMD Senior Staff Planners Course exceeded the standard.

Mrs. Woodson is a training developer for USACBRNS, Fort Leonard Wood. She holds a bachelor of science degree in psychology from the American Public University, Charleston, West Virginia, and a master of science degree in business administration from American Public University. She retired from the U.S. Army in March 2018. During her military career, she served in various CBRN and training units.

Career Management

By Lieutenant Colonel Jacy A. Park and Captain Benjamin Williams Jr.

We have been stationed at the U.S. Army Human Resources Command (HRC), Fort Knox, Kentucky, as assignment officers for the Chemical Branch for the last 2 years. It has been an eye opening experience. We wrote this article to share the lessons we learned with as many officers as possible. We hope the article arms you with essential information to better manage your career, improve officer manning in your unit, and assist in the professional development of the junior officers whom you coach and mentor.

The Process

Understanding the officer manning process and its associated timeline is vital to ensuring that key positions within a unit are filled and that personal assignment options for an officer's next permanent change of station (PCS) are maximized. There are two officer manning cycles:

- **Cycle 1: Winter.** The submission window of the winter cycle is March, and the movement window is between October and March.
- **Cycle 2: Summer.** The submission window of the summer cycle is September, and the movement window is between April and September.

Distribution cycle planning starts approximately 1 year out with the identification of personnel who are eligible to move. Units submit mission essential requirements (MERs) that prioritize requisitions and specify prerequisites for slots that they would like to have filled in the next manning cycle. A distribution conference to determine which requisitions will be prioritized and filled is held at HRC. Assignment officers receive validated requisitions to fill, and the number of requisitions match the number of officers who have been identified to move.

What does this mean to you? It determines where you can and cannot go. An officer can only PCS to an open, validated requisition. In today's Army, there are always more vacancies than there are officers moving to fill them. Therefore, the semiannual HRC distribution conference exists to prioritize and decide precisely which requisitions will be filled. If 30 officers are identified to move, there will be only 30 validated requisitions regardless of the number of vacancies. These assignments are the only assignments into which officers can PCS. This is the reason that assignment officers cannot support requests to PCS to units with vacancies that were not validated.

Timing is the essence of this process. In preparation for the semiannual distribution conferences, battalion or brigade personnel staff officers/assistant chiefs of staff, personnel (S-1s/G-1s) submit a forecast of vacancies (the MER) during the applicable timeframe. If an S-1/G-1 misses the MER submission window or fails to prioritize which position he or she would like to fill first, it is highly likely that key positions will not get filled. The MER is submitted nearly 8 months before officers PCS. The distribution conference occurs nearly 6 months before officers PCS. Therefore, unforeseen, unprogrammed departures cause significant turbulence in the system. This turbulence translates to fewer assignment options for the moving officer and a significantly reduced probability that the losing unit will get to backfill in a timely manner. Assignment officers spend a significant amount of time interacting with S-1s/G-1s (through their HRC representatives, the "account managers"), forecasting professional military education dates for officers and examining individual timelines in an attempt to reduce system turbulence.

Assignment officers often hear: "If I can't get a 74A [key developmental] KD position, I am willing to consider an immaterial KD position in an awesome location." Contrary to popular belief, Area of Concentration (AOC) 01A/02A positions do not grow on trees. Assignment officers don't get first pick at immaterial positions with a chemical, biological, radiological, and nuclear (CBRN) officer incumbent. Because everyone wants the same positions, the Officer Personnel Management Directorate (OPMD) executes AOC 01A/02A distribution using a draft format to ensure impartiality. This process resembles a fantasy football draft. As assignment officers, we enter the room with our desired positions based on our interactions with you. As the draft begins, we must

wait our turn to pick the desired requisition. If the desired position is taken by the time our pick comes around, we have no choice but to pick another requisition. Simply put, it is a competition and we do our best to get the immaterial positions you want. We try to pick positions with the greatest KD possibility or locations that will appeal to the most officers.

Assignments

There is no magic combination of assignments that automatically equates to battalion command. What really matters is a diverse assignment portfolio and strong performance (your senior rater's [SR's] assessment of your potential) in your assignments. With that said, not every good job is good for you. Depending on your definition of success in your military career and your desired end state, the path you should seek and, consequently, the jobs you should take will be unique. Don't blindly apply career advice from senior leaders to your career without analyzing what makes sense for you. There are a few things that you should keep in mind when planning a career path.

First, the job must meet your timeline. If the job you want is not available when you are ready for it, you will need to look elsewhere. For example, if you have paid attention to many of our past general officers' resumes, you probably have Army Staff assistant chief of staff, financial management (G-8), as one of your "must have" broadening assignments. However, there are no AOC 74A major positions in the Army Staff G-8 and there are only three 74A lieutenant colonel positions, with usually only one vacancy filled each year. If this the only broadening job on your list, add a few more.

Second, your skills and experience level must match the job/unit desired. Most officers ask for a joint position after a KD assignment because they want to "knock out" their joint requirement. Joint time is only a requirement if you are seeking to become a general officer. Since that represents less than 1 percent of a cohort year group, most of us should focus on getting enterprise level experience. The Chemical Branch has an abundance of joint positions. For example, the Chemical Branch has 45 hard-coded joint positions while the Armor Branch, which has three times the officer population of the Chemical Branch, has only 13 hard-coded joint positions. Many of the Chemical Branch joint positions are not as vital to our Corps as some of the non-joint positions. The real question you need to ask yourself is, "What enterprise level position will enhance my experience, prepare me for the next level, and help the Corps?" By "enterprise level," we specifically mean doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy (DOTMLPF-P) and combat training center observer, coach, trainer positions.

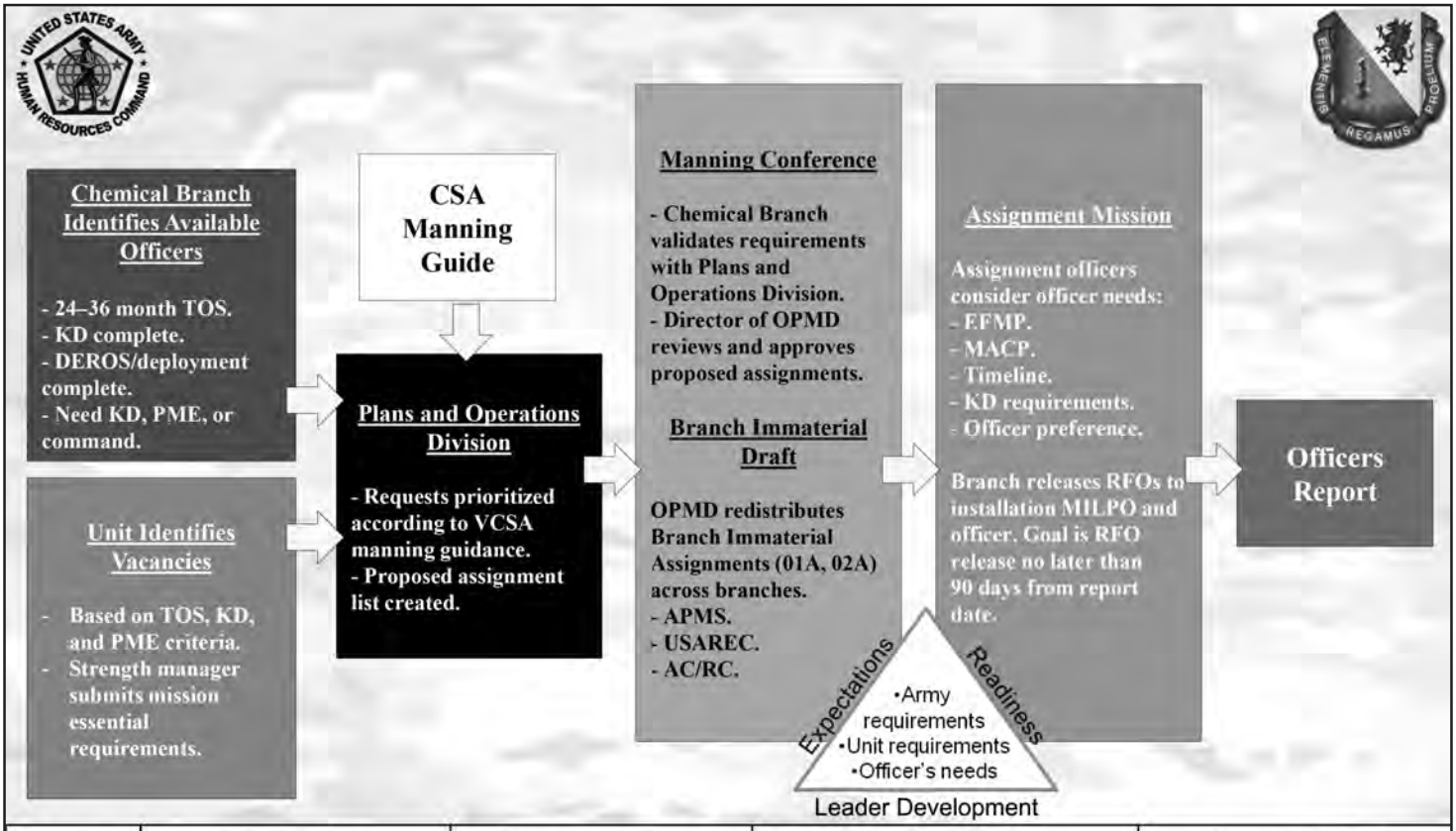
Third, the job must be a career enhancing job specifically for you. For example, it is rarely a good idea for a middle-third officer to go to the joint staff; other branches send their top-third officers to these assignments. There is a good chance that by the time you finish the 36-month joint requirement, you will be in the bottom third of your cohort year group because of the "highly qualified" reports that you may receive when competing against officers adjudged to have higher potential. But, by no means are we compelling officers to take less-challenging positions. HRC strives to send the right officer to the right job at the right time—even if it is a job for which the officer has negative preconceived notions.

The KD Mantra

Despite what Department of the Army (DA) Pamphlet 600-3, *Officer Professional Development and Career Management*, states, promotion boards look for common litmus tests by which to compare officers.[1] For captains, this litmus test is a company command; and for majors, it is a battalion or brigade operations staff officer (S-3) or executive officer position. You will put yourself at significant promotion risk if you are one of the very few officers in a year group who hasn't held these positions. Therefore, once you "pin" (captain or major), your primary concern should be to obtain a position as a company commander, S-3, or executive officer (as applicable); virtually nothing else (including "soft" KD assignments such as brigade CBRN or deputy CBRN positions) will get you promoted to the next rank. Additionally, in order to secure a promotion to the next rank, you are expected to complete a KD assignment with at least one "most qualified" evaluation.

Many officers seek assignments in exotic locations (such as Hawaii) instead of assignments that can become stepping stones to a KD assignment. Historically, exotic locations hold very few opportunities for KD assignments for captains or majors. The 3-year time-on-station requirement for outside the continental United States assignments exacerbates the situation. Although it may seem like there is plenty of time to get a KD assignment, this is not the case for many officers. To illustrate, from the moment you achieve the rank of captain, you have 5 years before your major promotion selection board. Planning backwards, you must be in a company command position for at least 18 months before that board so that both command evaluations are considered by the board. Therefore, you must be in command within 3.5 years after pinning on the rank of captain. Officers usually serve in staff positions for a year or two while awaiting command; that leaves 1.5 years. If you request an assignment in Hawaii before completing a KD assignment and cannot go directly into a KD assignment afterward, you have just put yourself at risk for promotion. The same logic applies to majors, except that it takes much longer to complete Intermediate Level Education (ILE)—an average of 2.5 years for officers who have not attended Command and General Staff College. Since many brigade commanders prefer to select officers who have completed ILE for S-3 or executive officer positions, your timeline may become very short. It is in your best interest to set aside dream locations until after KD assignment completion.

More importantly, it is necessary to focus on a KD position early due to the lack of 74A-coded KD positions for captains and majors. We currently have 49 AOC 74A command



Cycle	Identification	Manning Conference	Assignment Mission	Reporting Period
19-01	February 2018 *Executing*	May 2018	June/July 2018	October 2018–March 2019
19-02	August 2018 *Planning*	November 2018	December 2018/January 2019	April–September 2019

THE CHEMICAL CORPS -- CAPABLE IMMEDIATELY

Legend:

AC—active component
APMS—Assistant Professor of Military Science
CSA—Chief of Staff of the Army
DEROS—date estimated return from overseas
EFMP—Exceptional Family Member Program
KD—key developmental
MACP—Married Army Couples Program
MILPO—military personnel officer
OPMD—Officer Personnel Management Directorate
PME—professional military education
RC—reserve component
RFO—request for orders
TOS—time on station
USAREC—U.S. Army Recruiting Command
VCSA—Vice Chief of Staff of the Army

Assignment process

positions available for 392 captains and 18 AOC 74A S-3 or executive officer positions available for 171 majors. While your assignment officer will work diligently to obtain KD positions for you, there are simply not enough to go around. You must network and seek out immaterial opportunities on your installation. Assignment officers do not select company commanders (or battalion S-3s or executive officers); brigade commanders do.

Evaluations

Evaluations are written for board members—not the rated officer. Raters and SRs use very specific language to communicate performance and potential to a board. Most evaluations highlight what you have done, not what you have not done. However, this is only part of the picture. The Microsoft® PowerPoint® presentation, "OERs—Words Matter," available on the HRC Chemical Branch Web site, translates what a rater or SR says about performance and potential into "board speak."[2] For example, if you receive a highly qualified evaluation with top 30 percent enumeration, what this really means is that you fall within the middle third of your peers. If your evaluation states that you are a "top 10 percent officer" and your SR senior rates a total of eight officers in the same rank, you might automatically assume that you are the No. 1 officer, when in reality, you are likely a top 30 percent officer when compared to your competitors. There are two reasons for this. First, the total number of officers to whom you are being compared is omitted on the officer evaluation report (OER). You are a top 10 percent officer out of what population? The OER should say: "Top 10 percent officer of the eight officers for whom I senior rate." The SR purposely leaves the percentage vague to make the enumeration seem better than it actually is. Second, the No. 1 officer always receives "No. 1 officer of the eight officers whom I senior rate." By understanding the true meaning behind the words that are written in your OER, you can accurately assess yourself and plan your future accordingly.

Selection Boards

Most officers have an idea of how the selection board process works. Qualified board members score everyone's file, creating an order-of-merit list that determines who gets promoted and who doesn't make the cut. But many officers do not know that a second line is also drawn. The officers below this line have been determined by that board to be unqualified to be an officer. Those officers who fall under the "qualified" line will likely be selected for a show cause board. If you have a derogatory document in your file (referred OER, a non-left justified or qualified OER, or a General Letter of Reprimand), you will likely be identified as a candidate for a show cause board and could be chosen for elimination. This also applies to those who have officer files going in front of a below-the-zone promotion board.

Assistance

If you don't know where to start when preparing for a selection board or requesting a new assignment or you are not getting the assistance you need from your S-1/G-1, do not hesitate to call us. We will listen and either answer or point you in the right direction. Most of the requests for information (RFIs) that we receive require that we spend time searching through regulations, making calls, and visiting different offices to determine business rules and exceptions to policy. The earlier you let us know about a problem, the more time and resources we have to help.

If we don't know what you need or want, it is difficult for us to help. Keep your assignment officer up to date on your situation. Additionally, be sure to maintain your officer record brief (ORB)/Soldier record brief (SRB) with updated documents and keep the members of your chain of command on the same page at all times. Frequently update your ORB/SRB, and make any necessary corrections every year. Do not wait until the week before your promotion board convenes to make updates; something always goes wrong. Thoroughly read military personnel (MILPER) messages so that you understand each board and are aware of key timelines. Update your DA photograph every 2 years. Every day, many officers are dismissed from consideration for key positions because of poor DA photographs and ORBs/SRBs.

Read the Chemical Officer Branch "Hot Topics" newsletter.[3] The newsletter is published on the first of each month, and it highlights the upcoming boards or issues across the force and within the CBRN community. The HRC Web page is also updated with useful links, contact information, and resources.

Conclusion

If you keep these few pointers in mind throughout your career and work diligently in all that you do, we are confident that you will be able to effectively manage your career. Before our assignment at HRC, we simply did not know enough to ask the necessary questions about assignment options, career path decisions, professional timelines, and unit officer management. We hope this article sheds enough light to get the wheels in your head turning as you forge ahead in your career.

Endnotes:

[1]DA Pamphlet 600-3, *Officer Professional Development and Career Management*, 26 June 2017.

[2]"OERs—Words Matter," <https://www.hrc.army.mil/>, accessed on 9 October 2018.

[3]Chemical Officer Branch, "Hot Topics," <https://www.hrc.army.mil/content/Newsletter%20-%20Hot%20Topics>, accessed on 9 October 2018.

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International Mechanisms for the Investigation of Alleged Use of Biological Weapons—A Primer

By Lieutenant Colonel Dana Perkins, Ph.D.

Biological weapons are a major threat to the security of the United States and its deployed troops and allies. A biological incident may have implications under the "Convention on the Prohibition of the Development, Production, and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction" (commonly known as the "Biological Weapons Convention") or United Nations Security Council Resolution (UNSCR) 1540 (2004) if the incident can be attributed to the actions of a foreign party.[1, 2] Under the United Nations (UN) charter, the UN Secretary-General is authorized to investigate alleged biological weapon use. There are several resources available to UN member states for requesting an investigation. For deployed troops engaged in weapons of mass destruction (WMD) elimination (now commonly referred to as countering weapons of mass destruction [CWMD]) operations, knowledge of the international mechanisms for the investigation of alleged biological weapon use is valuable for planning considerations and for the close integration of military activities with related international efforts.

Georgian SWAT and hazmat response units during Exercise Diablo Shield, Tbilisa, Georgia, 24–28 April 2017

Biological Threats

Joint Operating Environment 2035, *The Joint Force in a Contested and Disordered World*, contends that, by 2035, the United States will likely face a future security environment in which dangerous consequences will arise from fragile or failing states that are unable to maintain positive control of their WMD arsenal and WMD-related materials or to contain infectious disease outbreaks.[3] It further emphasizes that aggressive states may seek to challenge the U.S. system of alliances and partnerships of the future or change international rules in their favor; therefore, the joint force must be prepared to provide "military support to alliances and international law."[4]

As noted in the *Summary of the 2018 National Defense Strategy of the United States of America*, biological weapons are becoming more feasible for sovereign states and non-state actors, as biological agents, materials, knowledge, and expertise are widely available.[5] Information about biological weapons programs and the intent to use biological weapons has been difficult to ascertain (Iraq was thought to have an active biological weapon program during the lead-up to the second Gulf War but actually did not, while the former Soviet Union managed to hide a sophisticated biological weapon program employing tens of thousands of personnel). There is also a multitude of subjective opinions and a lack of consensus among experts with regard to the threat level and the inherent difficulty in distinguishing whether an outbreak is natural, deliberate, or accidental in origin.[6, 7]

International Arms Control Treaties and Nonproliferation Framework

In the international arena, the following agreements are relevant to prohibitions on the use of chemical, biological, and toxin weapons:

- "Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare," commonly known as the "Geneva Protocol."[8]
- "Biological Weapons Convention."[9]

- "Convention on the Prohibition of the Development, Production, Stockpiling, and Use of Chemical Weapons and on Their Destruction," commonly known as the "Chemical Weapons Convention."[10]
- UNSCR 1540 (2004).[11]

The "Geneva Protocol" prohibits the use of chemical and biological weapons in war. These prohibitions have become so widely accepted that they are considered by many to be customary international law and binding on all states.

The "Biological Weapons Convention" is supported (in terms of meetings, outreach, and implementation support services) by a three-person implementation support unit.[12] Article VI of the "Biological Weapons Convention" allows any State Party to lodge a complaint with the UN Security Council if they believe other member states are violating the convention and requires each State Party to cooperate with the subsequent investigation.[13] However, Article VI power has never been invoked.

On the other hand, Article V of the "Biological Weapons Convention" mandates that States Parties consult with one another and cooperate, bilaterally or multilaterally, to solve compliance concerns.[14] In 1997, Article V was invoked by Cuba when it requested a formal consultation on an alleged use of biological weapons by the United States. The Cuban allegations and the U.S. response were distributed to States Parties for consideration. About 20 countries commented, and almost all of them agreed that there was no significant evidence supporting the allegations and that a natural outbreak was plausible.[15] If the deliberations had yielded a different result, the UN Security Council could have levied sanctions (an unlikely scenario since the United States holds veto power).

The "Chemical Weapons Convention" bans chemical weapons and requires the destruction of legacy stockpiles within a specified period. It is implemented by the Organization for the Prohibition of Chemical Weapons (OPCW). Certain biological toxins (ricin, saxitoxin), while covered under the "Biological Weapons Convention," are also under the purview of the "Chemical Weapons Convention" as toxic chemicals produced by living organisms.[16]

Together, the "Biological Weapons Convention" and the "Chemical Weapons Convention" prohibitions extend to all biological agents and toxins and, essentially, to all chemicals unless they are intended for peaceful purposes or their types and quantities are consistent with such purposes. These treaties are far more comprehensive than the "Geneva Protocol," which outlaws the use but not the possession of biological and chemical weapons.

The Department of State publishes an annual report on compliance with international treaties. In recent reports, the United States indicated that Russia has outstanding "Biological Weapons Convention" compliance issues (no evidence was provided that Russia destroyed or diverted to peaceful purposes the offensive biological research and development programs inherited from the Soviet Union), that North Korea may consider the use of biological weapons (contrary to its obligations under the "Biological Weapons Convention"), and that it is uncertain whether Syria would consider the use of biological weapons as a military option.[17, 18] These annual reports illustrate how difficult it is to assess compliance and gain a clear understanding of the security threat posed by the activities of certain countries.

SWAT team member

UNSCR 1540 (2004) was unanimously adopted in 2004 under Chapter VII of the UN charter to address the risk that terrorists and other nonstate actors could acquire WMD or related materials.[19] The resolution also created a committee (the 1540 committee), supported by a group of experts, to monitor implementation of the resolution. Chapter VII gives the UN Security Council the authority to "determine the existence of any threat to the peace, breach of the peace, or act of aggression" and to take military and nonmilitary action to "restore international peace and security."[20] Decisions adopted under Chapter VII are binding upon all member states and override other international obligations. UNSCR 1540 (2004) places three major obligations on member states:

- Refrain from providing any form of support to nonstate actors that attempt to develop, acquire, manufacture, possess, transport, transfer, or use WMD or their means of delivery.
- Adopt and enforce appropriate, effective laws prohibiting WMD proliferation to nonstate actors.
- Implement and enforce appropriate controls over WMD-related materials.

The UN Security Council adopted subsequent resolutions reemphasizing the importance of UNSCR 1540 (2004) and the need for all member states to effectively implement it.[21] Through UNSCR 2325 (2016), the UN Security Council also called upon member states to take into account the evolving nature of risk of proliferation and rapid advances in science and technology in their implementation of UNSCR 1540 (2004).[22] Despite being adopted under Chapter VII authority, UNSCR 1540 (2004) does not address ways for the UN Security Council to intervene in cases of flagrant violations. However, through UNSCR 2118 (2013), the Security Council recalled state members' obligations under UNSCR 1540 (2004) and decided that "Member states shall inform immediately the Security Council of any violation of resolution 1540 (2004) . . . in order to take necessary measures . . ."[23]

United Nations Secretary-General's Mechanism for Investigation of Alleged Use of Chemical, Biological, and Toxin Weapons

In 2011, approximately 100 civilian and military personnel from the United States and other countries participated in a tabletop exercise focused on the United Nations Secretary-General's Mechanism (UNSGM) for Investigation of Alleged Use of Chemical and Biological Weapons in Tbilisi, Georgia.[24] The fictional scenario started with a letter to the Secretary-General from a UN member state alleging that biological weapons were used against its civilian population by a separatist faction, leaving numerous people dead or seriously ill. This tabletop exercise, facilitated by the United Nations Office for Disarmament Affairs (UNODA), was the first to use the updated UNSGM technical guidelines and procedures in a fictional biological weapon scenario. At the time, UNODA facilitators stressed that UNSGM was solely a fact-finding mission and, in accordance with its mandate, the UN team would not seek to identify perpetrators or assign blame.[25]

Since then, chemical weapon attacks in Syria have led to international condemnation. UNSGM was activated with regard to the 2013 chemical weapon use in Syria; but using UNSCR 2235, the UN Security Council, for the first time, expressed its determination to identify and hold accountable those responsible for such acts.[26] The resolution established the OPCW–UN Joint Investigative Mechanism with the mandate to identify, to the greatest extent feasible, the individuals, entities, groups, or governments who were perpetrators, organizers, sponsors, or otherwise involved in the use of chemicals as weapons in Syria.[27] This request for identification represents a step up in the basic authority given to the Secretary-General in the late 1980s by the UN General Assembly for ascertaining alleged violations of the "Geneva Protocol."

The Joint Investigative Mechanism and six other previous UNSGM investigations (four related to the Iran–Iraq War and two in response to reports of alleged chemical weapon use in Mozambique and Azerbaijan) expanded the collective knowledge and understanding of UN investigations of alleged chemical weapon use, which led to updates in the technical methods and procedures applied in the field. However, there is currently a lack of academic forward thinking about how the lessons learned from these investigations may be applicable to future investigations of alleged biological weapon use or, even more controversial, to investigations of alleged biological weapon development. It is a hopeful sign that in 2013, upon completion of the UN mission to investigate allegations of the use of chemical weapons in Syria, the Secretary-General called for a lessons-learned process to strengthen preparedness in order to enhance the effectiveness of future UNSGM investigations.[28] A similar lessons-learned process has yet to be applied to the Joint Investigative Mechanism since its conclusion.

Under the UN charter, the Secretary-General has the standing authority to investigate the use of biological weapons. However, the UN Security Council can request that the Secretary-General investigate any threat to international peace and security, including biological weapon development, possession, testing, transfer, or accidental release. Such investigations can also be carried out at the request

Multisectoral cooperation during chemical-biological incident response in counterterrorism opeartions, Exercise Diablo Shield

of state members. For biological investigations, the Secretary-General has the authority to make advanced arrangements (enlisting the support of relevant international organizations such as the World Health Organization) for investigating alleged biological weapons at the request of any member state. In the case of chemical investigations, as illustrated by the recent history of Syria, OPCW can participate in joint investigations with the UN and carry out its own fact-finding mission.

The UNSGM is triggered by a request to the Secretary-General (by the Security Council or a UN member state) to investigate the possible use of chemical and biological weapons in violation of the "Geneva Protocol" or other relevant rules of customary international law.

Incident site security

The key elements of the mechanism are the technical guidelines and procedures for the conduct of investigations and the roster of experts and laboratories provided by member states. The technical guidelines and procedures were first published in 1989 and updated in 2007.[29, 30] The skills, knowledge, equipment, and other resources in the roster are made available to the Secretary-General by member states and international organizations. Participating laboratories should have capabilities in specific areas, such as the identification and characterization of different biological warfare agent samples (including clinical and environmental samples); evaluation of the effects of biological warfare agents and toxins (including epidemiological and ecological modeling); examination and evaluation of munitions, munition components, and other military delivery devices (including all technical specifications); and analysis of explosives.[31]

Member states designate experts to serve on the roster for potential biological weapon investigations. These individuals should have expertise in medicine, veterinary medicine, plant health, microbiology, chemistry, toxicology, or epidemiology.[32] In addition, field experience, interviewing skills, expertise with sample collection and preparation, forensics, and knowledge of chemical and biological weapons effects are a plus.[33]

Once on the site of the alleged use of a biological or chemical weapon, the international team performs, among others, the following tasks: identify the location of the site of the attack; examine the terrain, vegetation, and animal life; determine the degree of contamination; conduct field detection and analysis; collect physical evidence and biomedical/environmental samples; and conduct interviews. Based on the international team's reports to the Secretary-General and referral to the UN Security Council, as appropriate, it is up to the Security Council to determine accountability for the use of biological weapons.

UNSGM has never been activated to investigate the use of biological weapons, but concerns about the potential use of biological weapons by state or nonstate actors led the UN to revise UNSGM technical guidelines and procedures in 2007 to make them more relevant to a biological investigation. UNODA (the custodian of UNSGM within the UN system) built partnerships and/or signed memorandums of understanding with international organizations (World Health Organization, International Criminal Police Organization) in preparation for an investigation. These organizations also contributed to the lessons-learned process and the 2015 report regarding the UN mission in Syria, which covered areas such as the activation of UNSGM, strategic partnerships, training and information sharing, unity and consistency of the mission, and legal aspects. Gaps were discovered with regard to current technical guideline and procedure provisions on the ownership, confidentiality, and intellectual property rights of the information, materials (including samples), and data collected and generated by a UN investigative mission. An important point highlighted in this lessons-learned report is that "only in extraordinary circumstances would the Secretary-General choose not to investigate an allegation of use."[34]

Strengthening UNSGM is one of the objectives of the Global Health Security Agenda and of the G7 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction.[35, 36] The 2018 Global Partnership statement on disarmament and nonproliferation encouraged Biological Weapons Convention States Parties to reinforce the operational capability of UNSGM.[37]

Conclusion

In military doctrine, CWMD operations refer to operations that systematically locate, characterize, secure, disable, and/or destroy state or nonstate actor WMD programs and related capabilities in a hostile or uncertain environment.[38] CWMD operations may also be an effective tool to preclude terrorists or rogue regimes from acquiring WMD-related materials during or in the aftermath of a military campaign.[39] However, current military doctrine does not

mention information sharing or any potential support to, or synchronization with, personnel supporting UNSGM on the ground. For instance, Army Techniques Publication (ATP) 3-90.40, *Combined Arms Countering Weapons of Mass Destruction*, provides a vignette for placing CWMD operations in context by stating, "U.S. forces are participating in a UN campaign in response to clear and present danger of an aggressive and autocratic regime that has been developing nuclear and chemical WMD capabilities . . ." but lacks any further details about the impact of the UN campaign on conduct of operations and the information environment even though it emphasizes that "CWMD operations typically occur in full view of a global audience."[40] In such an environment, a question that should be considered is whether U.S. government-designated laboratories and/or UN-designated laboratories, such as those included on the UNSGM roster should be used, to provide internationally accepted definitive confirmation of a biological weapon program.

While designated units train and exercise using CWMD plans and procedures, opportunities still exist for strengthening partner nation capabilities to distinguish between natural and deliberate outbreaks, to prepare for recognizing attempts by rogue states and nonstate actors to conceal or destroy evidence of biological weapon activities, and to effectively utilize international coalition-building tools such as UNSGM.[41] Such opportunities could be enabled by programs and activities (Global Health Engagement, Cooperative Biological Engagement, Theater Security Cooperation) in support of U.S. national security policies and defense security cooperation strategies by health security-related activities and exchanges.[42, 43, 44]

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Endnotes:

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Chemical Assets in a BEB:
The 300th Chemical Company Role in Operation Inherent Resolve

By Second Lieutenant Terry M. Lee

In October 2017, the 40th Brigade Engineer Battalion (BEB), the "Battering Rams" of the 2d Armored Brigade Combat Team (ABCT), 1st Armored Division, Fort Bliss, Texas, deployed to Kuwait in support of Operation Inherent Resolve and Operation Enduring Freedom. In March 2018, the 40th BEB was joined by the 300th Chemical Company of the 485th Chemical Battalion, 415th Chemical Brigade, 76th Operational Response Command, a U.S. Army Reserve unit based in Morgantown, West Virginia. This unique opportunity to have company level chemical, biological, radiological, and nuclear (CBRN) assets available greatly benefited the 40th BEB, allowing the BEB to be a more versatile fighting force and to assist with developing interoperability with the Kuwaiti army in the CBRN domain.

The 300th Chemical Company departed West Virginia in late February. The company was deployed with dismounted reconnaissance sets, kits, and outfits (DRSKO), which provides a wider spectrum of dismounted CBRN reconnaissance capabilities than is organic to 40th BEB's CBRN platoon. Upon arriving at Camp Arifjan, Kuwait, in March 2018, the 300th Chemical Company quickly integrated itself within the 40th BEB, serving as a quick reaction-force command and a base defense operations center. The 300th also integrated CBRN training into the routine of the 40th BEB. Two events best highlight the advantages of attaching the 300th Chemical Company to the 40th BEB:

- A CBRN training partnership with members of the Kuwait Ministry of Defense Weapons of Mass Destruction Battalion.
- A CBRN Day for members of the 2d ABCT, security forces, and the U.S. Central Command.

CBRN Training Partnership

The CBRN training partnership, staged by the 300th Chemical Battalion, took place in early April at the Kuwait Naval Base. It helped develop interoperability with Kuwait counterparts. During the training, a vehicle was treated as if it were contaminated by a radiological weapon of mass destruction. Combined teams of U.S. and Kuwaiti soldiers decontaminated the vehicle using an M-26 joint service pump. Vehicle operators and occupants simultaneously performed mission-oriented protective posture gear exchanges nearby. The training was amplified by the summer heat in Kuwait, which allowed U.S. and Kuwaiti

A vehicle is decontaminated with the M-26 joint service pump by a combined group of 300th CBRN Soldiers and Kuwaiti soldiers during the CBRN Training Partnership at Kuwait Naval Base, Kuwait.

soldiers to prove their mental and physical toughness by enduring the conditions.

Kuwait holds the ability to prevent chemical warfare in high regard. This is evidenced by their representation in the November 2017 Conference of the States Parties of the Organization for the Prohibition of Chemical Weapons and the January 2018 ministerial conference on the International Partnership against Impunity for the Use of Chemical Weapons. Kuwait has also been a member of the Convention on the Prohibition of the Development, Production, Stockpiling, and Use of Chemical Weapons and on Their Destruction since 1997.[1] With this in mind, the invitation of the Kuwaiti Weapons of Mass Destruction Battalion to the combined CBRN training helped develop interoperability by demonstrating that the U.S. Army values the exchange of information for chemical disaster prevention capabilities. Without the attachment of the 300th Chemical Company, the 40th BEB would not have had the resources needed to conduct this valuable training event.

CBRN Day

CBRN Day was a showcase of CBRN prowess for members of the 2d ABCT, security forces, and U.S. Central Command at Camp Arifjan. During the morning portion of CBRN Day, the 300th Chemical Company and 40th BEB CBRN platoon staged a "round-robin" style static display of CBRN detection equipment, including DRSKO and various chemical protective suits. The audience saw a demonstration of an M1135 Nuclear Biological Chemical Reconnaissance Vehicle (NBCRV) marking a contaminated area and taking a possible contaminated soil sample from the inside of the vehicle. Attendees also got hands-on experience with platoon level CBRN gear for dismounted and mounted reconnaissance and watched a team from the 300th Chemical Company conduct a dismounted reconnaissance demonstration. The 300th performed a site survey and took samples of substances found at a clandestine laboratory during the demonstration.

The audience observed an operational decontamination demonstration using the M-26 on different types of military vehicles. To close the day's demonstrations, the 28th Infantry Division and the 300th Chemical Company presented seminars on the importance of incident command systems and the effective employment of different echelons of CBRN units. Attendees of CBRN Day came away with a better understanding of the capabilities of CBRN units of today and how CBRN units can be better utilized in BEBs and ABCTs.

Summary

The attachment of the 300th Chemical Company during the latter half of Operation Inherent Resolve made the 40th BEB a more versatile fighting force and allowed greater emphasis on CBRN capabilities during training. The 300th Chemical Company enabled the application of interoperability with the Kuwaiti army in the chemical realm, a shared concern of the United States and Kuwait. The 300th helped the 40th BEB resource and troubleshoot issues with its own modified table of organization and equipment, namely the NBCRV and M26 decontamination apparatus. The 40th BEB emerged from Operation Inherent Resolve with a greater appreciation for company level chemical assets and the advantage they provide on the battlefield in the prevention and early detection of chemical agents and in decontamination if a chemical attack has occurred. The experience of working with the 300th Chemical Company was invaluable to the deployment and left a lasting impression on the 40th BEB Soldiers.

Members of the 300th CBRN Company discuss and display samples during CBRN Day at Camp Arifjan, Kuwait, for an audience of 2d ABCT, security forces, and U.S. Central Command leaders.

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TOO HEAVY A BURDEN:
WHY THE NBCRV NEEDS TO LEAVE THE BCT

By Captain Anthony J. Guerrero

In 2006, the U.S. Army fielded the M1135 Nuclear, Biological, Chemical Reconnaissance Vehicle (NBCRV) to replace the M93 Fox Nuclear, Biological, and Chemical Reconnaissance Vehicle and the M31 Biological Integrated Detection System. The NBCRV combines the capabilities of its predecessors into one mobile laboratory.[1] It provides brigade commanders the organic ability to conduct presumptive chemical, biological, radiological, and nuclear (CBRN) surveillance; field confirmatory reconnaissance; and detect-to-treat biological surveillance, all digitally connected to the brigade headquarters through radio and satellite frequencies.[2] The NBCRV that General Dynamics Corporation delivered to the Army succeeded in fulfilling all of these requirements; however, the Army and the Chemical Corps failed to appropriately calculate the cost of having a mobile laboratory within a brigade combat team (BCT). Despite the unique capabilities of the NBCRV, maintenance is too labor-intensive and expensive and realistic training is too difficult to justify the vehicle being placed in the BCT. The Army should remove the NBCRV from Regular Army Stryker and armored BCTs and task-organize it to CBRN companies.

NBCRV maintenance is time-consuming and complex. An NBCRV requires approximately two work days to maintain each week. Preventive maintenance checks and services (PMCS) require three specialized military occupational specialties and related technical manuals. In contrast, the M1126 Infantry Carrier Vehicle (the most common variant of the Stryker) requires one technical manual and takes about half of one work day to perform PMCS, with a Military Occupational Specialty 91S (Stryker Systems Maintainer) providing field level maintenance.

NBCRV maintenance is expensive. The vehicle contains fragile, expensive systems that, if damaged, require replacement of extremely expensive major subcomponents; this work is normally above the operator or field maintenance level. Moreover, scheduled maintenance services for the NBCRV drive up its cost. In a BCT, the NBCRV platoon has three vehicles. A unit spends an average of $387,000 per NBCRV per year just for all scheduled sensor services. This means that BCTs currently spend more than $1,000,000 annually to maintain their vehicles. If all services were performed, units would spend closer to $2,000,000 per NBCRV each year.

It is difficult for BCT commanders to train an NBCRV platoon. Providing realistic NBCRV training is difficult because for many of the sensors, there is no authorized training simulant that creates a false positive and alarms the sensor. During training, observer/coaches or other white cells arbitrarily provide feedback of positive or negative readings to prompt the crew to execute the correct battle drill. In addition to the lack of proper training aids, the NBCRV sensor suite is fragile. This forces leaders to stay on roads or on large, flat, open areas where there is little risk of damaging the equipment. This further degrades a realistic training environment and causes commanders to be wary of scheduling training for NBCRV platoons for fear of maintenance issues.

NBCRV platoon manning also complicates training. Due to the small number of Soldiers in a BCT NBCRV platoon, training becomes problematic when accounting for Soldiers who are not available due to professional military education attendance, medical nonavailability, or administrative nonavailability. There is rarely a time when BCT commanders have enough of their NBCRV platoon present to conduct platoon level training.

Taking the NBCRV out of the BCT and realigning it only in CBRN companies would solve most of these problems. Removing the NBCRV from BCTs would not fix all the maintenance problems associated with the NBCRV, but it would take the maintenance cost away from the BCT commander. The CBRN battalion commander has a larger budget and better access to military and civilian subject matter experts who can keep annual operating costs down.

CBRN company commanders cannot create new training aids, but they are more likely than BCT commanders to create training that is as realistic as possible and to create requirements to develop new training aids in the future. In addition, the improved access that CBRN company commanders have to NBCRV subject matter experts would allow them to provide external evaluators for NBCRV training. CBRN company commanders would also have fewer manning issues than BCT commanders. A CBRN company with four NBCRVs would have more personnel; if BCTs no longer had NBCRVs, BCT NBCRVs could be moved to CBRN companies, which would increase personnel and equipment in the NBCRV platoon. Soldiers would still be unavailable for a variety of reasons, but having more equipment and personnel on would hand allow the commander to better execute platoon level collective tasks.

Some may argue that the NBCRV should stay in the BCT. They might say that while the current sensor suite is expensive in terms of cost and labor systems, measures are being taken to bring down maintenance cost and increase the durability of NBCRV sensors.[3] Some might also argue that BCTs could mitigate the lack of realism in NBCRV training through the use of virtual training systems. Finally, opponents of moving NBCRVs to CBRN companies could say that taking the NBCRV out of a BCT would take an important CBRN reconnaissance capability away from brigade commanders.[4]

These are not baseless arguments. The new sensors that are coming to the NBCRV should reduce maintenance cost and increase the hardiness of the systems; however, these upgrades were slated to begin in Fiscal Year 2018 but have now been pushed to Fiscal Year 2024.[5] It is unacceptable to expect a maneuver commander to bear this maintenance burden for another 6 years. It is also true that virtual trainers play an important role in NBCRV training. Nevertheless, a virtual trainer cannot currently simulate the experience of driving off-road or finding and collecting a sample in a tactical scenario. No one would tell an infantry battalion commander that virtual training is an acceptable substitute for a platoon live-fire exercise, and the same reasoning should also apply to an NBCRV platoon.

Removing the NBCRV from the BCT would take many capabilities out of the hands of the maneuver commander. As previously stated, the NBCRV gives brigade commanders the organic ability to conduct presumptive CBRN surveillance, field confirmatory chemical reconnaissance, and detect-to-treat biological surveillance. What is not evident to the layperson is that the CBRN surveillance the NBCRV provides is so short-range that it does not do much more than provide a few minutes' warning of a downwind hazard; the ability to conduct field confirmatory chemical reconnaissance simply confirms what infantry battalion organic chemical detection equipment would have already noted. To conduct most doctrinal biological surveillance missions, a commander would need more than three NBCRVs. It is also important to remember that a BCT commander does not fight in a vacuum. Even if NBCRVs were not organic to a BCT formation, they could still be attached to provide support to commanders when needed—the same way technical escort assets are attached to maneuver formations when needed.

When it comes to CBRN reconnaissance, commanders have one question: Is there a CBRN threat in the avenue of approach, or is it safe for maneuver forces? The NBCRV can absolutely answer this priority information requirement for a commander; yet, even without an NBCRV, maneuver commanders can already presumptively confirm or deny the presence of a CBRN threat using equipment that is organic to all of their formations. When considered from this perspective, one cannot justify the cost of keeping an NBCRV in a BCT. On the other hand, an NBCRV in a CBRN company would be easier to man, train, and maintain and would be more useful. Unlike a BCT commander, who is trying to exploit speed in the maneuver, a CBRN company commander is trying to perform a thorough CBRN reconnaissance and has more time to conduct higher levels of analysis. With NBCRVs only organic to CBRN companies, the CBRN company commander would also have an improved ability to support the division as a whole, meaning that an NBCRV could support a BCT when needed, while still providing support to other assets such as a combat aviation brigade or an expeditionary military intelligence brigade. The NBCRV is a highly capable asset and certainly has a role in the Regular Army; but as currently fielded, it clearly belongs in a CBRN company—not in a BCT.

Author's Note: The views and opinions expressed or implied in this article are those of the author and should not be construed as carrying the official sanction of the Department of Defense, the U.S. Army, or other agencies or departments of the U.S. government.

Endnotes:

[1]Bruce Baldwin, "Stryker NBCRV," *Army Chemical Review*, January–June 2007, pp. 4–7.

[2]Ibid.

[3]Maria R. Gervais, "Chief of Chemical and Commandant, U.S. Army Chemical, Biological, Radiological, and Nuclear School," *Army Chemical Review*, Summer 2016, pp. 2–3.

[4]Matthew A. Engel, "The Devaluation of CBRN Capabilities at the Brigade Level," *Army Chemical Review*, Summer 2016, pp. 28–29.

[5]James E. Bonner, "Chief of Chemical and Commandant, U.S. Army Chemical, Biological, Radiological, and Nuclear School," *Army Chemical Review*, Summer 2017, pp. 2–4.

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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*	29 Oct 18	Current.
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 synchronizes and updates language with JP 3-40 and JP 3-41; recognizes the proponent change for global countering weapons of mass destruction (WMD) to the U.S. Special Operations Command; and updates, revises, or deletes definitions and discussions to synchronize with other doctrinal updates.			
JP 3-27	*Homeland Defense*	10 Apr 18	Current.
JP 3-27 discusses fundamentals of homeland defense (HD), to include threats; policy and legal considerations; active, layered defense; and the HD operational framework. It describes command relationships and interorganizational cooperation in HD. It outlines strategic guidance, operational factors, intelligence sharing, and joint functions considerations for planning and operations for HD. Finally, JP 3-27 updates the relationships between Homeland security, HD, and defense support of civil authorities (DSCA) reflected by the new National Defense Authorization Act for Fiscal Year 2017.			
JP 3-28	*Civil Support*	31 Jul 13	Under revision.
JP 3-28 provides overarching guidelines and principles to assist commanders and staffs in planning, conducting, and assessing 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 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.
JP 3-41 describes CBRN response activities 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 chemical, biological, radiological, and nuclear response enterprise (CRE) capabilities and joint force matrix and clarifies supporting roles during international CBRN response.			
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	Current. Change 1 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*	24 Sep 18	Current.
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. Under review for revision.
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 CRE and conducting domestic CBRN response operations in support of DOD missions and national objectives. It will focus on planning, preparation, and execution at the tactical level. ATP 3-11.42 will incorporate changes in doctrine from updated JP 3-11, JP 3-28, and JP 3-41, and explain how the WMD-Civil Support Team (CST) concept of operations is integrated into the CRE structure. It will incorporate key doctrinal elements from ATP 3-11.41, ATP 3-11.46, and ATP 3-11.47.			
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–CST doctrine.			

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.			
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*	28 Aug 18	Current.
ATP 3-37.11 provides doctrine to facilitate the operations and training requirements of the CBRNE command. It also provides 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.			
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. Change published.
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. Change 1 adds Air Force designation.			

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 75 hours of dL instruction, which must be completed within 60 days before attending Phase II. The successful completion of Phase I Federal Emergency Management Agency (FEMA) 100/200/700/800, Hazmat Awareness Training, and Defense Support of Civil Authorities (DSCA) Phase I are required for Phase II attendance. Unit trainers enroll Soldiers through the Army Training Requirements System (ATRRS). 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>.
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 ATRRS. 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 ATRRS 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, Sergeant First Class Yabronda A.Battles at (573) 596-6221 or <yabronda.a.battles.mil@mail.mil>.

Contact Information

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Chief Warrant Officer Two Daniel I. Thomas (Senior Warrant Advisor-ARNG), (573) 563-5221 or <daniel.i.thomas3.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 W. 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.

Army Chemical Review Writer's Guide

Army Chemical Review is a Department of the Army-authenticated publication that contains instructions, guidance, and other materials to continuously improve the professional development of Army chemical, biological, radiological, and nuclear (CBRN) personnel. It also provides a forum for exchanging information and ideas within the Army CBRN community. *Army Chemical Review* includes articles by and about commissioned officers, warrant officers, enlisted Soldiers, Department of the Army civilians, and others. Writers may discuss training, current operations and exercises, doctrine, equipment, history, personal viewpoints, or other areas of general interest to CBRN personnel. Articles may share good ideas and lessons learned or explore better ways of doing things. Shorter, after action type articles and reviews of books on CBRN topics are also welcome.

Articles should be concise, straightforward, and in the active voice. Avoid using acronyms when possible. When used, acronyms must be spelled out and identified at the first use. Also avoid the use of bureaucratic jargon and military buzzwords. Text length should not exceed 2,000 words (about eight double-spaced pages).

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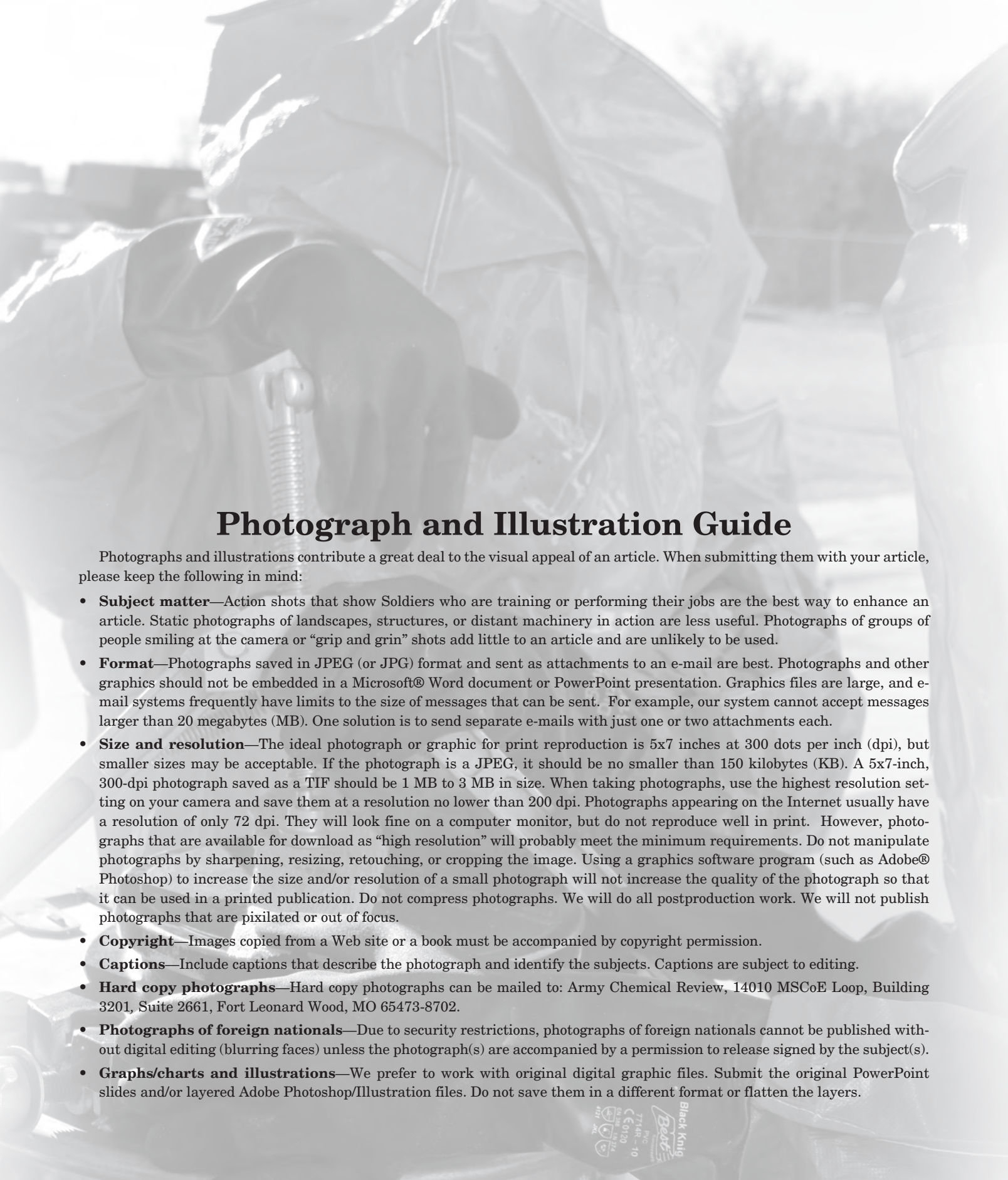

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