



Army Chemical Review

The Professional Bulletin of the Chemical Corps

2021



"Dragon Soldiers, CBRN Warriors"

U.S. Army
Chemical, Biological, Radiological, and Nuclear School
(573) XXX-XXXX
DSN 676-XXXX (563 prefix) or 581-XXXX (596 prefix)

COMMANDANT
BG Daryl O. Hood 563-8053
daryl.o.hood.mil@mail.mil

ASSISTANT COMMANDANT
COL Sean G. Kirschner 563-8053
sean.g.kirschner.mil@mail.mil

CHIEF OF STAFF
LTC Christine L. Emerick 563-8052
christine.l.emerick.mil@mail.mil

REGIMENTAL COMMAND SERGEANT MAJOR
RCSM Christopher Williams 563-6133
christopher.williams6.mil@mail.mil

REGIMENTAL CHIEF WARRANT OFFICER
RCWO Robert A. Lockwood 563-8051
robert.a.lockwood2.mil@mail.mil

DEPUTY COMMANDANT
Mr. Scott D. Kimmell 563-8132
scott.d.kimmell.civ@mail.mil

DEPUTY ASSISTANT COMMANDANT- ARMY RESERVE
COL Chae Kim 563-8050
hui.c.kim10.mil@mail.mil

DEPUTY ASSISTANT COMMANDANT-NATIONAL GUARD
MAJ Josh G. Howell 563-7676
josh.g.howell.mil@mail.mil

3D CHEMICAL BRIGADE
COL Adam W. Hilburgh 596-0016
adam.w.hilburgh.mil@mail.mil

DIRECTORATE OF TRAINING AND LEADER DEVELOPMENT
Dr. Barbara A. Kilthau 563-6531
barbara.a.kilthau.civ@mail.mil

PERSONNEL DEVELOPMENT OFFICE
CPT Chester T. Garner 563-7374
chester.t.garner.mil@mail.mil

CHIEF OF DOCTRINE
LTC Roger M. Lewis 563-8189
roger.m.lewis.mil@mail.mil

FFID PUBLICATIONS
Managing Editor, Diana K. Dean 563-4137
diana.k.dean.civ@mail.mil
Editor, Cheryl A. Nygaard 563-5226
cheryl.a.nygaard.civ@mail.mil
Contributing Editors,
Kyle A. Lockwood 563-5004
kyle.a.lockwood.civ@mail.mil
Adam P. Helmintoller 563-7546
adam.p.helmintoller.civ@mail.mil
Graphic Designer, Dennis L. Schellingberger 563-5267
dennis.l.schellingberger.civ@mail.mil

Army Chemical Review (ACR) (ISSN 0899-7047) is published annually in May by the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS) and the Maneuver Support Center of Excellence, Fort Leonard Wood, Missouri. *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. Send submissions by e-mail to usarmy.leonardwood.mscoe.mbx.acr@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 publish articles that have already been published elsewhere.

Articles may be republished if credit is given to *ACR* and its authors. All photographs are official U.S. Army photographs unless otherwise noted. *ACR* reserves the right to edit material.

ACR is now published exclusively online. It is available at the following links: <https://www.dvidshub.net/publication/517/army-chemical-review> and https://home.army.mil/wood/index.php/contact/publications/CR_mag. If you have a paid subscription and need a refund, please contact the U.S. Government Publishing Office, P.O. Box 979050, St. Louis, MO 63197-9000.

DIGITAL SUBSCRIPTIONS are available at <https://www.dvidshub.net/publication/517/army-chemical-review> and https://home.army.mil/wood/index.php/contact/publications/CR_mag.

By Order of the Secretary of the Army:

JAMES C. MCCONVILLE

General, United States Army

Official: *Chief of Staff*



KATHLEEN S. MILLER

Administrative Assistant

to the Secretary of the Army

2106303

Army Chemical Review

The Professional Bulletin of the Chemical Corps

PB 3-21-1, 2021

- 2 Chief of Chemical and Commandant, U.S. Army Chemical, Biological, Radiological, and Nuclear School**
- 4 Regimental Command Sergeant Major**
- 6 Regimental Chief Warrant Officer**
- 7 The 3d CST Conducts COVID-19 Response Operations Throughout Pennsylvania**
By Captain Cesar A. Allen
- 8 COVID-19: A Case for Bioterrorism Awareness**
By Captain Matthew E. Bertram
- 10 Precise Response**
By Captain Nicholas L. Calangi, Master Sergeant Jennifer L. Langes, and First Sergeant Daniel E. Totten
- 12 More Time in the Hot Zone: CBC Develops Lighter, Longer-Lasting Respiratory Protection System**
By Dr. Brian B. Feeney
- 14 The Puteaux Laboratory**
By Ms. Christy L. Lindberg
- 16 Improved Testing Could Get CB Protection to Warfighters Faster**
By Mr. Albert C. Vogel
- 18 34th CERFP Responds to COVID-19**
By Major Andrew J. Czaplicki
- 19 Army Scientist Plays Key Role in International Ban on Nerve Agent**
By Dr. Brian B. Feeney
- 20 Enhancing CBRN Interoperability and Building Relationships in the Netherlands**
By Captain Lorenzo Llorente II and Kaptain Tom Martens
- 22 BGCA: Chemical Weapons Caretakers**
By Ms. Angela L. Messinger
- 25 Back to School: Higher-Education Opportunities for CBRN Officers**
By Lieutenant Colonel Peter C. Zappola and Captain Chester T. Garner
- 27 The 8th WMD-CST and 8th CERFP Conduct COVID-19 Response Operations Throughout Colorado**
By Lieutenant Colonel Ryan G. Brock and Sergeant First Class Christian M. Gonzales
- 28 Decontamination Points: An Antiquated Graphic Control Planning Measure?**
By Major Spenser C. Weddington
- 30 Rethinking the CBRN Officer Career Path for Command and Staff Positions**
By Major Cameron W. Lothridge
- 33 2021 Honorees of the U.S. Army Chemical Corps**
Compiled by Ms. Christy L. Lindberg
- 34 Colonel Harry D. Tyson and the Development of the Mine-Clearing Line Charge**
By Mr. Kip A. Lindberg
- 36 Chemical Corps Regimental Honors Program: 2022 Nominations for the Hall of Fame**
- 37 Doctrine Update**

The Reserve Component Update is now available online at the following link:

<https://home.army.mil/wood/index.php/contact/publications/CR_mag>





Chief of Chemical and Commandant



U.S. Army Chemical, Biological, Radiological, and Nuclear School

Greetings, Dragon Soldiers! There are so many things going on in the world today. Whether you read the news on your computer or smart phone or you're one of the few people who still enjoy the well-fashioned newspaper or magazine, the myriad of events are too many to count. We can expect competition to occur on any number of topics, such as international relations, global trade, diplomacy, information operations, economics, military presence and training exercises, science, technology, the Novel Coronavirus (COVID-19) pandemic, vaccines, and the list goes on. What does this narrative suggest to us? According to Joint Doctrine Note (JDN) 1-19, *Competition Continuum*, "Rather than a world either at peace or at war, the competition continuum describes a world of enduring competition conducted through a mixture of cooperation, competition below armed conflict, and armed conflict."¹ With the competition continuum, our operating environment will continue to face volatile, uncertain, complex, and ambiguous challenges. Regardless of the challenges that we face, we must do our part as leaders in our Army and our Corps. We will remain aligned and nested in accomplishing our priorities.

Our Fiscal Year (FY) 2021 priorities are focused on developing leaders and driving change through creating options, combined arms solutions, and modernization strategies to win against peer threats in chemical, biological, radiological, and nuclear (CBRN) environments in large-scale combat operations. It is now incumbent upon our team to develop specific capabilities to achieve modernization objectives across the doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) domains. The modernization strategy is composed of three core functions: assess, protect, and mitigate; the desired end state is the ability to allow commanders to retain freedom of action in a CBRN environment. Much has recently been accomplished, but there is more to be done to ascertain our strategy. To provide clarity, we must understand our current initiatives by using the DOTMLPF approach.

There are three main CBRN doctrine publishing priorities for FY 2021—the development and publication of Army Techniques Publication (ATP) 3-11.74, *Chemical, Biological, Radiological, and Nuclear Platoons*² and ATP 3-11.32, *Chemical, Biological, Radiological, and Nuclear Passive Defense*³ and the revision of ATP 3-90.40, *Combined Arms Countering Weapons of Mass Destruction*.⁴ ATP 3-11.74, which was recently published, will assist CBRN platoon leaders and platoon sergeants in planning, preparing, and executing platoon operations for various CBRN platoon formations. The rewriting of ATP 3-11.32 will involve deconstructing the publication from its current form and creating two separate manuals. ATP 3-11.32 will be retitled as *Chemical, Biological, Radiological, and Nuclear Protection* and will focus on operational- and tactical-level considerations for protecting U.S. forces in a CBRN environment. ATP 3-11.33 will be developed as a new manual entitled *Chemical, Biological, Radiological, and Nuclear Contamination Mitigation* and will focus on aspects of preparing for, responding to, and recovering from incidents involving CBRN contamination. ATP 3-11.32 and ATP 3-11.33 are scheduled to be completed in May 2023. ATP 3-90.40 is being rewritten as a multi-Service publication linking the tactical and operational combined arms framework to the strategic organizing principles established in Joint Publication (JP) 3-40, *Joint Countering Chemical Weapons of Mass Destruction*,⁵ with publishing scheduled in October 2022.

On 24 July 2019, the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS), Fort Leonard Wood, Missouri, published the "Interdependent Contamination Mitigation White Paper" to explain contamination mitigation.⁶ This document serves as the conceptual framework to help guide the modernization of the contamination mitigation capability and establishes three objectives: gain real-time understanding, establish inherent protection, and negate hazard effects. On 18 March 2021, we completed our second contamination mitigation tabletop exercise, in which we completely reviewed and assessed our current decontamination capabilities to reduce the time and resources required to reduce risk to the force. We have developed and are in the process of packaging the Chemical Self-Assessment and Mitigation Bag. This resource will allow first-line leaders to employ a risk mitigation capability specifically designed for the general-purpose force. Our team will continue to answer the call and collaborate, innovate, and implement creative solutions to difficult problems.



**Brigadier General
Daryl O. Hood**

USACBRNS continues to use experimentation as a means of providing resource-informed, integrated, outcome-based results. We have conducted four joint and Army experiments, which addressed—

- Brigade combat team and marine, air, and ground task force threat awareness and understanding.
- Mounted CBRN reconnaissance and surveillance and chemical, biological, radiological, nuclear, and explosives (CBRNE) companies at echelons above brigade.
- Contamination mitigation.
- Dismounted CBRN reconnaissance and surveillance.

There were more than 650 participants involved in these experiments. Attendees represented military specialties from every warfighting function across the Department of Defense.

USACBRNS continuously assesses CBRN and Army force structures to ensure that the right capabilities are provided in support of the Army by integrating Military Occupational Specialty (MOS) 74D—CBRN Specialist back into maneuver formations—specifically, into brigade combat teams.

Headquarters, Department of the Army directed the conversion of five existing Active Component CBRN hazard response companies to CBRN heavy decontamination reconnaissance companies and the reduction of one heavy decontamination platoon in each of 24 Reserve Component CBRN area support companies. This addresses and eliminates Large-Scale Combat Operations Gap 16, regarding terrain and fixed-site decontamination capabilities.

Regarding the core function of protection, USACBRNS spearheaded the replacement of the Joint Service Lightweight Integrated Suit Technology with the Uniform Integrated Protection Ensemble Family of Systems, General-Purpose. The final selection for replacement was based upon positive user feedback; reduced thermal burden and improved mobility; and improved liquid, aerosol, and vapor protection. The replacement program, which is on track to attain Milestone C in a year, will improve Soldier lethality and the readiness of our force.

With regard to the area of assess, USACBRNS recently conducted two tabletop exercises focused on mounted and dismounted CBRN reconnaissance and surveillance. These tabletop exercises were designed to provide input for the concepts of employment for our CBRN reconnaissance and surveillance platoons, hazard assessment platoons, CBRNE companies, and infantry brigade combat team CBRN reconnaissance platoons. In addition, our materiel effort regarding the nuclear, biological, chemical, and radiological vehicle (NBCRV) sensor suite upgrade was at the forefront of the core function of assess. We piloted numerous experimentation efforts and completed the analysis necessary to replace obsolete sensors with leap-ahead technology across the force, increasing our lethality and survivability. Our focused efforts resulted in the integration of similar capabilities into a single sensor, reducing the load for our Soldiers while providing a networked set of sensors to our commanders, allowing for their immediate awareness. The first platoon will be equipped with the sensor suite upgrade in FY 23, and an initial operational capability is slated to be in place by FY 26.

USACBRNS has been working diligently with the leadership at the Maneuver Support Center of Excellence, Fort Leonard Wood, Missouri, and the U.S. Army Combined Arms Center, Fort Leavenworth, Kansas, to recalibrate our leader development strategy through data-rich assessments and to establish the desired knowledge, skills, and behaviors of our officers and noncommissioned officers over the course of their careers. Our efforts continue to help develop and refine our officer professional military education by increasing the practical application of course materials for the CBRN Basic Officer Leader Course and the CBRN Captain's Career Course. We completed a transition to large-scale combat warfighting vignette/scenario case study-based instruction.

We have begun coordinating the initial phases of the construction of a large-scale production training facility that will replicate near-peer threat production capabilities. The facility will fill a training resource gap for professional military education, functional courses, and U.S. Army Forces Command units. With this training asset, CBRN Soldiers will have the opportunity to train in an industrial-sized, state-sponsored weapons-of-mass-destruction facility, similar in size and complexity to what might be encountered in large-scale combat operations.

One of the great qualities of our Regiment is our ability to rapidly cross-level our ideas and information with one another. We are strongest when we fight together, and there has never been a more pressing time for the implementation of this philosophy than now. To counter near-peer adversaries, COVID-19, or any emerging CBRN threat, we must be proactive—not reactive. We must always remain at the leading edge of technology and modernization. Our Nation and our Service members are counting on USACBRNS and Dragon Soldiers to always bring their best to defend the homeland and win against any enemy. Stay disciplined and ready, and remain resilient during this crisis. We will defeat these threats together!

(Continued on page 5)



Regimental Command Sergeant Major



Greetings from the home of the U.S. Army Chemical Regiment. As your Regimental Command Sergeant Major, I have been constantly striving to improve our Corps and this past year, I have focused heavily on talent management. In addition, I have conducted multiple leader professional development sessions with our senior leaders and professional military education population on HOW mentoring our future leaders SHOULD be done.

As you know, we have recently faced one of the greatest crucibles of all time, fighting to protect the health and welfare of our people during the battle against the Novel Coronavirus (COVID-19). It filled me with incredible pride as I witnessed countless leaders in our Regiment stepping up to answer the call across the globe. Serving on the front lines in the fight against COVID-19, Dragon Soldiers have reconnected, contributed, and shared best practices and lessons learned throughout the world to support our communities during this daunting mission. Our expertise, skills, equipment, and training have been in high demand for the past year, and I can assure you that our Soldiers and units have answered the call with professionalism and competence everywhere they have been employed.

Over the past year, the U.S. Army Human Resources Command has changed how it manages talent, adopting a “Mission first, people always” philosophy. The Assignment Satisfaction Key–Enlisted Marketplace (ASK-EM), currently in place, will serve as a bridge or transitional system, until the Integrated Personnel and Pay System–Army can be fully implemented. The new system is projected to go online in December 2021, with market implementation in 2022. The intent of ASK-EM is to inject a higher level of transparency and objectivity in the assignment process for noncommissioned officers (NCOs) who are sergeants (promotable) through master sergeants. With few exceptions, ASK-EM actions are initiated based on the year and month that an individual is available to move. That date, in turn, is based on various aspects of the individual’s situation; however, the baseline is 36 months’ time on station for continental U.S. assignments.

With ASK-EM, Soldiers are in complete control of their own professional development to the extent possible. The Chemical Branch staff remains committed to providing feedback to individuals to help them build a foundation upon which to base their assignment decisions. Furthermore, within the ASK-EM module, the Branch staff provides comments and assignment recommendations based on a screening of the Soldier’s record, assignment history, and how the assignment history compares to Department of the Army (DA) Pamphlet (Pam) 600-25, *U.S. Army Noncommissioned Officer Professional Development Guide*,¹ and the Military Occupational Specialty 74D—Chemical, Biological, Radiological, and Nuclear (CBRN) Specialist professional development model. It is imperative that Soldiers remain engaged during the process, communicate with their branch manager, and seek guidance and input from their leadership, as they are in control of their own professional development. It is also imperative that senior enlisted leaders be involved in this process by providing counsel and advice to those under their charge. Unit personnel sections can pull information about the year and month that Soldiers are available to move from the Enlisted Distribution and Assignment System, which assists the senior enlisted leaders in understanding which Soldiers are currently in the cycle; senior enlisted leaders can then have candid conversations with movers about the best decision with regard to the Soldier’s professional development.

Many great things have occurred in the Chemical Corps within the past couple of months. We are extremely proud to announce the selection of eight master sergeants for attendance at the NCO Leadership Center of Excellence, Fort Bliss, Texas—the location of the Army’s culminating enlisted professional military education. This is a remarkable achievement for this superb group of senior NCOs—a true testament to their commitment to our Corps, the Soldiers within our formations, and the efforts and sacrifices they have made throughout their distinguished careers. Congratulations to the following selectees and their Families:

- Master Sergeant Domenic O. Barbeiro.
- Master Sergeant Peter R. Dallas.
- Master Sergeant Jawayne A. Gibbons.
- Master Sergeant Richard T. Jordon.
- Master Sergeant Jorge L. Rivera.
- Master Sergeant Polly Anna Schmidt.
- Master Sergeant Ricky Sierra Jr.
- Master Sergeant Sherine T. Richards.



**Command Sergeant Major
Christopher Williams**

Furthermore, DA recently conducted the Fiscal Year 2022 Command Sergeant Major Slate Board for the Regular Army, U.S. Army Reserve, and Army National Guard. As a result of this board, three of our very own CBRN sergeants major have been selected to serve in command sergeant major positions at the battalion level and two have been selected to serve as command sergeants major at the brigade level. This momentous occasion signifies their commitment to excellence, leadership, and devotion to our Corps and the Army. Congratulations to the following selectees and their Families:

Battalion Command Sergeant Major Selectees:

- Sergeant Major Francisco J. Cardenas.
- Sergeant Major Chylander S. Cummings.
- Sergeant Major William J. Fritzinger.

Brigade Command Sergeant Major Selectees:

- Command Sergeant Major Joe E. Johnson Jr.
- Command Sergeant Major Tremayne A. Robbins.

For many years, our career management field has been striving to provide additional opportunities for our command sergeants major. For the VERY FIRST time in history a CBRN command sergeant major has been selected for assignment to the Army Materiel Command—U.S. Army Environmental Command, Fort Sam Houston, Texas; congratulations to Command Sergeant Major Tremayne A. Robbins.

Congratulations are also in order for Command Sergeant Major Jorge Arzabala Jr. for his selection to serve as the command sergeant major of the 20th Chemical, Biological, Radiological, Nuclear, and Explosives Command, Aberdeen Proving Grounds, Maryland.

Please ALWAYS remember that I am extremely honored to have been your Regimental Command Sergeant Major. Thank you very much for your hard work, dedication, and unwavering support.

***Dragon Soldiers! CBRN Warriors!
Elementis Regamus Proelium!***

Endnote:

¹DA Pam 600-25, *U.S. Army Noncommissioned Officer Professional Development Guide*, 11 December 2018.

(“Commandant,” continued from page 3)

In closing, I sincerely thank the Soldiers, military leaders, and Department of the Army civilians who support this Regiment every day. Each of you must continue to display the trust and confidence that coincides with the patriotism (devotion), valor (courage), and fidelity (faithfulness) necessary for the Army to fight and win our Nation’s wars. Remember—we volunteered, and we took an oath to serve. The oath is a reminder of why we serve; we swore to defend an ideal and to continue to live up to the five essential characteristics of the Army profession—trust, military expertise, honorable service, esprit de corps, and stewardship. We are stronger now than ever before because each and every one of you continue to do your part to make a difference, regardless of the challenge or task at hand. I am proud to serve with you! It has truly been an honor and a privilege to serve as the 31st Chief of the Chemical Corps and Commandant of USACBRNS.

***Dragon Soldiers! CBRN Warriors!
Elementis Regamus Proelium!***

Endnotes:

¹JDN 1-19, *Competition Continuum*, 3 June 2019.

²ATP 3-11.74, *Chemical, Biological, Radiological, and Nuclear Platoons*, 15 April 2021.

³ATP 3-11.32, *Chemical, Biological, Radiological, and Nuclear Passive Defense*, 13 May 2016.

⁴ATP 3-90.40, *Combined Arms Countering Weapons of Mass Destruction*, 29 June 2017.

⁵JP 3-40, *Joint Countering Chemical Weapons of Mass Destruction*, 27 November 2019.

⁶“Interdependent Contamination Mitigation White Paper,” USACBRNS, 24 July 2019.



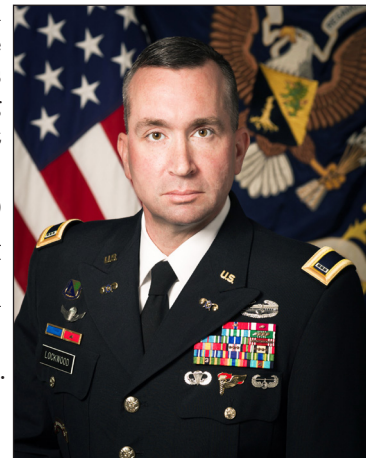
Regimental Chief Warrant Officer



Greetings, Dragon Soldiers! Welcome to the 103d year of the U.S. Army Chemical Corps! Since my last article, the Corps, the Army, the Nation, and the world have continued to be challenged by the Novel Coronavirus (COVID-19). As I write this article, the vaccination effort is gaining momentum and, hopefully, we are finally seeing the light at the end of the long tunnel that we have been traveling through over the last year and a half.

Despite all of the challenges, the chemical, biological, radiological, and nuclear (CBRN) warrant officer cohort has continued to grow and thrive. In November 2020, we selected 10 highly qualified noncommissioned officers to join the ranks of Active Component CBRN warrant officers. I would like to congratulate the following noncommissioned officers on their selection:

- Master Sergeant Alan M. Jones.
- Sergeant First Class James E. Chinda.
- Sergeant First Class Christopher D. Cox.
- Sergeant First Class Justin S. Cruthird.
- Sergeant First Class Steven K. Cutlip.
- Sergeant First Class Joshua D. Jimenez.
- Sergeant First Class Russell W. Payne.
- Staff Sergeant Kevin C. Freeman.
- Staff Sergeant Eric A. Robinson.
- Staff Sergeant Dionte O. Shelby.



**Chief Warrant Officer Three
Robert A. Lockwood**

I would also like to congratulate the following warrant officers most recently promoted to the ranks of field grade warrant officers three; their promotion is indicative of their hard work to date and demonstrated potential as leaders of the cohort:

- Chief Warrant Officer Three Ryan P. Horner.
- Chief Warrant Officer Three Heather M. Hubbard.
- Chief Warrant Officer Three Cameron M. Tinker.
- Chief Warrant Officer Three Parker C. Tootill.
- Chief Warrant Officer Two Richard L. Paukner.
- Chief Warrant Officer Two Xavier L. Wyatt.

This is my last submission to *Army Chemical Review* as the Regimental Chief Warrant Officer. It was a great 3 years, and I was honored to serve in the capacity of the third Regimental Chief Warrant Officer. I want to extend many thanks and my gratitude to each and every one of you for what you do on a daily basis for our Corps and our Army. I am often in awe of how we collectively overcome adversity and help continue to push the Corps forward. There is always more to do; but with our team of teams, I know that we will succeed. I would also like to extend very special thanks for everyone currently or formerly involved in the CBRN Warrant Officer Program. It's been an interesting time since the first CBRN warrant officer walked across the stage at Fort Rucker, Alabama, 10 years ago; the cohort has come a long way since then. We have made considerable gains in strength and capability over the past 3 years, and I am sure that the momentum will continue as the cohort rapidly approaches full accession. A year from now, the cohort will hit yet another major milestone in its growth with the selection of the first chief warrant officers four and the implementation of Phase 3 of Warrant Officer Intermediate-Level Education here at the U.S. Army CBRN School to educate them. You can be assured that it won't be long after that that the cohort hits its next peak (and a big one, it is).

In closing, I want to send a final message to the cohort as the Regimental Chief Warrant Officer: You are all rock stars! Keep up the fire! Continue to use the unique tools and skill sets you have to find creative solutions to complex problems. As I hand the reins over to Chief Warrant Officer Three Humphrey B. Hills, I do so with 100 percent confidence that he will continue to lead the cohort, Corps, and Army to even greater heights. I look forward to seeing what the future brings!

I wish you all the very best, and I hope to see everyone out in the force soon! Stay safe.

***Dragon Soldiers! CBRN Warriors!
Elementis Regamus Proelium!***

The 3d CST Conducts COVID-19 Response Operations Throughout Pennsylvania

By Captain Cesar A. Allen

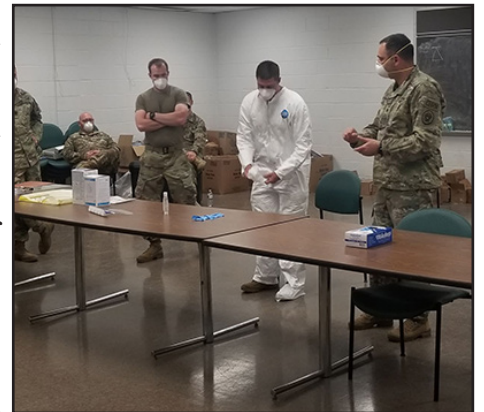


The 3d Civil Support Team (CST), Pennsylvania National Guard, Fort Indiantown Gap, Annville, Pennsylvania, is recognized as the Pennsylvania State subject matter expert for scenarios regarding management, protection, and mitigation in infectious disease and biological warfare environments. The adjutant general and joint operations requested that the 3d CST support the following task forces and organizations: the Novel Coronavirus (COVID-19) Task Force; the Iron Task Force; the Chemical, Biological, Radiological, and Nuclear Task Force; the Pennsylvania State Police; and the Pennsylvania Department of Health. The 3d CST's knowledge of force protection, personal protective equipment, mitigation, and decontamination has directly reduced the spread of infection among personnel working in COVID-19 facilities and contaminated environments.



3d CST Soldiers decontaminate the entrance to a business.

The 3d CST has directly trained and tested 164 personnel representing the military, the Pennsylvania Department of Health, and the Pennsylvania State Police in the use of N-95 masks and various respiratory apparatuses. Additionally, the CST trained the Pennsylvania National Guard to provide training and testing for the responding community, including more than 1,250 military and civilian personnel—all of whom have been involved in directly responding to hot-spot areas where COVID-19 is prominent and rampantly affecting residents and staff.



3d CST Soldiers teach donning and doffing of personal protective equipment.

Those who have been trained by the 3d CST have received instruction in the best and safest practices regarding the donning and doffing of personal protective equipment and contamination recognition and mitigation whilst working in COVID-19 facilities, nursing homes, hospitals, and the COVID-19 quarantine barracks on Fort Indiantown Gap. These efforts have resulted in substantial positive effects, decreasing exposure risks and overall Service member-related infections for those working in facilities or other environments with high rates of COVID-19 occurrences.

The 3d CST also supported the Brighton Rehabilitation and Wellness Center, Beaver County, Pennsylvania—one of the largest private health care centers in the state of Pennsylvania, with 750 residents and staff members—with personal protective equipment and mitigation training, medical planning and decontamination training, and training on the use of the HALO® disinfection system.

Captain Allen is a medical treatment officer for the 3d CST. He holds a master's degree in physician assistant studies from the University of Nebraska Medical Center, Omaha.

COVID-19: A Case for Bioterrorism Awareness

By Captain Matthew E. Bertram

Introduction

From the first known U.S. case of the Novel Coronavirus (COVID-19) in January 2020¹ to October 2020, there were more than 8 million confirmed cases of COVID-19 and over 200,000 deaths in the United States.² In addition to causing casualties, COVID-19 can be directly linked to economic downturn, decreased military readiness, and national security hazards. The recent outbreak of COVID-19 highlights the impact that bioweapons could have on strategic assets and U.S. biodefense strategies and responses.

Economic Impact

Though currently recovering, the U.S. stock market and employment rates plummeted during the first 6 months of 2020. In April 2020, the National Bureau of Economic Research (NBER) conducted a study to determine the impact of COVID-19 on the U.S. stock market. The NBER found that “no previous infectious disease outbreak, including the Spanish Flu, has impacted the stock market as forcefully as the COVID-19 pandemic.”³ The NBER study focused on market fluctuation as an indicator of instability and lack of confidence in the U.S. economy—two aspects of economic degradation. The study found that multiple factors directly related to COVID-19 contributed to the fluctuation in the stock market. For one thing, COVID-19 is highly transmissible in public settings, which has led to voluntary isolation and decreased participation in the U.S. service economy. For another thing, nonpharmaceutical policy interventions (NPIs) have been implemented; these policies include limiting or preventing travel and closing of nonessential businesses.

Since January 2020, unemployment claims have exceeded an estimated 60 million.⁴ Prior to the COVID-19 pandemic, the highest number of unemployment claims was 695,000 during 1 week in 1982. Beginning in March 2020, there were 20 consecutive weeks of more than 1 million insurance claims per week.⁵

Between market fluctuations, unemployment, and casualties, the total cost of the COVID-19 pandemic is estimated to be more than \$16 trillion, approximately 90 percent of the annual gross domestic product of the United States.⁶ This heavy cost results in a grave national security risk, limiting the ability to trade, produce and modernize the military fleet, and maintain a U.S. presence in overseas territories.

Military Readiness

As of 1 October 2020, there have been more than 38,500 confirmed COVID-19 cases and seven deaths among Service members across all branches of the military.⁷ Although only a fraction of total military personnel have contracted COVID-19,⁸ it is important to recognize the strain that has put on individual units when personnel become nondeployable.

Under COVID-19 conditions, the Army has canceled more than three National Training Center (NTC) rotations and multiple Combined Arms Training Center (CTC) rotations.⁹ The lack of training vastly degrades combat readiness. Consequently, lessons that could have been learned in training and training exercises must be learned in war.

The military has also been called upon to support the national COVID-19 response. This support has been resource- and personnel-intensive. The U.S. Army and Air National Guard sent more than 44,500 troops across the Nation to assist with the COVID-19 response.¹⁰ The U.S. Navy deployed two hospital ships to provide medical support.¹¹

Strategic National Stockpile

The United States funds and maintains a Strategic National Stockpile of medical supplies, vaccines, and equipment. The medical supply needs for the initial phases of the COVID-19 response far exceeded the federal reserve of medical supplies in the Strategic National Stockpile.¹² Such a depletion of the stockpile presents multiple risks to national security, degrading U.S. responses to natural disasters, disease outbreaks, and other missions.

Disease Tracing

COVID-19 has exposed deficits within U.S. biosurveillance programs. The main deficiencies are the inability to rapidly track identified cases and the failure to accurately aggregate data to obtain a realistic representation of the true COVID-19 spread. The delays and incomplete reporting of COVID-19 cases led many policy makers to consult alternative sources of information outside the Centers for Disease Control and Prevention, such as Johns Hopkins University.¹³ However, a rapid-surveillance program capable of tracking positive cases and contact tracing personnel was impossible due to outdated technology at every echelon.¹⁴ These shortcomings have allowed the virus to continue to spread, magnifying the threat to national security.

Biodefense Recommendations

It is imperative that the United States review lessons learned during the COVID-19 pandemic and adjust the *National Biodefense Strategy* accordingly.¹⁵ It is recommended that three policy areas be addressed—leadership, biosurveillance, and homeland preparedness.

Leadership


According to lessons learned from multiple previous exercises, evaluations, and the COVID-19 response, there has been inconsistent leadership and ever-changing roles and responsibilities regarding biodefense and disease response. In the future, there should be a permanent, consolidated, biodefense arm of the Department of Homeland Security. This office would be responsible for monitoring possible outbreaks, directing intelligence collection of bioagents, administering allocated biodefense funds, and heading the Nation's response to naturally occurring or man-made pathogens. In addition, this entity would recommend biodefense research requirements and medical supply stock updates based on the feedback of biosurveillance and intelligence collection.

Biosurveillance

The United States should expand and improve the Biosurveillance Information and Knowledge Integration Program in the areas of disease monitoring and intelligence collection efforts. Additional funding is necessary to modernize local and state biosurveillance assets, ensuring the capability to feed a larger national network. The focus of international intelligence collection must shift from the sole identification of known pathogens and move toward platform and knowledge bases.

Homeland Preparedness

Three major preparedness improvements are needed. First, additional medical stockpiles must be pushed to the state level, while the national stockpile is maintained. COVID-19 revealed that current stockpiles are insufficient and that delays in transportation lead to lives lost. Next, additional resourcing of medical countermeasure research must be provided. The medical research should be focused on platform technology rather than on individual vaccine research for specific pathogens. The development of a “plug and play” platform that can generate vaccines or other medical countermeasures based on input from any pathogen is critical, given that the next bioterrorism attack may incorporate a novel bioagent. Finally, funding for synthetic biotechnology research must continue to be increased. If the United States can assess and approximate the next threat, the biodefense enterprise will be one step closer to combatting it and emplacing effective deterrence measures.

As former Senate Majority Leader, Senator William Frist, M.D., says, “We now have an obligation to learn from this experience and take decisive steps to better prepare for the future. . . . Because—like all previous pandemics—COVID-19 too will shift from center stage. The public will have had their fill. The danger will seem removed.”¹⁶ 

Endnotes:

¹Mike Baker, “When Did the Coronavirus Arrive in the U.S.? Here’s a Review of the Evidence,” *The New York Times*, 15 May

2020, <<https://www.nytimes.com/2020/05/15/us/coronavirus-first-case-snohomish-antibodies.html>>, accessed on 1 August 2020.

²“COVID-19 Map,” Johns Hopkins Coronavirus Resource Center, Johns Hopkins University, Cambridge, Massachusetts, <<https://coronavirus.jhu.edu/map.html>>, accessed on 1 October 2020.

³Scott Baker, et al., “The Unprecedented Stock Market Impact of COVID-19,” NBER, 2020, <<https://doi.org/JEL>>, accessed on 1 October 2020.

⁴David M. Cutler and Lawrence H. Summers, “The COVID-19 Pandemic and the \$16 Trillion Virus,” *The Journal of the American Medical Association*, 2020, <<https://jamanetwork.com/journals/jama/fullarticle/2771764>>, accessed on 1 October 2020.

⁵*Ibid.*, p. 1.

⁶*Ibid.*, p. 1.

⁷Diana Stancy Correll, “7th U.S. Service Member Has Died From COVID-19,” *Military Times*, 3 September 2020, <<https://www.militarytimes.com/news/your-military/2020/09/03/7th-us-service-member-has-died-from-covid-19/>>, accessed on 20 September 2020.

⁸Ed Adamczyk, “U.S. Military Surpasses 30,000 COVID-19 Cases,” *United Press International*, 7 August 2020, <<https://www.upi.com/Defense-News/2020/08/07/US-military-surpasses-30000-COVID-19-cases/1761596830291/>>, accessed on 20 September 2020.

⁹Colin Clark, “Army Lost 3 NTC Training Rotations to COVID; FORSCOM Curbs Pace Next Year Too,” *Breaking Defense*, 14 October 2020, <<https://breakingdefense.com/2020/10/army-lost-3-ntc-training-rotations-to-covid-forscom-curbs-pace-next-year-too/>>, accessed on 1 November 2020.

¹⁰Jim Reed and Gretchen DuBois, “National Guard Assists Response to the COVID-19 Pandemic,” 2020, <<https://www.ncsl.org/research/military-and-veterans-affairs/national-guard-activation-in-every-state-assisting-response-to-the-covid-19-pandemic.aspx>>, accessed on 20 September 2020.

¹¹Terry Moon Cronk, “USNS Mercy, USNS Comfort Receiving Patients in LA, New York City,” U.S. Department of Defense, 2 April 2020, <<https://www.defense.gov/Explore/News/Article/Article/2134688/usns-mercy-usns-comfort-receiving-patients-in-la-new-york-city/>>, accessed on 20 September 2020.

¹²Lamar Alexander, “Preparing for the Next Pandemic,” U.S. Senate Committee on Health, Education, Labor, and Pensions, 9 June 2020, p. 29.

¹³*Ibid.*, p. 27.

¹⁴*Ibid.*, p. 28.

¹⁵“National Biodefense Strategy,” Department of Homeland Security, 25 January 2021, <<https://www.dhs.gov/coronavirus/presidents-biodefense-strategy>>, accessed on 05 April 2021.

¹⁶*Ibid.*, p. 1.

Captain Bertram is the brigade chemical, biological, radiological, and nuclear officer-in-charge, 1st Armored Brigade Combat Team, 1st Cavalry Division, Fort Hood, Texas. He holds a bachelor's degree in biology from Virginia Tech, Blacksburg, and a master's degree in defense and strategic studies from Missouri State University, Springfield.

Precise Response

By Captain Nicholas L. Calangi, Master Sergeant Jennifer L. Langes, and First Sergeant Daniel E. Totten

The hybridization of the chemical, biological, radiological, nuclear, and explosives (CBRNE) threat is becoming increasingly dynamic and unpredictable. From novel superviruses to more efficient contamination-dispelling methods, there is an urgent demand to have a force ready to fight and win in both contaminated and contested environments. To improve joint readiness amongst our North Atlantic Treaty Organization (NATO) allies, the Canadian Armed Forces hosted its annual NATO training exercise, Precise Response. The summer of 2019 marked the 16th installment of the exercise, and the United States was chosen to lead one of three CBRNE task forces. This unique privilege fell to the 11th CBRNE Company (Technical Escort). The 11th CBRNE Company established the Combined Joint (CJ)-CBRNE-Task Force Uniform (TFU),¹ which was comprised of 95 Soldiers, Airmen, and scientists from Austria, Canada, Denmark, France, Italy, Germany, and the United States. The goal was interoperability and proficiency with NATO allies under dynamic CBRNE threat scenarios with live-agent conditions. At the conclusion of Precise Response 19, the company was able to successfully operate with its NATO allies. The successes and lessons learned from Precise Response 19 proved that chemical, biological, radiological, nuclear, and explosives response teams (CRTs) are capable of working side by side with our allies, and this exercise positioned the 110th CBRN Battalion for success at NATO exercises Desert Vapor 19 and Dragon's Breath 19.



Soldiers from various countries receive a mission briefing using a terrain model.

Background

In the months leading up to Precise Response 19, U.S. Soldiers were required to become intimately familiar with Allied Engineering Publication (AEP)-66, *NATO Handbook for Sampling and Identification of Biological, Chemical, and Radiological Agents (SIBCRA)*.² This publication would govern how the 11th CBRNE Company would operate while executing mission command as a task force headquarters and how U.S. CRTs were to obtain samples. While comparable, procedures outlined in AEP-66 are a departure from the standard operating procedures established by the 20th CBRNE Command. The differences found in AEP-66 are procedural and include new terminology and variations in force design. For example, AEP-66 refers to sensitive-site assessments (SSAs) as CBRN reconnaissance and monitoring operations. Sensitive-site exploitation (SSE) and sampling are comparable to a NATO SIBCRA event. Regarding force design, while a CRT can provide SSA/SSE, sample transloading, and limited decontamination, other countries make use of specialty teams that perform one or two of these tasks at a time. While the differences seem minor, they are crucial because force design differences could affect communication and mission execution, and any deviation from AEP-66 procedures would affect the ability of the laboratories to accurately analyze U.S.-procured samples.



Postmission decontamination of a U.S. Soldier by a German soldier.

Operational Phase

The United States sent the 11th CBRNE Headquarters Company, consisting of four Soldiers and two CRTs, to Precise Response 19. To establish the CJ-CBRNE-TFU, the U.S. element was assigned one Danish recce/SIBCRA³ team, one French recce/SIBCRA team, one Italian SIBCRA team, one Austrian SIBCRA team and thorough decontamination team, a German microbiologist, a Canadian thorough decontamination unit, and a Canadian medical monitoring team. Once formed, the CJ-CBRNE-TFU was responsible for completing anywhere from three to six missions per day, while seamlessly generating intelligence. The actionable intelligence gathered drove the follow-on missions that culminated in exposing and defeating a web of threats.

Hosted and performed by the Canadian Armed Forces, Precise Response 19 tested the skills of the three CBRNE task force headquarters, each mission integrating multiple nations in a live-agent environment. Missions almost always included reconnaissance or SSA of multiple compounds or rooms within a building, mitigation of any explosive hazards through explosive ordnance disposal, collection of samples, and the gathering of any information that would answer critical information requirements of higher headquarters. The transload of each sample was provided to a Canadian chemical mobile laboratory, a German mobile radiological laboratory, or a German mobile biological laboratory. Each of these laboratories followed NATO sampling standardization agreements, and their strict compliance with AEP-66 was critical in ensuring that the laboratory would accept samples for processing.



A microbiologist from Germany and LNOs from Italy, Austria, and Canada discuss intelligence gathered during an integrated mission sequence.

The CJ-CBRNE-TFU placed a liaison officer (LNO) from each country in the task force headquarters command post. This afforded timely reporting from the teams in the field and helped alleviate any confusion that might have arisen from the language barrier. The potential for encountering problems in the hot zone due to the language barrier cannot be overstated. Participants had a different mastery of the English language. Each LNO communicated with the teams

on-site. Orders pushed through the LNO could be communicated in the native tongue, ensuring smooth operations. The LNOs relayed the information from the field through the task force commander for command decisions. LNOs tracked their individual missions while the U.S. Operations Section gathered information and tracked the CRTs who were reporting from their command post near the decontamination lines.

Future Training Possibilities

CRTs are the force packages that have historically been chosen to participate in the Precise Response exercise. However, other capabilities across the U.S. Army Chemical Corps should be explored. In future exercises, a hazard assessment platoon could provide a more robust decontamination capability than could be provided by a CRT. Participating countries could also rotate mobile laboratories to support the exercise. This would be an appropriate venue for a light mobile expeditionary laboratory, as it would validate deployment operations and improve NATO sampling processes. Not only would this improve shared understanding among our NATO allies, but it would also allow them to operate within the parameters of the AEP-66 NATO standard operating procedures. Having either the U.S. heavy or light mobile expeditionary laboratories would also greatly increase interoperability and allow other nations to work with U.S. Army expeditionary laboratories. Laboratories would receive daily samples from three task forces and have the opportunity to train by processing initial and final results within 24 to 48 hours.

The United States was unable to conduct any field analysis of samples collected by CRTs during Precise Response 19. This was due to the limited size of the area of operation and to prescribed safety measures that prevented field confirmatory analysis in the cold zone. Initial attempts to take U.S. equipment into the hot zone to perform on-site analytics were abandoned due to the size of the equipment carrying cases and the requirement for all equipment in the hot zone to go through Defence Research and Development Canada decontamination procedures. U.S. CRTs were also unable to use self-contained breathing apparatus (SCBA), as Canadian participants were unfamiliar with decontamination procedures for the modified U.S. mask. If coordination had been completed prior to arrival, it may have been possible to use the noted equipment. The need for a crush-proof biological transport case was also identified, as the standard, orange, biological transport case that CRTs use fails to comply with NATO standards.

Summary

Precise Response 19 increased the 11th CBRNE Company interoperability with NATO allies and fostered a shared understanding of what to expect during a multinational response should a CJ-CBRNE-TFU ever be required. The Precise Response 19 CJ-CBRNE-TFU proved up to the task, capable of providing CBRNE assessments and advisement to NATO commanders and input for CBRN hazard management operations, such as decontamination. All the countries task-organized under TFU worked well together.

(Continued on page 13)

More Time in the Hot Zone: CBC Develops Lighter, Longer-Lasting Respiratory Protection System

By Dr. Brian B. Feeney

Editor's Note: All quotes in this article were obtained from a personal interview with Mr. Jonathan D. Sampson at the U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC), Aberdeen Proving Ground, Maryland, on 17 September 2019.

When an industrial accident releases toxic industrial chemicals in the United States, the first responders usually consist of the particular state's Army National Guard civil support team. Team members suit up in full-body protective gear and enter the hot zone. One of the major challenges that they face is the length of time that their respiratory protection systems allow them to stay there.

Responders currently tend to rely on closed-circuit, self-contained breathing apparatuses as part of their full protective ensembles. Use of the breathing apparatus requires the wearing of a bubble suit, which restricts motion and increases the weight and thermal burden on the user. The ensemble weighs 36 pounds, traps heat within, and does not allow for the wearer to drink while wearing it; it is heavy, hot, and "thirsty." In addition, there is a 4-hour usage limit.

The "Closed System"

"The *closed* in *closed system* means that the user inhales and exhales on the same breathing loop; no exhalations are made to the outer environment. It comes with a 4-hour time limit," said Mr. Sampson, a mechanical engineer at DEVCOM CBC. Mr. Sampson is the project team leader for research in designing a replacement system known as the Full-Spectrum Respiratory Protection System.

"Civil support team responders have told us that the 4-hour time limit in the current system really reduces their effectiveness," Sampson said. "When they suit up, they have to do equipment checks and then get to the mission site and, upon leaving the site, have to be decontaminated—all the while, using up time within that 4-hour window. On average, they have only 1 hour in the hot zone," he added.

Although the problem of heat stress in the current system can be reduced by using ice to cool the breathing loop, ice is very heavy, it is logistically complicated to supply, and it melts fast. Additionally, the need for rehydration during a mission is not addressed by the current system at all.

A Better System

Presented with these limitations, the DEVCOM CBC design team went to work. "We knew we had to center our

solution around mission availability—more time in the hot zone. We also knew we had to reduce weight, lower the internal temperature, and get rid of the need for ice," said Mr. Sampson, "So we teamed up with one of our sister Army research laboratories, the DEVCOM Soldier Center, and used a couple of their design innovations. These included adding a streamlined, body-forming uniform with built-in chemical agent protection and a tube for hydration to our system."

Team members used existing technology to add a cooling plate to replace bags of ice. They even added miniature fans. They were able to further reduce weight by incorporating ultra-high-pressure gas cylinders, which hold the same amount of oxygen in a much smaller, lighter-weight container. All external parts were designed to fit together in a compact, easy-to-don and easy-to-remove backpack weighing only 24 pounds.

The real breakthrough, though, was the employment of two different respiratory protection modes in one system, making it a combined unit respirator. That advancement dramatically increased the time that civil support team members could spend on-site.

When placed in powered air-purifying mode, a fan is used to push ambient air through the respirator filter, purifying the air as it enters the suit and maintaining positive pressure. The respirator can be operated for 8 hours in power air-purifying mode. Adding a powered air purifying respirator to the closed-circuit capability affords operators up to 12 hours of protection.

The closed-circuit, self-contained breathing apparatus mode uses the existing closed-circuit technology of carbon dioxide absorption from the breath stream combined with injections of oxygen to maintain optimal oxygen levels while keeping carbon dioxide levels to a minimum. In addition, it makes use of the M53 mask and hydration tube. Furthermore, ice is replaced with a much lighter-weight cooling plate. The respirator can be used for 3 hours in closed-circuit, self-contained breathing apparatus mode; but the design team is confident that, with some further design optimizations, the time can be extended to at least 4 hours.

Switching between modes in response to the threat level around them prevents operators from using such a large percentage of available time for equipment checks, transportation to the site, and decontamination.

Warfighter Testing

The entire effort to improve the protective ensemble was funded by the Defense Threat Reduction Agency, which developed and executed the Chemical Biological Operations Analysis to test emerging chemical and biological defense technologies. The event was held at Camp Dawson, Kingwood, West Virginia, on 22 August 2019. Industry, academia, and government laboratories were invited to bring their latest chemical and biological defense prototypes for warfighter use in realistic missions. The military operators provided candid feedback on the usefulness of the prototypes and then recommended possible improvements.

The 35th West Virginia National Guard Civil Support Team, St. Albans, West Virginia, was assigned to test the Full-Spectrum Respiratory Protection System prototype at the Chemical Biological Operations Analysis. The mission of the 35th was to support civil authorities at a domestic chemical, biological, radiological, nuclear, and explosives incident site by identifying agents and substances, assessing the consequences, advising on response measures, and assisting with requests for additional state and federal support. Two teams from the 35th practiced investigating an abandoned structure containing a series of rooms for the presence of chemical, biological, radiological, nuclear, and explosives materials. One of the teams wore the current closed-circuit, self-contained breathing apparatus system; the other wore the Full-Spectrum Respiratory Protection System prototype. The team wearing the Full-Spectrum Respiratory Protection System prototype had the advantages of a body-cooling system, no bubble suit, available drinking water, and more time on-site. Those operators reported that they were very satisfied with the advantages offered by the Full-Spectrum Respiratory Protection System and that they were very glad to have the longer duration to complete the mission.

Next Steps

With the first phase of prototype development complete, Mr. Sampson and his design team will work with manufacturers in private industry to develop a next-generation prototype that combines all of the innovations created thus far and further refinements based on the latest laboratory-generated performance data. This next-generation prototype will be subjected to rigorous field testing, and that data will be incorporated into the design of the final system. Ultimately, Sampson looks forward to the widespread use of the system by Army National Guard civil support teams across the Nation.

For more information about the DEVCOM CBC, visit the website at <<https://www.cbc.devcom.army.mil>>.

Dr. Feeney is a public affairs specialist with the DEVCOM CBC. He holds a bachelor's degree in history from Colorado College, Colorado Springs; a master's degree in risk communication from Cornell University, Ithaca, New York; and a Ph.D. in risk communication from Temple University, Philadelphia, Pennsylvania.

("Precise Response," continued from page 11)

The German biologist was always prepared to provide expert advice and to enter the hot zone, if requested. U.S. explosive ordnance disposal teams seamlessly integrated with each of the elements task-organized under the CJ-CBRN-TFU. This phenomenal experience showcased the ability of the United States to perform mission command while also integrating U.S. CRTs. It is vital that CRTs continue to be integrated with NATO allies in CBRN missions. Through integration, CRTs gain knowledge and experience in deploying and immediately integrating with foreign nations in joint task forces. The importance of NATO interoperability and the value of cross-training on tactics, techniques, and procedures cannot be overemphasized.

Endnotes:

¹Combined Joint Chemical, Biological, Radiological and Nuclear Defence Task Force NATO," <https://www.nato.int/cps/en/natohq/topics_49156.htm>, accessed on 15 January 2020.

²AEP-66, *NATO Handbook for Sampling and Identification of Biological, Chemical, and Radiological Agents (SIB CRA)*, NATO Standardization Agency, 2012.

³Recce/SIB CRA refers to NATO designations of teams. Recce refers to reconnaissance team, and SIB CRA refers to the sampling team.

Captain Calangi was previously the company commander, 11th CBRNE Company. He holds a bachelor of science degree in biology and a bachelor of arts degree in history from Loyola University, Chicago, Illinois. He also holds a master of science degree in environmental management from Webster University. He is currently pursuing a master of science degree in biology from George Mason University, Fairfax, Virginia.

Master Sergeant Langes was previously the company first sergeant, 11th CBRNE Company. She holds an associate's degree in business management from Columbia Southern University, Orange Beach, Alabama and a bachelor of science degree in occupational safety and health and. She is currently attending a nonresident Sergeants Major Academy class (CL 47) while facilitating the Master Leader Course at Joint Base Lewis-McChord, Washington.

First Sergeant Totten is the first sergeant, 11th CBRNE Company. He holds an associate's degree in information technology from Pierce College, Lakewood, Washington, and is pursuing a bachelor of science degree in industrial/organizational psychology from the Florida Institute of Technology, Melbourne, Florida.

THE PUTEAUX LABORATORY

By Ms. Christy L. Lindberg

Today, the 1st Area Medical Laboratory; 20th Chemical, Biological, Radiological, Nuclear, and Explosives Command; Aberdeen, Maryland, “provides mission-critical tasks such as detection of chemical, biological, and radiological threats; tactical movement; reaction of enemy fire; casualty care; and shipment of theater-validated samples to specific U.S. laboratories.”¹ But the mobile and in-theater laboratories of today originated in the theater-based laboratories on the battlefields of World War I.

In 1917, then Lieutenant Colonel Amos A. Fries took charge of the Overseas Section of the Gas Service of the



Brigadier General Fries

Chemical Warfare Service (CWS) in France. He soon realized that there was a need for facilities for analyzing enemy gas shells and facilitating the possible production of protective equipment. The laboratory established at Puteaux (on the Seine), near Paris, France, would eventually fulfill this need. It proved to be an essential facility that produced immediate results, which the unreliable commu-

nication and transportation limitations of stateside research could not provide.

Over time, the Gas Service developed into the following sections: Overseas, Research, Development, Gas Defense Production, Gas Offense Production, Medical, Proving, Administration, Miscellaneous Research, and Gas and Flame. The Technical Division—under the Research Section—had a tremendous mission. Staffed with approximately 100 commissioned officers, noncommissioned officers (NCOs), and other enlisted personnel, the responsibilities of the Technical Section ranged from those born of wartime necessity to those related to civilian chemical research.

The first test of the in-theater laboratory at Puteaux occurred during the Meuse-Argonne Campaign, the most significant American Expeditionary Force contribution to the Allied war effort. Initial American positions had been blanketed by German gas shells, some of which had failed to explode. CWS officers and NCOs scoured the battlefield for defensive equipment and unexploded German gas munitions in the wake of the American advance. These items were recovered, as were unfired gas shells located along the routes of attack, in abandoned German artillery positions and gas dumps. One officer who searched the fields was First Lieutenant John Thoen, a field artillery officer (and chemist in civilian life), who had been transferred to the CWS after arriving in France. Thoen, along with three other CWS officers, worked the area of advance by the 26th Infantry Division, recovering dozens of German gas shells, which they packed in several canvas bags and tossed in the trunk of their touring car. “Rattling and swaying along the rough roads,” Thoen writes, “I thought any minute something might explode, but we got back without anything happening.”²

Realizing the need to have its own gas warfare research facility in France, the U.S. Gas Service made such a request from the French government. In turn, the French government offered the facilities in Puteaux, which included a laboratory formerly used for tuberculosis research. However, the laboratory was in disrepair and 110 tons of specialized laboratory equipment from the United States was needed to meet research and development requirements. On 1 June 1918, a train bearing eight freight cars rolled into the station at Puteaux. Among the 1,300 boxes packed inside were all the supplies and equipment required to make the laboratory a self-sustaining facility containing a glassblowing workshop, ice-making equipment, and a liquid-air machine. By September, the laboratory was well-established, staffed with between 70 and 80 Soldiers, and ready for the influx of captured German gas warfare equipment.³

Major Frederick G. Keyes, who held a doctorate in organic chemistry from Brown University, and was conducting research on the measurements for equations of states of gases and liquids (pressure-volume-temperature relations) at the Massachusetts Institute of Technology when the American entry into World War I interrupted his plans. Keyes joined the CWS; and by February 1918, he had organized

a complete laboratory for research and testing in chemistry, physics, and bacteriology and had overseen the shipping of that laboratory to France.⁴ Major Joel H. Hildebrand, a professor at the University of California, joined Keyes at CWS, becoming the Director of Experiments at Hanlon Field near Chaumont, France. In an address to his alma mater, the University of Pennsylvania, Hildebrand observed, "It is worth noting . . . that very little of the specific information learned in the university could be applied by these men in their war work. No one in the Gas Service, for example, had ever studied gas warfare at college. The experimental and engineering and tactical problems involved were entirely new; no textbooks existed which prescribed their solution. Success depended upon fundamental training, education rather than instruction."⁵ This sentiment was echoed by Lieutenant Colonel Fries, who states, "It was and is believed that the [CWS] should be composed of men from every walk of life. In three positions out of every four in the field, a good personality combined with energy, hard work, and common sense count for more than mere technical training."⁶

Upon arrival at the CWS Gas Laboratory at Puteaux, the German gas shells collected by First Lieutenant Thoen were taken to the Miscellaneous Research Section, where they were classified and their contents tentatively identified by the visible external markings. The munitions were then disarmed, their fuses examined, and the contents drained into holding containers for analysis. Despite the dangers inherent with disarming gas shells, there were no injuries reported due to this work. One man in particular, Sergeant Edwin Barnum, a chemist from Oskaloosa, Iowa, was noted for his prowess. "He became an expert on the various types of enemy ammunition," writes First Lieutenant Charles Osmond, the officer in charge of the Miscellaneous Research Section, "and [he] was continually consulted concerning various shells and their contents, when brought to the 'Lab' for examination."⁷ None of the shells recovered were found to contain anything but agents already known to be used by the Germans. Filter canisters for German gas masks, taken from the battlefield or German troops captured in the offensive, were examined by CWS Gas Laboratory personnel. As with the German shells, nothing unusual was discovered in the canisters; they contained the same charcoal media that had been known to be used in the past. These findings indicated that Germany was not fielding new types of chemical agents; none were recovered—and if any existed, no effort was being made to replace the German gas mask filters to provide protection against the new agents, suggesting that American mask filter canisters would retain their effectiveness.

In addition to the research being conducted on captured German gas warfare materiel, the Gas Defense Production Section of the CWS Gas Laboratory was developing gas defense products. An antigas salve was developed to counteract the blistering effect of mustard agent. The salve, known as Sag ("gas" spelled backward) paste, consisted of chlorinated bleach suspended in petroleum jelly. Sag paste proved to be an effective preventative measure against mustard agent


burns and blisters. The laboratory began contacting French manufacturers to produce the paste in the required quantity, which was estimated at 4 tons per 25,000 men, monthly.⁸

Finally, the Gas Defense Production Section of the CWS Gas Laboratory was developing a gas camouflage, which—although too late for use in the Meuse-Argonne Campaign—it hoped would reap benefits in the planned American gas offensive of 1919. Since there were no reliable systems for visually detecting mustard agent, combatants on both sides were limited to detection by smell alone. In low concentrations, mustard agent has a recognizable odor, similar to ground mustard seeds, onions, or garlic—odors not usually present on a battlefield. Therefore, when such an odor was detected, it was interpreted to mean that the agent was present, which resulted in initiating a gas alarm, donning gas masks, and either evacuating from the area or beginning the decontamination process. It was hoped that the development and addition of a secondary chemical—one that would produce a smell similar to freshly dug earth, a common smell that was secondary to conventional shellfire on the battlefield and one that overwhelmed the smell of garlic—to the agent would allow the agent to be camouflaged from olfactory detection (meaning no recognition and, thus, no alarms) and would lead to greater enemy casualties.⁹

The Miscellaneous Research Section was assigned perhaps the most diverse and extensive part of the mission. Several advances were investigated for, and offered to, the Air Service—a semiautomatic fire extinguisher developed for airplanes, a type of glue developed for laminated airplane propellers, and preventive treatments for corrosion of the aluminum in the zenith carburetors of aircraft engines. Since the electric fuses for the chemical agent Livens Projectors were too inconsistent, the Miscellaneous Research Section produced a more uniform fuse. The work of the Miscellaneous Research Section also impacted the Medical Corps, the Ordnance Department, the Quartermaster Corps, and many other U.S. services.¹⁰

Near the end of the Meuse-Argonne Campaign, with the expectation that the support requested for the gas efforts of the Spring 1919 offensive would overwhelm the staff and facilities at Puteaux, the analysis of recovered enemy gas munitions and equipment was transferred to the CWS Experimental Station at Hanlon Field, allowing the chemists at Puteaux to concentrate purely on research.

The laboratory established by the CWS at Puteaux exemplified the efficiency and "can do" attitude of the American war effort. Within months of assessing the need, personnel and equipment were in place to evaluate enemy munitions and conduct vital research to further the mission of the combat arms branch. The impact and legacy of the laboratory at Puteaux were later realized by the chemical laboratory companies of World War II, and that realization continues today with the mobilization-ready 1st Area Medical Laboratory, 20th Chemical, Biological, Radiological, Nuclear, and Explosives Command, and mobile laboratories assisting with the Novel Coronavirus pandemic.


(Continued on page 17)

Improved Testing Could Get CB Protection to Warfighters Faster

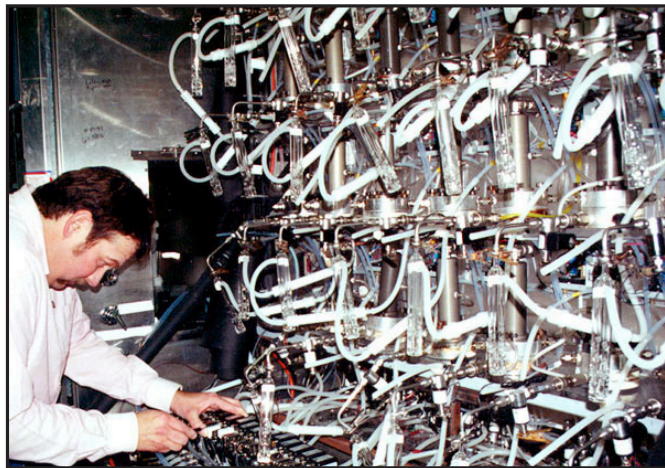
By Mr. Albert C. Vogel

Editor's note: All quotations in this article were obtained from phone interviews with Dr. R. Aaron Rogers and Mr. Darren M. Jolley on 8 July 2020.

For more than 20 years, testing the material from which protective clothing, including gloves and boots, might be made has been a laborious process but scientists, engineers, and technicians at U.S. Army Dugway Proving Ground, Utah, have revamped the process. They have created an innovative fixture that is faster to set up, easier to use, and capable of providing quicker results. The sooner a new material can be tested and proven, the sooner protective items made from that material can reach warfighters who rely upon them for their safety and for the mission.

The new test fixture—the Swatch Permeation Test Fixture, Reengineered (SPiTFiRE)—not only works faster than the previous fixture (which is still in use), but requires fewer personnel for operation, thereby reducing the cost of testing. “SPiTFiRE is the first iteration of a new generation of swatch-testing fixtures,” project scientist Dr. R. Aaron Rogers said, “It is actively enhancing our capability from operational, safety, and cost perspectives. It’s really caused us to think outside of the box regarding what advancements are possible.”

Physical scientist Mr. Darren M. Jolley noted that SPiTFiRE was created to improve upon the current system for testing material, the Aerosol Vapor Liquid Assessment Group (AVLAG). Built into a fume hood in the 1990s,



The AVLAG system in a fume hood, circa 1999.

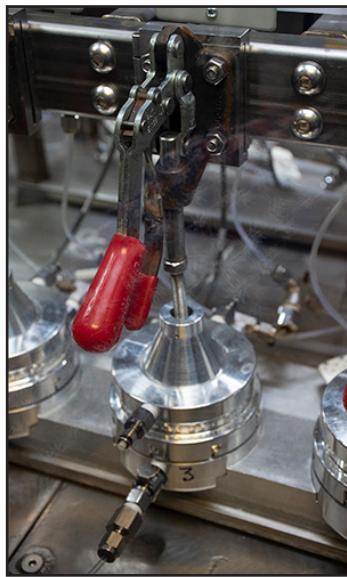


Dr. Rogers works with SPiTFiRE in a glovebox.

AVLAG and the hood are experiencing age-related issues. The set-up and operation of AVLAG are slow, and assembly of the stainless steel components of the “cup” that contains each swatch of material to be tested is laborious. “AVLAG cups are held together by bolts and nuts,” said Dr. Rogers, “We use power drills to assemble and disassemble, which takes time. Testing is conducted within a fume hood, requiring agent handlers to wear M50 protective masks in the lab[oratory] during testing.”

SPiTFiRE and AVLAG cup components are similar; both systems make use of O-rings to prevent leaks between components. However, SPiTFiRE components are tightly held together with an exterior clamp. SPiTFiRE is housed in a glovebox that is much smaller than the hood that houses AVLAG. Like AVLAG, SPiTFiRE is under negative air pressure within a laboratory filtration system. However, unlike with AVLAG, SPiTFiRE operators do not wear M50 masks for long periods; they generally wear them only when placing an agent into the glovebox or during decontamination. Five to seven personnel are required for operation and decontamination of AVLAG, whereas only four personnel are required for the operation of SPiTFiRE and only two or three for decontamination. Reduced personnel requirements for the use of SPiTFiRE means reduced testing time and reduced testing fees for customers. “We can explore more options in a

shorter length of time,” Dr. Rogers said, “An AVLAG might take years for all the different types of testing, whereas SPiTFiRE could complete the required testing in less than a year. The warfighter gets the item faster.”



A SPiTFiRE fixture

With the new program, all data is traceable to its raw data origin. “That’s super important for integrity,” Dr. Rogers said, “[There’s] no way to hide where you got the data. From an operational security point of view, it’s very secure.”

Since it’s a new system, SPiTFiRE is currently undergoing verification and validation. The first test will be for the U.S. Air Force, which wants to know if the off-gassing of a protective suit with low-level chemical or biological contamination can result in a level safe enough for reissue.

The introduction of a new and proven protective suit to warfighters typically requires 2 years of swatch testing in changing temperatures, humidity levels, pressure levels, and flows that mimic the harsher climates of the world. “If we can speed up testing, we can advance the protection of our warfighters much more rapidly by using the very latest technology, staying ahead of our adversaries every step of the way,” Dr. Rogers said. “This really plays into the Army’s mission of being ready,” he noted, “We are trying to bring things up to speed so we can provide accurate information as quickly as possible.”

Mr. Vogel is a public affairs specialist at Dugway Proving Ground. He attended Eastern Washington University School of Journalism, Spokane.

(“The Puteaux Laboratory,” Continued from page 15)

Endnotes:

¹“Who Trains to Run Tests on Deadly CBRN Agents While Taking Mortar Fire? The 1st AML, That’s Who,” *CBRNE Central*, <<https://cbrnecentral.com/who-trains-to-run-tests-on-deadly-cbrn-agents-while-taking-mortar-fire-the-1st-aml-thats-who/16147/>>, accessed on 22 October 2020.

²Thoen correspondence, USACBRNS History Office, Considered the precursor to technical escort units, many advancements in safety have been established since the days of the CWS Laboratory at Puteaux.

³*History of the Chemical Warfare Service American Expeditionary Forces Technical Division*, Part II, Paris Laboratory, 1918.

⁴John Ross, “Frederick George Keyes, 1885–1976: A Biographical Memoir,” National Academies Press, Washington, D.C., 1998, pp. 3–4.

⁵“University of California Chronicle,” Vol. 21, No. 2, April 1919, p. 138.

⁶Amos A. Fries and Clarence J. West, *Chemical Warfare*, McGraw-Hill Book Company, Inc., New York, 1921, p. 111.

⁷Letter from First Lieutenant Charles Osmond to Mrs. Barnum, as reprinted in *The Oracle*, the Oskaloosa, Iowa, High School newspaper, in March 1919. Sergeant Barnum survived his service of disarming shells and returned stateside in January 1919. He died of influenza at Camp Merritt, New Jersey, on 12 February 1919.

⁸First Deficiency Appropriation Bill, “1919: Hearings Before Subcommittee of House Committee on Appropriations in Charge of Deficiency Appropriations for the Fiscal Year 1919 and Prior Fiscal Years,” 65th U.S. Congress, Second Session, Government Printing Office, 1918, p. 1,150.

⁹*History of Chemical Warfare Service American Expeditionary Forces Technical Division*. Although much work was done for the development of gas camouflage, a satisfactory combination was never achieved.

¹⁰Ibid.

Ms. Lindberg is the regimental historian at the U. S. Army Chemical, Biological, Radiological, and Nuclear School History Office, Fort Leonard Wood, Missouri. She holds a bachelor’s degree in history, humanities, and political science from the University of Northern Iowa, Cedar Falls, and a master’s degree in history from Missouri State University, Springfield.

34th CERFP Responds to COVID-19

By Major Andrew J. Czaplicki

Nearly 200 U.S. Army National Guard Soldiers and U.S. Air Force Airmen assigned to the 34th Chemical, Biological, Radiological, Nuclear, and Explosives Enhanced Response Force Package (CERFP), Richmond, Virginia, completed more than 3 months of continuous sample collection and performed other missions in support of the Commonwealth of Virginia Novel Coronavirus (COVID-19) pandemic response efforts on 27 July 2020. The 34th CERFP was activated shortly after the governor of Virginia issued an emergency declaration earlier in 2020.

Starting in late April 2020, the 34th CERFP conducted 413 sample collection missions across 138 different localities in Virginia. The vast majority of these missions consisted of point prevalence surveys in which survey strike teams went room to room at long-term and specialized-care facilities. Individual samples were taken from residents for COVID-19 infection testing. Each facility continued its current isolation and quarantine procedures until the results were returned—at which point, the facilities could redirect residents and resources to treat those exposed and minimize further infection. The point prevalence survey strike teams were essential in combating the effects of the virus. Each mission was performed in partnership with the local county or city department of health. In addition, approximately 30 large-scale drive-through or walk-up community-based testing events were also conducted in order to reach isolated, rural, or at-risk communities.

At the height of the response, the 34th CERFP fielded nine point prevalence survey strike teams. Each strike team was comprised of four sampling teams, each with three personnel who had received rigorous medical training on proper sample collection, sample handling, and sanitation. The point prevalence survey strike teams were supported by a small command and control team with a decontamination section. Decontamination is a part of the process that is every bit as important as the actual sample taking.

The decontamination of the sample collectors ensured that the virus never left the facilities. Personnel were systematically washed with a bleach-water mixture while walking through an organized set of stations. A similar bleach-water mixture was used to decontaminate masks,


A Soldier from the 34th CERFP, takes a swab sample from a patient.



boots, and other equipment. After the decontamination process, Soldiers and Airmen used an alcohol-based sanitizer to minimize any accidental or secondary contamination. Over the 413 missions, Soldiers and Airmen were decontaminated a total of 3,398 times.

To support the nine strike teams, the headquarters section ran two 12-hour shifts that overlapped during the time spanning from 3:30 a.m. to 9:00 p.m. daily to organize logistics, manage personnel, track current operations, and plan future operations. Logistics was the primary focus of the 24 personnel assigned to the headquarters. A six-Soldier detail within the headquarters section was responsible for managing more than 190,000 test kits, a fleet of 40 vehicles, and \$2,000,000 in personal protective equipment.

At the end of July, after 95 days of operations, National Guard Soldiers and Airmen had collected more than 105,000 samples for COVID-19 testing, representing 10 percent of the total number of samples collected in Virginia.

A second, smaller Virginia National Guard task force was established in September 2020 to continue supporting testing efforts carried out at isolated, rural, and at-risk communities. 

Major Czaplicki is the deputy commander of the 34th CERFP. He holds a bachelor's degree in international studies from the Virginia Military Institute, Lexington, and a master's degree in business administration with a cognate in project management from Liberty University, Lynchburg, Virginia.

Army Scientist Plays Key Role in International Ban on Nerve Agent

By Dr. Brian B. Feeney

Editor's note: All quotes in this article were obtained from a personal interview with Dr. Robert L. Kristovich at the U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC), Aberdeen Proving Ground, Maryland, on 24 February 2020.

In March 2018, the world was reminded of the existence of a deadly Russian-developed nerve agent when former Russian double agent Mr. Sergei V. Skripal and his daughter were found poisoned and unconscious on a park bench in Salisbury, England. Russian scientists who developed the nerve agent, which was Novichok, claim that it is five to eight times more potent than VX nerve agent.

The Organization for the Prohibition of Chemical Weapons (OPCW), The Hague, Netherlands, rose to the occasion and led the world response. In October 2018, at a 41-member OPCW Executive Council meeting that included the United States, the Netherlands and Canada formally proposed adding two families of Novichok series agents to the OPCW list of banned substances.

The U.S. State Department led the U.S. effort to garner support for the technical-change proposal and to ensure that the proposal would be adopted. The State Department assigned Dr. Robert L. Kristovich and Dr. Frederic J. Berg of the DEVCOM CBC to provide technical expertise. Specifically, they presented the underlying science behind the lethality of Novichok to members of the OPCW in an attempt to ensure that the proposal was passed at the next annual all-members meeting. Dr. Kristovich was selected to lead the CBC effort because he has been a toxicologist specializing in chemical agent lethality his entire career and has developed the deep scientific understanding required to explain the need to counter the proliferation of this deadly compound.

“To develop the argument, we had to thoroughly analyze the agent to determine its degree of toxicity, its molecular stability, and how easy or hard it is to produce,” said Kristovich, “I had a lot of help from extremely knowledgeable chemists from around the Center and was strongly supported by the Defense Threat Reduction Agency Joint Science

and Technology Office for Chemical and Biological Defense; the Joint Program Executive Office for Chemical, Biological, Radiological, and Nuclear Defense; and the office of the Deputy Assistant Secretary of Defense for Chemical and Biological Defense. In this whole-of-Nation Chemical Biological Defense Program approach, we determined that, by all counts, Novichok is a very, very bad thing to have in the hands of a bad guy.”

Dr. Kristovich and the team of CBC experts got to work on building the case for adding Novichok to the OPCW Schedule 1 list of banned chemical materials. They provided an educational briefing to the participating states of the French-led International Partnership Against Impunity for the Use of Chemical Weapons and the Fourth OPCW Review Conference in November 2018. In November 2019, after more than a year of work, the proposal was adopted at the 24th Session of the OPCW Conference of the member states. The members not only unanimously passed the resolution, but they also stood and applauded—a very rare show of appreciation throughout OPCW history and one that was well deserved, given that this was the first-ever change to the list of banned chemicals.

Dr. Kristovich looks back at the coordinated international response with satisfaction. “We proved that the U.S. Chemical Biological Defense Program and the OPCW possess such a technological lead in chemical agent detection and defense that it makes no sense for another nation or group to even try to use these materials,” he said, “This response shows the world how very relevant and effective the OPCW is and how the international response to a chemical agent threat changes and adapts to whatever threat may be posed.”

Dr. Feeney is a public affairs specialist with the DEVCOM CBC. He holds a bachelor's degree in history from Colorado College, Colorado Springs; a master's degree in risk communication from Cornell University, Ithaca, New York; and a Ph.D. in risk communication from Temple University, Philadelphia, Pennsylvania.

Interoperability and Building Relationships in the Netherlands

By Captain Lorenzo Llorente II and Kaptain Tom Martens

The National Defense Strategy¹ and the U.S. Army Europe and Africa operational approach emphasize the importance of building strong relationships with our allies and partners. The U.S. Army Reserve 773d Civil Support Team (CST), Kaiserslautern, Germany, developed the necessary tactical actions to support these strategic objectives by partnering and building a strong relationship with the Defence Chemical, Biological, Radiological, and Nuclear Centre (DCBRNC), Vught, the Netherlands. The friendship between the two organizations began in July of 2020, during the planning phase of Defender-Europe 2020, with the execution of a maritime situational training exercise at a major seaport of deportation. This collaborative effort resulted in a cohesive relationship and a shared understanding of the survey and decontamination capabilities of each group, allowing the identification of lessons learned to improve chemical, biological, radiological, and nuclear (CBRN) interoperability within the European theater.

773d CST

The 773d CST, which was activated a little more than a decade ago, is a unique organization. It is the only CST that is not assigned to the National Guard Bureau. This has resulted in many challenges with resourcing and modernization, but has also created many opportunities for training events with partner nations in order to seek identity and purpose as one of the only CBRN capabilities in the European theater assigned to U.S. Army Europe and Africa. The opportunity to train at the DCBRNC was one that the 773d CST could not pass up. It was an opportunity to learn how Dutch forces work with civilian authorities at an incident site and to compare their tactics, techniques, and procedures to those that the 773d CST would use when responding to an incident on a U.S. military installation.

Lessons Learned by the 773d CST

The first thing that the 773d CST noticed about the Dutch CBRN forces was their use of a 24-hour on-call response team. At least six of the Dutch CBRN soldiers slept at the unit headquarters so that they could rapidly respond to an incident, similar to traditional U.S. firefighters on a work-rest cycle. This proved necessary since the team was actually required to respond to an incident in which suspicious cargo emitted a chemical vapor at the local airport the night before the maritime situational training exercise.

During the exercise, Dutch civilian crisis agencies including local medical, fire, and police departments trained with the CBRN response force on a scenario in which a local national planned a chemical attack that resulted in a chemical release on a ship. In order to maintain mutual cohesiveness and understanding throughout the incident, every agency met at the incident command post every hour to ensure that objectives were being met. Meetings took longer than usual due to the language barrier; however, the Dutch CBRN operations officers were very good interpreters. The 773d CST worked with the Dutch explosive ordnance disposal and CBRN teams to conduct sensitive-site assessment and exploitation. Dutch and U.S. sampling techniques were similar; however, the back-briefings illustrated that there was miscommunication between the explosive ordnance disposal team and the 773d CST regarding the sampling priority list for each room on the ship. To improve shared understanding and prevent such miscommunication in the future, both organizations agreed to conduct mission briefings together. On-site decontamination was conducted by the fire department, preserving additional manpower for the 773d CST in the event that another sampling team needed to be sent downrange.

The most important lesson that the 773d CST learned during this exercise was the importance of synchronizing the incident command post objectives with every agency involved before executing the mission. In a traditional mission conducted by the 773d CST, a rehearsal of concept would have been conducted at the staging area, which would have increased the tempo during this particular situational training exercise. Starting interoperability during the planning phase instead of the execution phase would have also allowed for more decentralized command and control.

The Netherlands DCBRNC

The DCBRNC provides education, training, and support for military personnel and civilian first responders in the CBRN domain. Accordingly, the DCBRNC plays a central role in the handling of CBRN-related incidents by providing first responders and training and assisting partner organizations in CBRN response techniques. The DCBRNC includes the National Training Centre CBRN; the CBRN School; the Defence Expertise Centre CBRN; and the CBRN Response Unit, which is deployable. The National Training Centre CBRN is the largest CBRN training facility in



Members of the 773d CST conduct site characterization on a vessel during the training exercise.

Europe, offering dozens of training settings for CBRN professionals to train and improve their skills. These settings include a simulated chemical laboratory, hospital, supermarket, airplane cabin, restaurant, railway yard, illegal drug laboratory, and subway station. Ultimately, the combination of these extensive training facilities and the ability of the DCBRNC to provide expert knowledge, specialized education, and CBRN response specialists makes the DCRBNC unique within Europe.


Lessons Learned by Dutch CBRN Forces

The major takeaway from this exercise scenario was an understanding of the flow of information between U.S. Soldiers, the CBRN response team from the Netherlands, and civilian agencies involved. In scenarios like this, specialists are drawn to specific areas within the larger whole. Managing these specialists and the information they gather and henceforth distributing that information are key components of succeeding in maritime scenarios, especially when working with the 773d CST survey team, which has different reporting requirements than its Dutch counterparts. Training and collaboration with local authorities are vital, and they allow everyone involved to gain an understanding of how to communicate with one another; they also allow U.S. and Dutch personnel to augment one another, increasing combat power during a CBRN incident.

All commanders should be able to trust their subordinates to perform at the required level—and the more the 773d CST and Dutch CBRN response team can train with each other, the more decentralized incident commander control can be. Without trust, micromanagement and time costly discussions between agencies occurs. This training scenario, taught the participants that the best approach is to

have an interoperability training plan, starting with small-scale training exercises with the 773d CST and culminating with a maritime exercise, such as the one discussed in this article. This allows both countries to build trust and cohesiveness, while strengthening communication techniques in order to tear down any language barriers that may slow the mission tempo.

Postexercise Relationship

Although deficiencies were identified during the exercise, the commander's intent to enhance interoperability and build relationships with our allies and partners was met. The 773d CST showed a strong commitment toward a North Atlantic Treaty Organization ally and demonstrated the ability to integrate and conduct multinational CBRN operations with Dutch forces. The relationship between the organizations has evolved to a personal level, which has allowed key leaders to add one another to their speed-dial functions. The cohesiveness between both nations proves that interoperability does not only occur through the execution of missions, but also through fellowship. 

Endnote:

¹National Defense Strategy, Department of Defense, 2018.

Captain Llorente is the operations officer and CBRN officer for the 7th Mission Support Command, Kaiserslautern. He holds a bachelor's degree in kinesiology from California State University, Fresno, and is currently pursuing a master's degree in business administration.

Kaptain Martens is the head training officer for the CBRN Response Unit within DCBRNC. He holds a bachelor's degree in mechanical engineering and several other studies from Avans Hogeschool, Hertogenbosch, the Netherlands.



BGCA: Chemical Weapons Caretakers

By Ms. Angela L. Messinger

Editor's Note: All quotations in this article were obtained from personal interviews with Blue Grass Chemical Activity (BGCA) leaders from 12 to 14 January 2021.

The BGCA, Blue Grass Army Depot (BGAD), Richmond, Kentucky, spearheads the effort to ensure that the BGAD workforce, community, and environment are protected until the chemical weapons stockpile on BGAD is destroyed. Roughly 23 percent of the stockpile has been destroyed, and the remainder is under lock and key in the chemical limited area of the depot. BGCA is tasked with safely securing, storing, and monitoring the entire Blue Grass stockpile, which originally consisted of more than 523 tons of nerve and blister agent. The BGCA mission is performed by a team of almost 200 people, who work in fields such as safety, personal protective equipment (PPE), laundry, laboratory sampling and monitoring, electronics maintenance, “The Convention on the Prohibition of the Development, Production, Stockpiling, and Use of Chemical Weapons and on Their Destruction” (commonly known as the Chemical Weapons Convention¹ treaty compliance, quality assurance, emergency operations, budget, and logistics. While there are several key foci to the BGCA mission, the most visible is supporting the transfer of chemical weapons from storage igloos into enhanced on-site containers for movement and demilitarization to the Blue Grass Chemical Agent-Destruction Pilot Plant (BGCAPP). Safety is always at the forefront of everything the organization does to support the Nation’s commitment to chemical weapons destruction.

The BGCA Safety Office recommends and implements processes to keep the workforce, community, and environment safe. Safety and occupational health specialists work with supervisors to oversee the safety of munitions movements, training, administrative offices, and operations areas to ensure that personnel follow proper procedures. These specialists also analyze the risks associated with operations and weather and then recommend practices to reduce those risks. According to Mr. David W. Moragne, the BGCA safety and occupational health manager, “[The] team takes a detailed look at the safety practices across the organization to ensure our employees are protected. Additionally, our



A BGCA toxic materials handler prepares decontamination trailer for operations.

employee safety committee meets regularly to provide ideas to improve workforce safety.” The safety team motto is “Accountability, Responsibility, and a Willingness to Stop.” The organization teaches employees to be accountable—and to hold each other accountable—for maintaining safety practices and to stop operations if they see something that could injure someone or damage property. The culture, programs, and training have been significant factors in the stellar safety record of the organization.

The BGCA Surety Office works closely with the Safety Office and the other directorates to ensure proper control measures for chemical weapons and the people who handle them. The surety program undergoes strict scrutiny from external agencies such as the Department of the Army Inspector General and the U.S. Army Materiel Command. These checks and balances, along with a strong internal inspection program, help ensure the continued safety and security of the weapons stockpile.

The Chemical Operations Directorate is responsible for a large aspect of the BGCA mission. This directorate

handles PPE, laundry, laboratory sampling and monitoring, field operations, and chemical weapons inventory. For the Chemical Operations Directorate, a key part of ensuring workforce safety is the acquisition, testing, assembling, cleaning, issuing, and tracking of PPE. The PPE team has been supporting the BGCA workforce as well as BGAD firefighters, security forces, and emergency medical technicians for many years. It extended its support to the demilitarization workforce shortly before chemical weapons destruction started. As the BGCA moved closer to starting the first chemical weapons destruction campaign, a PPE distribution point was established at BGCAPP. This initiative improved operational efficiencies for both BGCA and BGCAPP. From this distribution point, the PPE team provides M40 masks and conducts mask fit tests for the BGCAPP workforce.

BGCA also handles BGCAPP laundry requirements. When working with chemical weapons, employees must wear undergarments, overalls, and socks provided by the government. Though it rarely occurs, there is a real risk of toxic agent contamination for employees, and this ensures that personal property does not become contaminated in the unlikely event that a worker is exposed to toxic chemical agents. The field operations team sets up decontamination equipment so that workers can quickly wash off toxic agents, remove contaminated clothing, and receive other assistance as needed. Medics are also available to render aid if there is an emergency.

Before workers open a storage igloo to access weapons, personnel from the Laboratory and Monitoring Division, BGCA, monitor the structure with real-time analytical platforms (RTAPs) to determine if there are chemical agents in the air. An RTAP monitoring system operator provides support during leaker isolation operations and participates in each munitions movement to ensure the continued safety of workers who move munitions. The RTAP operator also stands ready to monitor the air within the enhanced on-site container if the door does not properly seal.

Electronics mechanics keep RTAPs operational by conducting routine and emergency maintenance. The team of mechanics established a satellite station closer to the chemical weapons to increase efficiency during chemical operations. An on-site mechanic quickly responds to maintenance or equipment replacement needs. This extended reach into the secure area saves time and increases overall safety and security for the workforce and chemical weapons.

Physical scientists and technicians prepare and test chemical agent standards that are used to calibrate and challenge RTAP equipment, such as miniature continuous air-monitoring systems. This enables regular monitoring to ensure that structures that house chemical weapons or hazardous waste are free from harmful chemical agents. The team of scientists and technicians also created chemical agent standards for the BGCAPP laboratory until the labo-

ratory became fully functional.

The Field Operations Division conducts leaker isolation operations. If a chemical leak or vapor is detected, a team of toxic materials handlers and quality assurance specialists (ammunition surveillance) work together to find the leaking munition, containerize it, and then move it to another igloo. This team also ensures that custody of chemical weapons is properly transferred to BGCAPP. Inventory specialists and toxic materials handlers check lot numbers, quantities, and banding before signing custody over to BGCAPP. Once this process is complete, forklift operators load the muni-



BGCA operators monitor the VX projectile storage igloo for chemical agent release.

tions into enhanced on-site containers to be transported to BGCAPP for demilitarization.

A great deal of advance coordination occurs before transportation missions are conducted. The Chemical Operations Directorate hosts regular joint Munitions Transportation Team meetings to refine the details of upcoming munitions movement operations. Personnel conduct inspections and preoperational checks on equipment and vehicles slated for use. On the day of scheduled operations, the BGCA Emergency Operations Center conducts a final meeting to synchronize all operations and movements within the chemical limited area where the weapons are housed. Each partner organization confirms that all required personnel and equipment are available and in place for safe operations. In addition to tracking all movements within the chemical limited area, the Emergency Operations Center coordinates work plans with community partners, including the Madison County Emergency Management Agency and local hospitals. The Emergency Operations Center is the central communications hub for munitions movement, hazard modeling, chemical accident emergency response, and incident reporting.

Emergency Operations Center technicians regularly lead and participate in joint training exercises with



BGCA toxic materials handlers guide VX projectiles into an enhanced on-site container for demilitarization transfer.

BGCAPP control room operators and Madison County Emergency Management Agency personnel. This practice allows all organizations to test communication methods, discuss appropriate protective-action recommendations, and refine emergency response reporting protocols. According to Mr. Mark C. Ernst, BGCA director of operations, “Our team works hard to maintain open lines of communication with our Chemical Stockpile Emergency Preparedness Program partners. Mutual trust and transparency are very important to the success of chemical weapons storage and demilitarization. Our strong partnership with BGCAPP, Madison County, and the CSEPP [Chemical Stockpile Emergency Preparedness Program] community is paying big dividends as we support the long-awaited destruction of these toxic munitions in accordance with the Chemical Weapons Convention.”

The Chief of Staff Directorate provides support that enables all areas of the BGCA mission, including treaty compliance, logistics, budget, public affairs, management, and personnel transition.

To ensure compliance with the Chemical Weapons Convention, treaty specialists from the Chief of Staff Directorate oversee all aspects of treaty-related requirements. These specialists verify treaty compliance of munitions transfers to BGCAPP and munitions tagged as samples for the Organisation for the Prohibition of Chemical Weapons. Twice a year, the treaty specialists host Organisation for the Prohibition of Chemical Weapons inspectors, who inventory all chemical munitions and inspect munitions custody documents at BGCA. The treaty specialists work closely with the Organisation for the Prohibition of Chemical Weapons Executive Council and inspectors, the Defense Threat Reduction Agency, and BGCAPP to ensure that inspections, on-site visits, and chemical inventory tracking are properly completed in accordance with Chemical Weapons Convention

requirements.

The logistics team from the Chief of Staff Directorate works with each directorate to ensure that supplies and equipment are ordered in appropriate quantities so that workers across the organization have what they need to execute their part of the overall mission. The logistics team not only facilitates acquisition, but also manages the BGCA vehicle fleet, which includes vans, trucks, sedans, and generators; trailers that serve as decontamination units; and a re-fitted trailer for community events. The team manages property books for more than \$50 million of supplies and equipment for BGCA and BGCAPP. Working with the Budget Office, the logistics team provides the equipment needed to conduct the mission while ensuring that the organization stays within its budget. In

reference to his team, Chief of Staff Mr. Gregory H. Collinsworth said, “This group ensures each directorate has what it needs to execute the mission. A lot of hard work goes on behind the scenes to bring in new employees, work within the confines of our budget, and prepare our workforce for the eventual closure of this organization. I am proud of the support my team has provided.”

Since destruction operations began in 2019, one entire class of weapons, GB projectiles, has been destroyed. Mustard and VX projectiles are currently being demilitarized at BGCAPP. Once these campaigns are complete, only GB and VX rockets will remain. The destruction of the entire Blue Grass chemical weapons stockpile is scheduled to be completed by the end of 2023.

According to Lieutenant Colonel Edward E. Williams, BGCA Commander, “BGCA is participating in a significant milestone in U.S. history—the destruction of the Nation’s chemical weapons stockpile. It is truly a privilege to lead this outstanding organization as we work with our mission partners to achieve this aspect of national security objectives.”

Endnote:

¹“The Convention on the Prohibition of the Development, Production, Stockpiling, and Use of Chemical Weapons and on their Destruction,” United Nations Treaty Collection, 2021, *Treaties.Un.Org*, <https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVI-3&chapter=26>, accessed on 5 April 2021.

Ms. Messinger is the director of emergency operations for BGCA. She holds a master's degree in military operational arts and science from Air Command and Staff College, Maxwell Air Force Base, Montgomery, Alabama.



Back to School: Higher-Education Opportunities for CBRN Officers



By Lieutenant Colonel Peter C. Zappola and Captain Chester T. Garner

During the career timeline of a U.S. Army officer, there are a few windows of opportunity to gain broadening experience in unique training and schooling environments. One of those opportunities is higher education through the Army's Advanced Civil Schooling (ACS) program, offered by the Advanced Education Programs Branch.¹ ACS is a fully funded program that allows officers at various levels to obtain an advanced degree at a top-tier institution. While in this program, officers are full-time students with the sole duty of completing a degree within a specified timeframe. After graduation, chemical, biological, radiological, and nuclear (CBRN) officers complete a utilization tour in a critical position that supports future Chemical Corps initiatives.² This article highlights two of the marquee degrees available to CBRN officers through the ACS program—the master of business administration degree from Emory University, Atlanta, Georgia, and the master of arts degree in international affairs from The Fletcher School, Tufts University, Medford, Massachusetts.

Master of Business Administration From Emory University

The Goizueta Business School (GBS) at Emory University is one of the premier business programs in the Nation, and it serves as a great community for Regular Army Soldiers and veteran students. In recent years, there have been a handful of Regular Army Soldiers in each graduating class. Maneuver Support Center of Excellence and Fort Leonard Wood, Missouri, Commander Major General James E. Bonner was one of the first to recognize the value that a master of business administration degree could bring to the Chemical Corps. The Corps began sending officers to complete GBS master of business administration programs in 2017. Through the efforts of Lieutenant General P. K. "Ken" Keen (Retired), senior lecturer in organization and management and associate dean for leadership at GBS, Emory has worked to reserve one seat per schoolyear for CBRN officers. As with other ACS programs, prospective students take the Graduate Record Examination and, as a formality, interview with the school. The intent of offering this degree program to CBRN officers is to provide them with an academically rigorous background in preparation for filling organizational-level positions (such as positions with a

U.S. Army finance office, or the Personnel Development Office at the Maneuver Support Center of Excellence) where their analytical, critical thinking, and managerial skills will have the greatest impact. A quick look at the leader development strategy that is part of the GBS curriculum demonstrates how the program goes far beyond spreadsheets and speaking skills in preparing young officers to step into key roles throughout their Army and civilian careers.

In addition to the learning of various business disciplines that comes with a master of business administration degree, GBS has built leadership development into the core requirements for all of its students. From the very outset of the program, students begin a healthy examination of the dynamics of leading and working within teams; discussing and understanding diversity of thought, experience, heritage, and culture; employing personal assessment tools like the Birkman Method; and developing a growth strategy to becoming a successful and effective leader, follower, and team player.³ Some leadership courses are framed by adopting the perspective of the general manager in making decisions; setting direction, vision, and priorities; coordinating efforts; negotiating; and establishing culture and behavior.⁴ Other courses "center on building self-awareness and developing skills in empathy, influence and communication."⁵ The intentional end state of this focused leadership diet is articulated in one course description:

"... to help ... contribute to and build work environments and cultures that are 'brain friendly,' i.e., ones that bring out the very best in people. We would characterize these environments as being inspiring (with positive stress) places where people create, innovate, cooperate, imagine, produce, and conduct themselves with moral maturity."⁶

GBS does more than preach the antithesis of toxic leadership. It enables students to discover their own ideal brand of leadership by inviting them to explore fundamental principles and philosophies through hands-on experience, research-backed frameworks, and contemporary and historical examples. This in-depth examination, delivered in concentrated doses over the course of several semesters, understandably shapes how officers understand and plot their personal growth and impact within an organization—something that cannot be fully captured here. However, it

should be clear that there is a great deal of overlap between how the Army seeks to shape its future leaders and what GBS is able to provide.

Master of Arts in International Affairs From The Fletcher School, Tufts University

The Fletcher School of Law and Diplomacy, Tufts University, was founded in 1933 as the first graduate-only school of international affairs in the United States. An average of 550 students from the United States and more than 40 countries around the world enroll in The Fletcher School each year. Fletcher alumni live and work in more than 130 countries and are engaged in careers within national governments, international organizations, businesses, banking, journalism, education, international research, and countless other private and public pursuits.⁷

The Fletcher School master of arts degree in international affairs is a 1-year program for mid-career professionals on sabbatical or leave of absence from government ministries, international organizations, and other institutions.⁸ Students, who must have at least 8 years of professional experience, are typically between the ages of 32 and 39 years old. About half of the students are from outside of the United States, meaning that classmates have diverse real-world knowledge and opinions from which to base their perspectives in the classroom. For example, Lieutenant Colonel Peter C. Zappola (one of the authors) took a course on weapons of mass destruction, taught by a Western European professor, with students from the United States, China, Eastern Europe, India, and Japan; the conversations that they had regarding nuclear deterrence and policy were unlike anything else he had experienced.

The flexibility of The Fletcher School master of arts program allows students to select courses that match specific functional and/or regional interests, which means that Service members can tailor the program to their specific goals. Lieutenant Colonel Zappola focused on national security policy and decision making. Fletcher students can also cross-register for courses at Tufts University and at Harvard University, Cambridge, Massachusetts, providing increased opportunity to further customize the educational experience.

Fletcher has a rich history of excellence in international security and support to the military. U.S. Navy Admiral James G. Stavridis (Retired), former Supreme Allied Commander, Europe, and himself a Fletcher graduate, was the dean in 2017. He held monthly breakfasts with Soldiers and used the opportunity to share his many experiences. At the same time, there were five national security fellows from the various senior Service colleges who were attending Fletcher in lieu of a war college and who served as mentors to the junior officers. The class was also fortunate to have General Joseph F. Dunford, a Fletcher master of arts program alumnus and then chairman of the joint chiefs of staff, visit and speak about national military strategy. He has maintained regular contact with the school since he graduated as a major. A professor whose father was an Army special operations officer arranged to have General Raymond A. "Tony"

Thomas, then commander of the U.S. Special Operations Command, speak to Lieutenant Colonel Zappola's class as well. The faculty of the International Security Department is internationally renowned, which affords military professionals a level of opportunity that is unmatched in most graduate programs.

Conclusion

Following the successful completion of key major and captain developmental positions, completing an advanced degree through programs such as those at Emory and Tufts can be a tremendous boost to the knowledge that officers already bring to the organizations in which they serve. Officers interested in participating in ACS should inform their U.S. Army Human Resources Command career manager at least 15 months before the start date of the desired program. For more information, explore the Advanced Education Programs Branch website at <<https://www.hrc.army.mil/Officer/Officer%20Advanced%20Education%20Programs>>.

Endnotes:

¹"Advanced Education Programs Branch," U.S. Army Human Resources Command, <<https://www.hrc.army.mil/Officer/Officer%20Advanced%20Education%20Programs>>, accessed on 10 February 2021.

²"Advanced Civilian Schooling," *My Army Benefits*, <[https://myarmybenefits.us.army.mil/Benefit-Library/Federal-Benefits/Advanced-Civil-Schooling-\(ACS\)?serv=122](https://myarmybenefits.us.army.mil/Benefit-Library/Federal-Benefits/Advanced-Civil-Schooling-(ACS)?serv=122)>, accessed on 10 February 2021.

³"The Birkman Method," Birkman International, <<https://birkman.com/the-birkman-method/>>, accessed on 10 February 2021.

⁴Renée Dye, "Syllabus for Leading Organizations and Strategy," GBS, Emory University, Spring 2019.

⁵Karl Kuhnert and Rick Gilkey, "Syllabus for Leading with Emotional Intelligence," GBS, Emory University, Spring 2019.

⁶Ibid.

⁷"A History of Excellence," *The Fletcher School*, <<https://fletcher.tufts.edu/about/history-excellence>>, accessed on 10 February 2021.

⁸"Master of Arts, Mid-career Program," *The Fletcher School*, <<https://fletcher.tufts.edu/academics/masters-programs-residential/MA>>, accessed on 10 February 2021.

Lieutenant Colonel Zappola is the commander of the 84th Chemical Battalion, Fort Leonard Wood. He holds a bachelor's degree in exercise science from Miami University, Oxford, Ohio; a master's degree in exercise physiology from the University of Illinois; and a master of arts degree in international affairs from Tufts University.

Captain Garner is the chief of personnel development at the U.S. Army CBRN School, Fort Leonard Wood. He holds a bachelor's degree in biophysics from Brigham Young University, Provo, Utah, and a master of business administration degree from Emory University.

The authors would like to thank Lieutenant General P. K. "Ken" Keen (Retired) and Major Cameron W. Lothridge for their contributions to this article.

The 8th WMD-CST and 8th CERFP Conduct COVID-19 Response Operations Throughout Colorado

By Lieutenant Colonel Ryan G. Brock and Sergeant First Class Christian M. Gonzales

The 8th Weapons of Mass Destruction (WMD)–Civil Support Team (CST), Buckley Air Force Base, Colorado, led a Novel Coronavirus (COVID-19) task force comprised of 79 members from the 8th WMD-CST and 8th Chemical, Biological, Radiological, and Nuclear Enhanced Response Force Package (CERFP) in conducting COVID-19 testing operations throughout the State of Colorado from 14 to 26 March 2020.

The task force, which traveled 1,230 miles and established testing sites in Denver, Montrose, Pueblo, Salida, and Telluride, partnered with the Colorado Department of Public Health and Environment, the Colorado State Patrol, and many local incident commanders to test 472 patients for COVID-19 in those five Colorado cities. Bringing together two different chemical, biological, radiological, and nuclear capabilities for a unique mission and operation was truly significant. The teams flawlessly worked together, sharing many tactics, techniques, and procedures. Once the task force had established the groundwork for the testing sites, many other teams within the Army National Guard chemical, biological, radiological, and nuclear response enterprise adopted the same tactics, techniques, and procedures for their states.

The 8th WMD-CST left the COVID-19 mission to reset for its standard mission; to date, the 8th CERFP continues to conduct COVID-19 testing throughout the state of Colorado, where it has tested more than 5,000 civilians.

Lieutenant Colonel Brock is the commander of the 8th WMD-CST. He holds a bachelor's degree in community health from the University of Nebraska, Lincoln, and a master's degree in management and leadership from Webster University.

Sergeant First Class Gonzales is the noncommissioned officer in charge of operations for the 8th WMD-CST. He is working toward a bachelor's degree in emergency management from the American Military University.



A sign directs drivers not to enter the COVID-19 testing area.



Soldiers and Airmen from the 8th CERFP conduct drive-through COVID-19 testing.

Decontamination Points: An Antiquated Graphic Control Planning Measure?

By Major Spenser C. Weddington

While serving in the Protection Directorate, G-34, 8th Army, I participated in my first combined command post training event at Camp Humphreys, Korea. The event simulated the Notional Joint Combat Operation Model, as described in Joint Publication (JP) 3-0, *Joint Operations*.¹ Synchronization of forces in multidomain, joint operations creates a very challenging problem set. At echelon, staff understanding must be synchronized to support flexibility and decision making for leaders in a complex environment. Given the importance of this goal and the complexity of achieving it, it is important to continually examine and refine how things are done. From a chemical, biological, radiological, and nuclear (CBRN) perspective, do current doctrinal representations and decontamination point plans best promote this flexibility in accordance with Field Manual (FM) 3-11, *Chemical, Biological, Radiological, and Nuclear Operations*;² FM 1-02.1, *Operational Terms*;³ and FM 1-02.2, *Military Symbols*?⁴

Mission analysis for combined command post training began months before the event. During mission analysis, I noticed a reoccurring trend that I have encountered throughout my career: For CBRN planning, there has always been a heavy emphasis on decontamination points. Clearly, according to FM 3-11, preplanned decontamination points should serve as important planning elements in assessment, protection, and mitigation. However, these preplanned decontamination points are created under various planning assumptions. Preplanned decontamination points generally meet all criteria outlined by FM 3-11; JP 3-11, *Operations in Chemical, Biological, Radiological, and Nuclear Environments*;⁵ and Army Techniques Publication (ATP) 3-11.32, *Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Passive Defense*.⁶ However, depending upon evolving factors related to mission, enemy, terrain, troops, time, civilians, and weather, these preplanned decontamination points can quickly become irrelevant, obfuscating the CBRN common operating picture battlespace. A CBRN common operating picture that relies on irrelevant information creates conditions that can lead to further chaos and friction during a CBRN attack. Furthermore, depending on the staff understanding of CBRN unit capabilities and the analyses of movement and logistical requirements, these planned decontamination points may impede flexibility and limit decision space for commanders.

Using current doctrine (FM 1-02.1, FM 1-02.2, and JP-3), I created an initial area of operations (AO) and area of responsibility (AOR) graphic (see Figure 1). The problem with this depiction of decontamination points is that it presents an unclear CBRN common operating picture. This depiction includes all decontamination points—including those that may not be relevant based on mission, enemy, terrain, troops, time, civilians, and weather. The inclusion of possible irrelevant points greatly inhibits situational awareness and understanding of the CBRN common operating picture. We could improve upon this model. Why not simplify this graphic to make it clearer and add flexibility to command planning and decision making? Based on mission requirements, the graphic could be contiguous or noncontiguous, chemical units could be assigned a geographic model similar to the AO/AOR model, and graphic models could be completed with movement timetables and codified support relationships according to the main and supporting efforts of a phase in an operation. The models could be amplified with various supporting data to facilitate understanding.

Figure 2, which is similar to Figure 1, is another AO graphic that I created, but the changes illustrate how greater clarity and flexibility could be achieved. This graphic represents a better way to depict unit capabilities, travel time, and decontamination responsibilities. Further, the CBRN common operating picture is simplified and situationally relevant most of the time. The graphic control measure depicted in Figure 2 would provide staff with the flexibility to support units in time and space, regardless of weather or situational conditions. This new decontamination AO/AOR model would allow for decluttering of the operational map and facilitate a rapid understanding of unit responsibilities and capabilities. Coordination between contaminated and decontaminating units would still be required in accordance with current doctrine. However, this change in the graphic control measure would allow leaders to rapidly visualize, understand, and describe CBRN operations to better support large-scale combat operations.

As Army engagement with multidomain operations, joint operations, large-scale combat operations, and peer threats becomes more frequent and complex, the Chemical Corps must adapt. The combined command post training event made it clear that staff at all echelons must provide a clear and flexible common operating picture to accomplish the mission. The current doctrinal depiction of decontamination

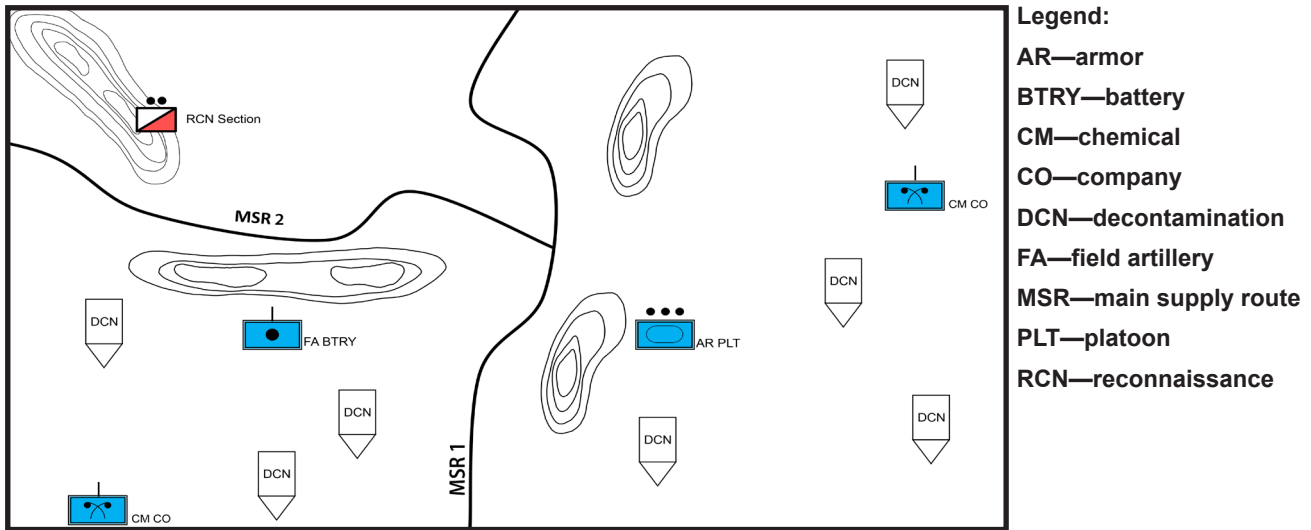


Figure 1. AO graphic based on current doctrine

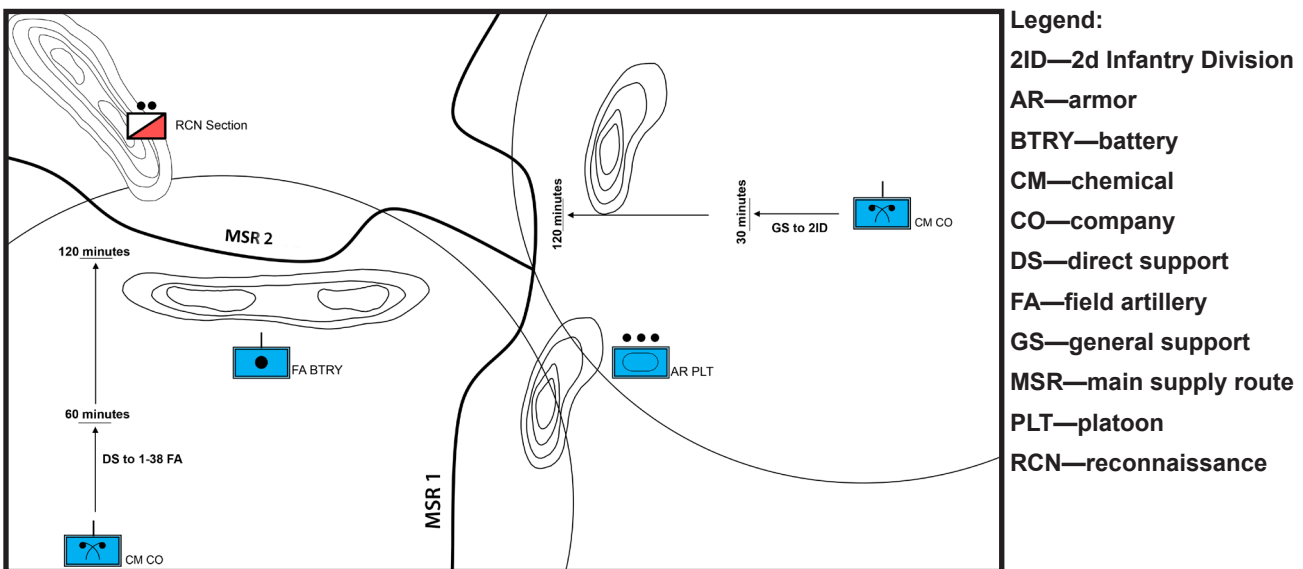


Figure 2. AO graphic based on improved model

points can potentially create an unsynchronized, cluttered, and misunderstood CBRN common operating picture. The improved model provides a way for leaders and staffs to rapidly gain a general understanding of decontamination areas and direct-support relationships with CBRN units. 🧑🏻‍🚒

Endnotes:

- ¹JP 3-0, *Joint Operations*, 22 October 2018.
- ²FM 3-11, *Chemical, Biological, Radiological, and Nuclear Operations*, 23 May 2019.
- ³FM 1-02.1, *Operational Terms*, 9 March 2021.
- ⁴FM 1-02.2, *Military Symbols*, 10 November 2020.

⁵JP 3-11, *Operations in Chemical, Biological, Radiological, and Nuclear Environments*, 28 October 2020.

⁶ATP 3-11.32, *Multi-Service Tactics, Techniques, and Procedures for Chemical Biological, Radiological, and Nuclear Passive Defense*, 13 May 2016.

Major Weddington is a plans officer in the 8th Army, Camp Humphreys, Korea. He holds a bachelor's degree in biology from Oklahoma State University, Stillwater; a master's degree in operational studies from the Command and General Staff College, Fort Leavenworth, Kansas; and a master's degree in environmental management from Webster University.

Rethinking the CBRN Officer Career Path for Command and Staff Positions

By Major Cameron W. Lothridge

According to Department of the Army (DA) Pamphlet (Pam) 600-3, *Officer Professional Development and Career Management*, “Officers will be managed by categories and groups with similar functions to facilitate the development of officer functional competencies required on the future battlefield. The design is not intended to reflect where officers serve on the battlefield, but to align the functions and skills required.”¹ Army functional categories are listed in Table 1. The Chemical Branch is currently aligned under the Operations Functional Category.² As the Army prepares to enhance readiness through talent management, realignment of the Chemical Branch to the Operations Support Functional Category should be considered in order to better facilitate the development of CBRN officer functional competencies required for large-scale combat operations.

Key developmental (KD) positions for CBRN officers at ranks of lieutenant through major should serve as a means to develop technical and tactical competencies for successfully

serving as a tactical CBRN battalion commander or the primary CBRN staff officer at echelons above brigade. These goals align with attaining a successful 20-year professional career of service and the rank of lieutenant colonel. Smart-book DA Pam 600-3, *Officer Professional Development and Career Management*, states, “CBRN officers plan, employ, and coordinate CBRN systems from platoon level through corps and joint task forces in support of joint and unified land operations.”³ CBRN officers develop these abilities by serving in CBRN staff and leadership positions at echelon and “. . . must possess knowledge of CM [Chemical Branch] requirements, wide area security/combined arms maneuvers CBRN unit support, and coordination principles.”⁴ Furthermore, “All company grade officers must focus their efforts during the company grade years on mastering the basic skills of their specific branch,”⁵ whereas, “the junior field grade years serve to develop the officer cohort in a variety of branch or [functional area] assignments within their functional category.”⁶

Operations	Operations Support	Force Sustainment
Air Defense Artillery	Enterprise Marketing/Behavioral	Adjutant General
Armor	Force Management	Army Acquisition
Aviation	Foreign Area Officer	Financial and Comptroller
Chemical	Information Networks Engineering	Logistics Corps
Engineer	Military Intelligence Branch	Ordnance
Field Artillery	Nuclear and CWMD Officer	Quartermaster
Infantry	Operations Research/Systems Analysis	Transportation
Military Police	Public Affairs	Information Dominance
Army Special	Signal Corps	Cyber
Civil Affairs	Simulation Operations	Electronic Warfare
Psychological Operations	Space Operations	Information Operations
Special Forces	Strategic Intelligence	Special Branches
	Strategist	Army Medical
	United States Military Academy Professor	Chaplain
		Judge Advocate

Table 1. Current Army functional categories and career groups

The ability for CBRN officers to focus on mastering the basic skills of the Chemical Branch is impeded by its current alignment under the Operations Functional Category. The consensus among many leaders within the Operations Functional Category is that company commander as a captain and operations officer/executive officer as a major are the only viable KD (commonly referred to as hard-KD) positions when it comes to promotion potential. This is a logical thought process for many of the career groups within the Operations Functional Category because the majority of their career paths are focused on battalion and brigade command. However, this paradigm devalues the key development that CBRN officers receive when advising senior commanders on countering weapons of mass destruction and conducting CBRN defense. This is important because most CBRN officers serve as staff officers for their entire careers. Many CBRN officers view these staff positions as “soft-KD” positions, or “purgatory”, while they wait for the hard-KD positions that matter for an Operations Functional Category promotion board. Yet, many CBRN officers find themselves seeking immaterial command, operations officer, or executive officer positions due to the lack of available technical hard-KD positions. These immaterial positions may broaden CBRN officers’ understanding of a different Army formation, but are unlikely to further their specific branch skills. The risk to the profession is that there may not be enough quality CBRN lieutenant colonels to willingly serve as division CBRN officers and tactical CBRN battalion commanders if CBRN officers do not master the basic skills of the branch as captains and reinforce these skills as majors.

The Operations Support Functional Category might underwrite a more flexible career path that could better facilitate the development of CBRN officers due to a heavier staff-centric than command-centric career model for the career groups within the Operations Support Functional Category. Therefore, potential identified while serving as a CBRN staff officer would likely garner higher promotion potential with an Operations Support promotion board than with an Operations promotion board. This would enable CBRN captains and majors to spend more time in operational staff positions, expanding their knowledge and experience related to large-scale combat operations.

The transition of the Chemical Branch to the Operations Support Functional Category would not reduce the relevancy of the Chemical Corps to the maneuver community. On the contrary, the increased focus of serving on staffs as opposed to in hard-KD positions would place additional emphasis on supporting senior commanders. The Chemical Branch senior leaders would be better postured to coach officers on the importance of serving on operational staffs at each grade instead of recommending immaterial command, operations officer, or executive officer positions. This would also provide junior CBRN officers with enhanced mentorship from above-average CBRN officers at the division and corps echelons.

The Army selects officers to fill battalion and brigade command positions and specialized designated key billets through the centralized selection list (CSL) process. There

are currently eight lieutenant colonel and six colonel CSL commands in the Chemical Branch. Shifting the Chemical Branch to the Operations Support Functional Category might introduce an opportunity to identify the 10 division and four corps CBRN officer positions as key billets through CSL. (Key CSL billets, which are common within the Operations Support Functional Category, do not currently exist in the Operations Functional Category.) This would be beneficial to the Army because the best available officers would be selected to serve in CBRN command, division CBRN officer, or corps CBRN officer positions. A lack of incentives for retirement-eligible lieutenant colonels and colonels has resulted in an Army struggle to fill division and corps CBRN officer positions with quality officers. Codifying division or corps CBRN positions on the CSL would provide the opportunity for extremely talented officers to express their preference for these key staff positions over command if the key staff positions better align with their knowledge, skills, behaviors, and desires. These officers would be more competitive for acceptance to the senior Service college, promotion to colonel, and CSL selection at colonel if CBRN division officer positions were identified as key billets on the CSL—certainly more so than if the positions were not on the CSL.

There are risks involved in designating division and corps CBRN officer positions as key billets on the CSL. The number of Chemical Branch CSL requirements would increase to 18 lieutenant colonels (nine per year) and 10 colonels (five per year). These requirements would likely encompass the entire pool of eligible quality CBRN officers each year. Therefore, Chemical Branch officers would likely be unable to serve in immaterial lieutenant colonel and colonel CSL commands such as those involving recruiting, basic training, or garrison. This could be considered detrimental to the overall career progression of a specific CBRN officer, but these officers have already reached the pinnacle of a successful career—and serving in a division or corps CBRN officer position would provide them with the opportunity to mentor the next generation of CBRN officers toward successful careers. Because the Chemical Branch is extremely small at the lieutenant colonel and colonel ranks, we must carefully place these talents in positions where they can best support the unique functions that the Chemical Branch provides for the Army.

The Chemical Branch needs to reevaluate the current career path in order to fully prepare officers to serve as senior CBRN commanders and division/corps CBRN officers. The path should ensure that officers are given the opportunity to transition from staff positions to technical leadership positions from the ranks of lieutenant through major; however, the problem requires additional research and is dependent on the functional category of the Chemical Branch. A possible redesigned career model if the Chemical Branch moved to the Operations Support Functional Category is provided in Table 2 (page 32).

We must recognize that the Army is seeking to effectively manage talent by aligning the knowledge, skills, and behaviors of officers to the most critical positions in order to fight

	Lieutenant	Captain	Major
KD Assignments	<ul style="list-style-type: none"> • Battalion CBRN Officer • Operational Platoon/Team Leader • Operational XO 	<ul style="list-style-type: none"> • Operational Company Commander • Chemical Recon Detachment Command • Brigade CBRN Officer 	<ul style="list-style-type: none"> • Operational Battalion/Brigade S-3 • Operational Battalion/Brigade XO • Deputy Division/Corps CBRN Staff Officer • Special Forces Group CBRN Officer • 160th SOAR CBRN Officer • Division/Corps G-5 Staff Officer
Broadening Assignments	<ul style="list-style-type: none"> • IMT Platoon Leader/XO • Aide-de-Camp 	<ul style="list-style-type: none"> • Small-Group Instructor • NTC/JRTC/1st Army OC/T • One-star Staff Positions (ESC/TSC/AAMDC) • Recruiting/TRADOC Company Commander • Scholarships/Internships • HRC Career Manager • Training With Industry • CBRN Officer SFAB • USMA/ROTC Instructor 	<ul style="list-style-type: none"> • ACOM/DRU/Joint Staff Officers • CTC Combat Trainer • TRADOC Battalion/Brigade XO/S-3 • Recruiting Battalion/Brigade XO/S-3 • CBRN School Staff • Futures Command Staff • HRC Career Manager • USMA/ROTC Instructor

	Lieutenant Colonel	Colonel
Key Assignments	<ul style="list-style-type: none"> • CSL Lieutenant Colonel Level Command • CSL Division CBRN Officers 	<ul style="list-style-type: none"> • CSL Colonel Level Command • CSL Corps CBRN Officer
Supporting Assignments	<ul style="list-style-type: none"> • ACOM/DRU/Joint Staff Officer • Brigade DCO • ROTC Professor of Military Science • HRC Branch Chief • Inspector General • CBRN School Staff 	<ul style="list-style-type: none"> • ACOM/DRU/Joint Staff Officers • CBRN School Staff • Futures Command Staff

Legend:

AAMDC—Air and Missile Defense Command	HRC—U.S. Army Human Resources Command	S-3—training officer
ACOM—Army command	IMT—initial military training	SFAB—Security Force Assistance Brigade
CTC—combat training center	JRTC—Joint Readiness Training Center	SOAR—Special Operations Aviation Regiment
DCO—deputy commanding officer	NTC—National Training Center	TRADOC—U.S. Army Training and Doctrine Command
DRU—direct-reporting unit	OC/T—observer coach/trainer	TSC—Theater Sustainment Command
ESC—Expeditionary Sustainment Command	Recon—reconnaissance	USMA—U.S. Military Academy
G-5—operations	ROTC—Reserve Officer Training Corps	XO—executive officer

Table 2. Possible redesigned career path for CBRN officers

and win on the battlefield against any adversary in the world. The Chemical Branch has historically struggled to develop the technical skills of officers and build their competitiveness for promotion by seeking hard-KD positions due to inclusion in the Operations Functional Category. This has led to a lack of availability of eligible quality officers who are willing to serve as division and corps CBRN officers. Therefore, the Chemical Branch should accept the risks in transitioning to the Operations Support Functional category in search of a career model that can better develop CBRN officers so that they are ready to command CBRN formations and advise senior commanders on countering weapons of mass destruction and CBRN defense during large scale-combat operations.

Endnotes:

¹DA Pam 600-3, *Officer Professional Development and Career Management*, 3 April 2019, p. 11.

²Smartbook DA Pam 600-3, *Officer Professional Development and Career Management*, U.S. Army Chemical Corps, 1 June 2017, <<https://www.milsuite.mil/book/groups/smartbook-da-pam-600-3>>, accessed on 15 April 2021.

³Ibid.

⁴Ibid., p. 2.

⁵DA Pam 600-3, p. 14.

⁶Ibid., p. 15.

Major Lothridge is currently attending the Army Command and General Staff College at Fort Leavenworth, Kansas. He holds a bachelor's degree in political science and a master's degree in cybersecurity from the University of South Florida, Tampa.

2020 Honorees of the U.S. Army Chemical Corps

Compiled by Ms. Christy L. Lindberg

Hall of Fame Inductee

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. One individual, Colonel Harry Tyson (Retired), was inducted into the Hall of Fame in June 2020; please see Mr. Kip Lindberg's article entitled "Colonel Harry Tyson and the Development of the Mine-Clearing Line Charge" on page 34 for further information about Colonel Tyson.



Distinguished Member of the Corps Inductee

The award of Distinguished Member of the Corps signifies that an individual has not only contributed a lifetime of service to the Chemical Corps, but also continues to support the Chief of Chemical in implementing the Corps vision. Beyond the normal duties of their post-Service occupation, these individuals have exhibited altruistic and philanthropic qualities for the benefit of the Corps and the Nation. One individual was inducted as the 2020 Distinguished Member of the Corps in June 2020.

Lieutenant Colonel Britt Estes (Retired)



Lieutenant Colonel Britt Estes (Retired) is a native of Arkansas and was commissioned into the U.S. Army Chemical Corps as a distinguished military graduate from Arkansas State University in 1985. He holds a bachelor's degree in political science and a masters' degree in adult and continuing education. His military education includes the Chemical Officer Basic and Advanced Courses, the Combined Arms Service and Staff School, and the U.S. Army Command and General Staff College (CGSC).

In his 20 years of active duty service, Lieutenant Colonel Estes served in various command and staff positions. His final assignment was as an instructor at CGSC. Upon retirement, Lieutenant Colonel Estes accepted a Department of the Army civilian position with the Department of Army Tactics, CGSC.

At CGSC, Lieutenant Colonel Estes was awarded the academic rank of assistant professor, and he currently teaches tactics to captains and majors from all branches and to officers from our international partners. Always leading and mentoring, Estes has volunteered to serve as a CGSC staff group advisor. To remain current in chemical, biological, radiological, and nuclear (CBRN) operations, he frequently serves as an observer/trainer for the Mission Command Training Program, where he coaches, teaches, and mentors CBRN personnel in brigade and division level exercises.

Estes has also voluntarily served as an ambassador of the U.S. Army Chemical Corps at Fort Leonard Wood, Missouri. He has advocated policy on behalf of numerous commandants, influenced training and education to better incorporate countering weapons of mass destruction and CBRN defense, and has served as a mentor for each new class of U.S. Army Chemical Corps officer students. His volunteer work on behalf of the Chemical Corps includes coordinating and facilitating 20 iterations of CGSC CBRN Branch Day activities. He also planned, coordinated, and facilitated numerous CBRN working lunches/socials with students and CBRN officers attending the Precommand Course, which generated multiple mentorship opportunities.

Lieutenant Colonel Estes has also planned, coordinated, and facilitated professional development sessions with CGSC CBRN officers. He is currently developing a "regreening course" for incoming CGSC CBRN officers. This course is designed to prepare CBRN officers to properly integrate into a division staff conducting large-scale combat operations.

Ms. Lindberg is the regimental historian at the United States Army Chemical, Biological, Radiological, and Nuclear School History Office, Fort Leonard Wood, Missouri. She holds a bachelor's degree in history, humanities, and political science from the University of Northern Iowa, Cedar Falls, and a master's degree in history from Missouri State University, Springfield.

Colonel Harry D. Tyson and the Development of the Mine-Clearing Line Charge

By Mr. Kip A. Lindberg



The story of Colonel Harry D. Tyson is, in many ways, uncommon in the history of the U.S. Army Chemical Corps. He was an immigrant to the United States, dedicated 28 years of service to the country, was an outspoken proponent for chemical warfare preparedness, and was twice wounded in two separate world wars. Perhaps his greatest contribution to America's defense came with the development of a mine-clearing device—definitely “out of the lane” of his normal chemical duties—with revised models that are still in use today.



Colonel Harry D. Tyson

Born in Liverpool, England, in 1897, Tyson and his family immigrated to the United States in 1910. He was living in Birmingham, Alabama, when he was drafted into the Army in 1918. He was assigned to Company F, 1st Gas Regiment, and served with that organization in France during World War I. Taking part in the St. Mihiel and Meuse-Argonne offensives, he was gassed on 10 November 1918, the day before the Armistice ended the fighting. So severe were his injuries that he remained hospitalized for more than a month. By February 1919, he had recovered enough to rejoin his regiment for its return to the United States.

Following his discharge, Tyson attended the University of Alabama, graduating in 1925 with a degree in chemical engineering. After graduation, he was commissioned as a second lieutenant, Chemical Warfare Service, and served in the U.S. Army Reserve, with a full-time profession as a supervising foreman for the Allied Chemical Company in Birmingham. Throughout the 1920s and 1930s, he was a much-requested speaker on chemical warfare preparedness and authored a number of newspaper articles. In 1937, he applied for, and was granted, American citizenship as a naturalized citizen.

With America's entry into World War II foreseen in 1940, Tyson—now a captain—was placed on active duty as the assistant chemical officer for the 1st Armored Division. He was detailed to Edgewood Arsenal, Maryland, to assist in the design and development of the first mechanized flamethrower for armored vehicles. An experienced machinist, mechanic, and “problem solver,” Tyson's ability to think outside of the box proved beneficial for the flamethrower propellant and

ignition controls. Returning to the 1st Armored Division, he deployed overseas with the unit in 1942. Promoted to major, Tyson ascended to the role of division chemical officer.

As the 1st Armored Division's chemical officer, Major Tyson was present at the Allied beachhead at Anzio, Italy, from January to May 1944. There, he observed the effect that German landmines were having on the stalled Allied operation and the tremendous numbers of casualties they were creating.

In addition to performing his duties as division chemical officer, Major Tyson chose to address the enemy minefield problem. Minefield clearing, an engineer function, involved teams of Soldiers using electronic mine detection equipment and/or handheld probes to locate mines, then manually digging, uncovering, and disarming them—all tasks often performed under enemy observation and fire. When speedy removal was required, Soldiers could detonate a path through the minefield using lengths of explosive-filled, sheet steel pipes. Many lengths could be connected and pushed across the minefield, then detonated. The blast, in turn, detonated the buried mines. Although an improvement over manual detection and removal, the use of these “Bangalore torpedoes” (named for the Indian city where they were first developed) still required that a team of men potentially remain under fire during the process.

Major Tyson believed that he could improve this process, reducing the amount of time American Soldiers would be under enemy fire. Borrowing a welder and assorted metal stock from the engineers and a 60-millimeter mortar from the infantry, Tyson modified an inert 60-millimeter mortar shell by welding a length of metal rod to the nose. Next, he braided 12 strands of explosive primacord together to make a 100-foot-long rope of explosives and then tied the explosive rope to the metal rod welded to the mortar shell and coiled the rope around a conical rack of his own design. To the end of the explosive primacord rope, he tied 150 feet of ¼-inch twine.

When aimed and fired over a suspected minefield, the mortar shell pulled the length of explosive primacord rope through the air and the entire 100 feet easily unraveled from the conical rack without tangling. After hitting the ground, the rope was straightened by pulling back on the 150 feet of attached twine. By attaching a detonator to the primacord rope, Major Tyson initiated the explosion. The effect was nearly perfect—the explosion created a 16-inch path that was cleared of all grass, rocks, and brush for a distance of

30 yards. In addition to cutting all booby trap trip wires in the path, the explosion detonated all buried antipersonnel mines (including wooden mines) within 3 feet of the path. It also detonated the heavier antitank mines—even those buried nearly a foot deep.



Colonel Tyson with his mine-clearing device

After perfecting the system, Major Tyson was tasked to give a public demonstration to 300 British and American officers. Impressed by the simplicity and effectiveness of the mine-clearing system, the commanding generals of the 1st Special Service Force (the Devil's Brigade) and the 3d, 34th, and 45th Infantry Divisions ordered Major Tyson to demonstrate his device to their troops and to instruct their engineer and ordnance units in its construction. So impressed was Major General John "Iron Mike" O'Daniel, commanding general of the 3d Infantry Division, that he personally led his officers down the path that Major Tyson had created through a German minefield.

Soon, the entire stockpile of primacord available in the Mediterranean Theater of Operations was dedicated to the production of mine-clearing systems. Before the end of the war, the mine-clearing launcher was standardized as the M1 and M2 Antipersonnel-Mine Clearing Cable, with the modified 60-millimeter mortar shell replaced by a rocket and the length of explosive cable increased to 170 feet.

For the mine-clearing device, Major Tyson received a commendation from General Mark Clark, commanding general of the Fifth Army. While experimenting with his mine-clearing system, Major Tyson was



Mine-clearing device

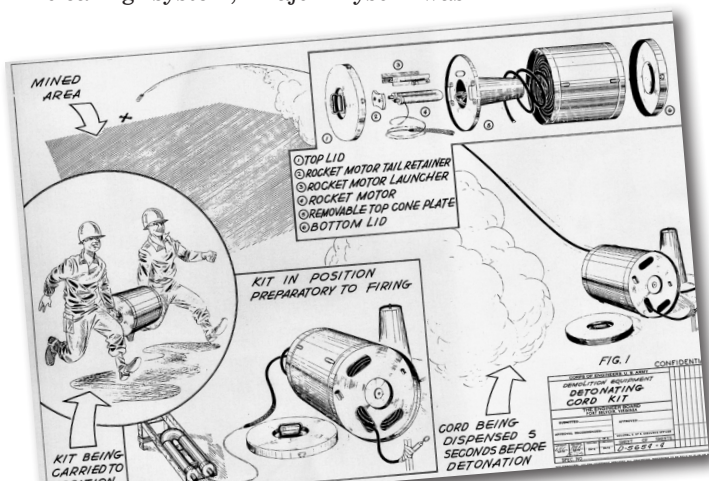
wounded in the leg by German artillery fire, earning a second Purple Heart. In addition, he received a Bronze Star for meritorious service for the design and production of his mine-clearing device.

Reports of the design and production of Major Tyson's mine-clearing system are the first documented accounts of what would eventually become the U.S. Army mine-clearing line charge (MICLIC), which—some 70 years later—is still a staple of engineer mine-clearing operations.

In addition to the mine-clearing capability, Tyson theorized that the mine-clearing device could also be used to clear a path through a chemically contaminated area, with the flame and heat from the blast incinerating even persistent mustard agent.

As the Allied advance continued through Italy, Major Tyson invented a smoke-launching system that could be manufactured and mounted to American tanks in the field. While smoke-launching systems for tanks were not new, previous ones had made use of traditional smoke grenades, which required several minutes for the creation of an effective screen. For Major Tyson's version of the smoke-launching system, the traditional smoke grenade was combined with a white phosphorous grenade; the smoke from the burning white phosphorous created instant concealment, allowing time for the smoke grenade to disperse a longer-lasting screen. Tyson's design was eventually manufactured as the M176 smoke-launching system, and he received recognition from his command for this invention due to the number of lives saved before the end of the war. As with the MICLIC, versions of this invention are still in use on armored vehicles today.

Major Tyson returned stateside in September 1944, in part to recuperate from his injuries. In early 1945, as a lieutenant colonel, Tyson was reassigned as the chief chemical officer of the newly organized XXXVI Corps, in preparation for its role in the invasion of Japan. However, the war ended before XXXVI Corps could deploy overseas and Lieutenant Colonel Tyson was sent back to Italy, where—for 2 years—he provided the Hellenic Army with technical advice on the civil war and its fight against Communist




M1 Antipersonnel-Mine Clearing Cable drawing

aggression. Between 1948 and 1950, Tyson was stationed in Germany and was a key player in the destruction of German chemical agent stockpiles.

In 1950, suffering from reoccurring problems with the leg wound he had received at Anzio, then Colonel Tyson was admitted to Walter Reed Hospital for surgery. Although the surgery was successful, the wound ultimately resulted in his retirement based on physical disability. For his service to the Chemical Corps and the Army, Colonel Tyson was awarded the Legion of Merit.

In retirement, Tyson built on his primacord rope idea, designing and patenting a flexible, multidirectional, anti-personnel mine that he called "Fragmacord," which was a length of primacord encased in serrated steel rings. Fragmacord could be strung along enemy footpaths or suspended from tree limbs above a footpath. When detonated by trip wire or command, the cord exploded, shattering the steel rings and sending the fragments in all directions. Fragmacord was placed in production at Picatinny Arsenal, New Jersey, and was used in Vietnam. Tyson signed his rights as patentee over to the U.S. government so that it could produce Fragmacord without payment of royalty. Tyson later worked for the Peoples Gas Company of Florida™, where he conducted chemical research and patented a propane gas filtration system.

For the last 20 years of his life, Colonel Tyson (Retired) enjoyed spending much of his time fishing and operating several bait shops in Florida. His custom hand-tied lures were much sought-after by saltwater fisherman. He was an active participant in the reunions of the 1st Gas Regiment Association, which, in the 1980s, were held at the U.S. Army Chemical School at Fort McClellan, Alabama. At the reunion there in 1985, Tyson struck up a conversation with Major General John Appel (Retired), past Chief of Chemical and then president of the Chemical Corps Museum Foundation. Early the next year, Tyson wrote to Appel. Enclosed in the letter were the original notes and photographs that had been taken at the demonstration that Tyson had given to the 300 officers at Anzio. It was Tyson's wish that those materials be retained as part of the historical record of the Chemical Corps, and Major General Appel passed the collection along to the U.S. Army Chemical Corps Museum, Fort Leonard Wood, Missouri.

Four months later, on 1 August 1986, Colonel Tyson (Retired) passed away at the age of 88. He was buried in Arlington National Cemetery, Arlington, Virginia. He had given a lifetime of service to his adopted homeland, the Army, and the Chemical Corps; and in recognition of his achievements, was inducted into the Chemical Corps Hall of Fame in June 2020. His invention and development of the MICLIC and armored vehicle smoke-launching systems has benefited the men and women of America's armed forces, preventing countless wounds and deaths, and continues to do so into the 21st Century. 

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

Chemical Corps Regimental Honors Program 2022 Nominations

Nominations are being accepted for the 2022 Chemical Corps Regimental Honors Program for the Hall of Fame and Distinguished Member of the Corps.

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.

Distinguished Member of the Corps

This award is extended to living individuals who have served the Nation in their careers and continue to serve the Regiment by acting in an unpaid capacity in conducting business for the Regiment, service to the Corps, or community service following retirement. This service could take the form of anything from volunteering to perennially holding a position and actively participating within the governing body of the Chemical Corps Regimental Association. It could also involve representing the Chief of Chemical at ceremonies and speaking engagements and participating in other non-compensated duties that actively support chemical, biological, radiological, and nuclear Soldiers. To be eligible, military and U.S. Department of Defense civilians must have been retired from federal service (military and/or civilian) for at least 2 years. (Regular Army military and current [nonretired] federal civilian personnel are not eligible for the program.) They must have devoted a significant portion of their career to the Chemical Corps mission. The expectation is that the nominee will have served as a uniformed member of the Chemical Corps or as a Department of Defense civilian directly engaged in support of the Chemical Corps mission. The individual must have made a significant contribution to the Chemical Corps and must continue to support the Corps after retirement.

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 2022. For more information, see the Chemical Corps Regimental Association website at <<http://www.ccrasn.org>>, call 573-563-7339, or e-mail <christy.l.lindberg.civ@mail.mil>.

DOCTRINE UPDATE

U.S. Army Maneuver Support Center of Excellence Force Field Integration Directorate			
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; Doctrine Division; Force Field Integration Directorate; U.S. Army Maneuver Support Center of Excellence; Fort Leonard Wood, Missouri, 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	<i>Operations in Chemical, Biological, Radiological, and Nuclear (CBRN) Environments</i>	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. 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 (CWMD) to the U.S. Special Operations Command; and updates, revises, or deletes definitions and discussions to synchronize with other doctrinal updates.			
JP 3-27	<i>Homeland Defense</i>	10 Apr 18	Under revision.
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 (FY) 2017.			
JP 3-28	<i>Civil Support</i>	28 Oct 18	Current.
JP 3-28 provides overarching guidelines and principles to assist commanders and staffs in planning, conducting, and assessing DSCA. It describes the fundamentals of response and the federal role in supporting a comprehensive all-hazards response. JP 3-28 discusses planning to support and sustain DSCA, to include intelligence support, health services, mortuary affairs, and other support and sustainment considerations.			
JP 3-40	<i>Countering Weapons of Mass Destruction</i>	27 Nov 19	Current.
JP 3-40 outlines a CWMD strategic approach for planning. It discusses CWMD activities and operations in relation to the joint functions. It describes the specialized tasks associated with the organizing principles of prevent, protect, and respond.			
JP 3-41	<i>Chemical, Biological, Radiological, and Nuclear Response</i>	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.			
JP 3-72	<i>Joint Nuclear Operations</i>	17 Apr 20	Current.
JP 3-72 provides fundamental principles and guidance to plan, execute, and assess nuclear operations.			
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.			
ATP 3-11.23 MCWP 3-37.7 NTTP 3-11.35 AFTTP 3-2.71	<i>Multi-Service Tactics, Techniques, and Procedures for Weapons of Mass Destruction Elimination Operations</i>	1 Nov 13	Under revision with ATP 3-90.40.
Army Techniques Publication (ATP) 3-11.23 describes the weapons of mass destruction (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.			

Number	Title	Date	Status
ATP 3-11.32 MCWP 3-37.2 NTTP 3-11.37 AFTTP 3-2.46	<i>Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Passive Defense</i>	13 May 16	Scheduled for revision. This publication will be divided into two publications CBRN Protection and CBRN Contamination Mitigation.
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	<i>Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Planning</i>	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 CWMD. 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	<i>Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Reconnaissance and Surveillance</i>	31 Mar 21	Current.
ATP 3-11.37 establishes forms, modes, and methods of (and tasks for) CBRN reconnaissance and surveillance. It also establishes four new CBRN hazard identification levels that have been accepted by combatant commanders and the medical community for environmental samples and clinical specimens. These hazard identification levels allow the conventional force to provide the commander with sample identification at higher levels of confidence. This, in turn, allows the commander to make timely, higher-level decisions that enhance force protection, improve mission accomplishment, and result in resource savings. 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	<i>Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Consequence Management Operations</i>	30 Jul 15	Current. Under review with the creation of a new publication, ATP 3-11.42, <i>Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Domestic Response</i> .
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	<i>Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Domestic Response</i>	TBD	New publication, 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	<i>Weapons of Mass Destruction–Civil Support Team Operations</i>	20 May 14	Current. Under review with the creation of a new publication, ATP 3-11.42, <i>Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Domestic Response</i> .
ATP 3-11.46 serves as the foundation for WMD-CST doctrine.			
ATP 3-11.47 AFTTP 3-2.79	<i>Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives Enhanced Response Force Package (CERFP) and Homeland Response Force (HRF) Operations</i>	26 Apr 13	Current. Under review with the creation of a new publication, ATP 3-11.42, <i>Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Domestic Response</i> .
ATP 3-11.47 contains detailed tactical doctrine and TTP and sets the foundation for the tactical employment of the CERFP and HRF.			

Number	Title	Date	Status
Army-Only Publications			
USACBRNS is the U.S. Army proponent for five tactical-level, Army-only publications.			
ATP 3-11.24	<i>Technical Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives (CBRNE) Force Employment</i>	6 May 14	Requires revision.
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 3-11.74	<i>Chemical, Biological, Radiological, and Nuclear Platoons</i>	15 April 21	Current.
ATP 3-11.74 provides fundamental TTP for planning, preparing, and executing platoon operations within CBRN platoon formations.			
ATP 3-90.40	<i>Combined Arms Countering Weapons of Mass Destruction</i>	29 Jun 17	Under revision.
ATP 3-90.40 provides tactical-level commanders, staffs, and key agencies with a primary reference for planning, synchronizing, integrating, and executing combined arms CWMD.			
ATP 3-37.11	<i>Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) Command</i>	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.			
FM 3-11	<i>Chemical, Biological, Radiological, and Nuclear Operations</i>	23 May 19	Current.
Field Manual (FM) 3-11 defines the core functions of the Chemical Corps and describes how they integrate into large-scale combat operations. FM 3-11 is an Army-only publication that provides doctrine for operations to assess CBRN hazards, protect the force, and mitigate the entire range of CBRN threats, hazards, and effects.			
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	<i>Multi-Service Reference for Chemical, Biological, Radiological, and Nuclear (CBRN) Warning, Reporting, and Hazard Prediction Procedures</i>	15 May 17	Current. Change 1 published 21 Dec 17.
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	<i>Multi-Service Tactics, Techniques, and Procedures for Installation Emergency Management</i>	23 Jun 14	Under revision.
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	<i>Chemical, Biological, Radiological, and Nuclear Threats and Hazards</i>	13 Dec 17	Current. Change 1 published 14 June 2018. Change 2 published 12 Nov 19.
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 2 adds an appendix for supplemental information on nontraditional agents.			

A person in a dark, rocky tunnel illuminated by a blue light source. The person is walking away from the camera, and the tunnel walls are rough and textured. The lighting is dramatic, with strong shadows and highlights.

WE RULE THE BATTLE

THROUGH THE ELEMENTS

PIN: 208447-000