Army Chemical Review

The Professional Bulletin of the Chemical Corps

2022 Annual Issue

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

COMMANDANT
COL Sean Crockett **563-8053**
<dale.s.crockett.mil@army.mil>

ASSISTANT COMMANDANT
VACANT **563-8053**

CHIEF OF STAFF
MAJ Venancio O. Castro **563-8052**
<venancio.o.castro.mil@army.mil>

REGIMENTAL COMMAND SERGEANT MAJOR
CSM Christopher Williams **563-6133**
<christopher.williams6.mil@army.mil>

REGIMENTAL CHIEF WARRANT OFFICER
CW3 Humphrey B. Hills II **563-8051**
<humphrey.b.hills.mil@army.mil>

DEPUTY COMMANDANT
Mr. Scott D. Kimmell **563-8132**
<scott.d.kimmell.civ@army.mil>

DEPUTY ASSISTANT COMMANDANT– ARMY RESERVE
COL Chae Kim **563-8050**
<hui.c.kim10.mil@army.mil>

DEPUTY ASSISTANT COMMANDANT–NATIONAL GUARD
LTC Josh G. Howell **563-7676**
<josh.g.howell.mil@army.mil>

3D CHEMICAL BRIGADE
COL Fredrick B. Parker **596-0016**
<fredrick.b.parker.mil@army.mil>

DIRECTORATE OF TRAINING AND LEADER DEVELOPMENT
COL Tywana D. Robinson **563-6531**
<tywana.d.robinson.mil@army.mil>

PERSONNEL DEVELOPMENT OFFICE
MAJ Chester T. Garner **563-7374**
<chester.t.garner.mil@army.mil>

CHIEF OF DOCTRINE
LTC Roger M. Lewis **563-8189**
<roger.m.lewis.mil@army.mil>

FFID PUBLICATIONS

Managing Editor, Ms. Diana K. Dean **563-4137**
<diana.k.dean.civ@army.mil>

Editor, Ms. Cheryl A. Nygaard **563-5226**
<cheryl.a.nygaard.civ@army.mil>

Contributing Editor, Mr. Kyle A. Lockwood **563-5004**
<kyle.a.lockwood.civ@army.mil>

Graphic Designer, Mr. Dennis L. Schellingberger **563-5267**
<dennis.l.schellingberger.civ@army.mil>

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JAMES C. MCCONVILLE
General, United States Army
Chief of Staff

Official:

MARK F. AVERILL
Administrative Assistant
to the Secretary of the Army
2205404

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Chief of Chemical and Commandant,

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

Colonel
Sean Crockett

Greetings, chemical, biological, radiological, and nuclear (CBRN) warriors!

Our Army and our Corps are at a critical point in history. In the past year, we have ended a 20-year war in Afghanistan, continued to fight the battle against the Novel Coronavirus (COVID-19), and watched geopolitical tensions with several of our near-peer competitors come to bear. As I write this message, our Army is positioning forces overseas while the largest European land war since World War II unfolds between Russia and Ukraine. We are, no doubt, in turbulent times—and it is more important now than ever that the Regiment remain ready and relevant in support of maneuver forces.

Our fiscal year (FY) 2022 priorities are people first and modernization. To accomplish our goals, we must develop specific capabilities across the doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) domains that will ensure survivability and enable freedom of action in large-scale combat operations and multi-domain operations against near-peer threats in a complex CBRN environment. Modernization objectives will set conditions for mission success for the Army 2030 force and beyond, utilizing our three core functions: assess, protect, and mitigate. Moving forward, we will be focusing our efforts on the FY 22 priorities:

- **People first.** These efforts will include a thorough evaluation of the personnel structure of the Chemical Corps. We need a structure that is optimized for both current and future requirements and that maximizes the potential of our Soldiers to meet those demands. We need to build on the excellence present within our ranks. To those ends, we are analyzing how to develop expertise that is appropriately broad and sufficiently deep. Achieving a balance in breadth and depth will align our Soldier capabilities with modernization objectives spanning the DOTMLPF domains, magnifying their effects.

  In this issue of *Army Chemical Review*, you will find an introduction to some of the proposed structural changes intended to achieve that balance. Collectively, these proposals are referred to as the CBRN People Strategy. The intent behind the CBRN People Strategy is to build and maintain CBRN defense expertise across our core functions of assess, protect, and mitigate. These structural changes are works in progress; there is much left to do and a range of impacts to consider. But the discussion that these proposals invite is needed. More importantly, these structural changes will guide actions that ensure that the U.S. Army Chemical Corps can successfully fulfill the needs of the Army. The U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS), Fort Leonard Wood, Missouri, will continue to refine current proposals and to engage in dialogue with the field in order to move forward with deliberate and well-developed structural change.

- **Modernization.** CBRN doctrine reflects established and validated tactics, techniques, and procedures based on "extant" capabilities nested within the overarching Army operating concept. As the Army and the Chemical Corps support the 2030 force, doctrinal changes will trail the developments. Army Techniques Publication (ATP) 3-11.37, *Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Reconnaissance and Surveillance*,[1] was revised in FY 21 to focus on the "assess" core function and stay abreast of the transition to LSCO. The CBRN doctrine publishing priorities for FY 22 are focused on the second and third doctrinal pillars and will result from splitting what is currently ATP 3-11.32, *Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Passive Defense,*[2] into two publications: ATP 3-11.32, *Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Protection,*[3] and ATP 3-11.33, *Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Contamination Mitigation*.[4] In the near future, we can expect another round of revisions introducing MDO.

  Our efforts to modernize CBRN capabilities and formations continue along an irreversible path with momentum. The CBRN Operations Force Modernization Strategy,[5] coupled with the Army Modernization Strategy,[6] provides a clear path to develop the CBRN capability required to enable the force to fight and win in CBRN environments to 2030 and beyond. Working with our partners across science, technology, and advanced development, we continue to develop prototype capabilities designed to meet the challenges that we expect the Army of 2030 to face in LSCO. To maximize employment of these capabilities, we are also assessing our force structure to ensure that we are properly organized at all levels to support movement and maneuver in MDO.

I'd like to highlight two capabilities that are progressing significantly and that we expect to see in the hands of our Soldiers within the next 5 years. The Nuclear, Biological, Chemical Reconnaissance Vehicle Sensor Suite Upgrade is currently undergoing final operational testing, with equipment of the first unit planned for FY 24. This enhanced mounted CBRN reconnaissance capability provides situational understanding of the CBRN environment to allow commanders to make proactive risk-based decisions without exposing Soldiers to the hazard. In addition, the Uniform Integrated Protective Ensemble, the replacement for the Joint Service Lightweight Integrated Suit Technology, will begin to be fielded in FY 26. It will provide greater protection against aerosols and vapor hazards. Semiautonomous contamination mitigation is in prototype development, with demonstrations expected in FY 23. This capability reduces reliance on manpower, resources, and time through precision detection and robotic-enabled equipment to return combat power more quickly and at lower risk.

During our Regimental Week, 6–10 June 2022, we will celebrate the 104th anniversary of our Corps. We are working "full steam ahead" to plan numerous events that will bring Dragon Soldiers and senior leaders together to discuss modernization efforts and celebrate our 104-year history of support to our Nation. I trust that Dragon Soldiers and CBRN units around the globe will find ways to celebrate at home station if unable to join us at Fort Leonard Wood.

I want to thank the members of this Corps who support our mission day in and day out. Your continued dedication to this Regiment has allowed us to remain steadfast in our training and support to the maneuver forces over the years. I am confident that our modernization efforts will keep our Corps ready and relevant as we transition into Army 2030 and beyond.

As I approach the end of my first year as the 32d Chief of the Chemical Corps and Commandant of USACBRNS, I am humbled to have this opportunity to serve our Corps and I look forward to our accomplishments in the year ahead.

Dragon Soldiers! CBRN Warriors!

Elementis Regamus Proelium!

Endnotes:

[1]ATP 3-11.37, *Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Reconnaissance and Surveillance*, 31 March 2021.

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

[3]ATP 3-11.32, *Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Protection*, not yet published.

[4]ATP 3-11.33, *Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Contamination Mitigation*, not yet published.

[5]CBRN Operations Force Modernization Strategy, USACBRNS, 12 July 2018.

[6]Army Modernization Strategy, U.S. Army, 2021.

Regimental Command Sergeant Major

Greetings, Dragon Soldiers!

As your 15th Regimental Command Sergeant Major, I want to congratulate Command Sergeant Major Raymond P. Quitugua Jr., who was selected to be the 16th Regimental Command Sergeant Major of the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS), Fort Leonard Wood, Missouri. I would also like to extend a congratulatory welcome and thank you to his spouse and Family for their continued support. I am extremely confident that his selection will continue to move the Regiment forward.

Command Sergeant Major Christopher Williams

In reflecting on my tenure as the 15th Regimental Command Sergeant Major, I am reminded that our chemical, biological, radiological, and nuclear (CBRN) Soldiers and leaders have remained professional and have constantly strived for excellence within the Corps. In one of the first articles that I wrote after taking this position, I stated that my priority was to travel and personally visit our CBRN warriors. Although I would have liked to have visited more CBRN warriors to observe outstanding training events firsthand, the global threat of the Novel Coronavirus (COVID-19) hampered this goal. It fills me with incredible pride to receive positive feedback from across the CBRN cohort, indicating that our Soldiers and units have answered the call with professionalism and competence everywhere they are employed.

As we continue to perform during this time, we are dedicating our focus to training and developing leaders. Over the past year, USACBRNS has updated Smartbook Department of the Army (DA) Pamphlet (Pam) 600-25, *U.S. Army Noncommissioned Officer Professional Development Guide*.[1] The update describes the full spectrum of developmental opportunities that noncommissioned officers (NCOs) can expect throughout their careers. Additionally, we continue to work with the leadership at the Maneuver Support Center of Excellence, Fort Leonard Wood, and the U.S. Army Combined Arms Center, Fort Leavenworth, Kansas, to refine our leader development strategy and identify the knowledge, skills, and behaviors that we desire in our officers and NCOs throughout their careers. These ongoing efforts allow the Regiment to synchronize and integrate with the Army's talent management process.

From strengthening our relationship with the 76th Operational Response Command, Salt Lake City, Utah, while preparing for multiple conferences for all components during CBRN Regimental Week to preparing for the return of 102d Training Division, 3d Chemical Brigade, Fort Leonard Wood, cadre from the Training Resources Arbitration Panel in support of the One Army School System, we have shown our dedication to all CBRN warriors.

Regardless of the challenges presented by the COVID-19 pandemic, our enlisted Soldiers continue to answer the call of the Nation. This dedication to serve and commitment to our Corps and the Soldiers within our formations led to the selection of six master sergeants for attendance at the Sergeant Major Academy, NCO Leadership Center of Excellence, Fort Bliss, Texas. Congratulations to the following selectees and their Families:

- Master Sergeant Jose L. Albinodiaz.
- Master Sergeant Dorman G. Bowman Jr.
- Master Sergeant Darryl E. Harley Jr.
- Master Sergeant Adam R. Jaffe.
- Master Sergeant Gedney P. Riley.
- Master Sergeant Walter S. Veazey Jr.

Furthermore, DA recently conducted the Fiscal Year 2023 Command Sergeant Major Slate Board for the Regular Army, Army National Guard, and U.S. Army Reserve. As a result of this board, two of our CBRN sergeants major were selected to serve in command sergeant major positions at the battalion level. The Army saw unique potential for serving in military occupational specialty-immaterial command sergeant major positions in the following sergeants major:

- Sergeant Major Jessica Cho.
- Sergeant Major Ronis J. Gutierrez.

The achievements of these senior NCOs reflect their ability to lead, train, and inspire the direction of our Regiment and our Army. I genuinely appreciate their hard work, dedication, and unwavering support. Our Soldiers, NCOs, and officers will benefit from their accomplishments.

In closing, as the Regimental Command Sergeant Major, I want to send a final message to enlisted Soldiers: You are professionals! Remain diligent in your performance! As future CBRN leaders, continue to demonstrate why NCOs remain the backbone of the Army.

Endnote:

[1]Smartbook DA Pam 600-25, *U.S. Army Noncommissioned Officer Professional Development Guide*, U.S. Army Chemical Corps, 24 March 2022.

Regimental Chief Warrant Officer

Greetings, fellow Dragon Soldiers!

Chief Warrant Officer Three
Humphrey B. Hills II

I am privileged to serve you as the 4th Regimental Chief Warrant Officer. This is a position and title that I do not take lightly. The Regimental Chief Warrant Officer is the senior warrant officer advisor to the Commandant on all matters pertaining to accession, institutional training, leader development, talent distribution and management, and readiness for more than 160 chemical, biological, radiological, and nuclear (CBRN) warrant officers. The position was established by the 27th Chief of the U.S. Army Chemical Corps, Brigadier General Peggy C. Combs, in 2013. As I vowed on 22 July 2021, when I took a firm hold of the saber and assumed responsibility as the Regimental Chief Warrant Officer from the 32d Chief of Chemical, Colonel Sean Crockett, I will "carry the water" with the highest regard and standard with respect to serving and supporting our people, the Chemical Regiment, and the Army.

Calendar year 2022 is looking very bright for our Regiment. Not only are we celebrating the 104th year of existence for the Corps, but we are also celebrating the 11th year of the CBRN Warrant Officer Program. I am excited to announce that this year the Army will select the first cohort of CBRN warrant officers for promotion to chief warrant officers four. This will be another history-making event to look forward to. The warrant officer cohort may be small in numbers, but must remain large with respect to impact. Good luck to the year group 2011 warrant officers who are eligible for this promotion selection board.

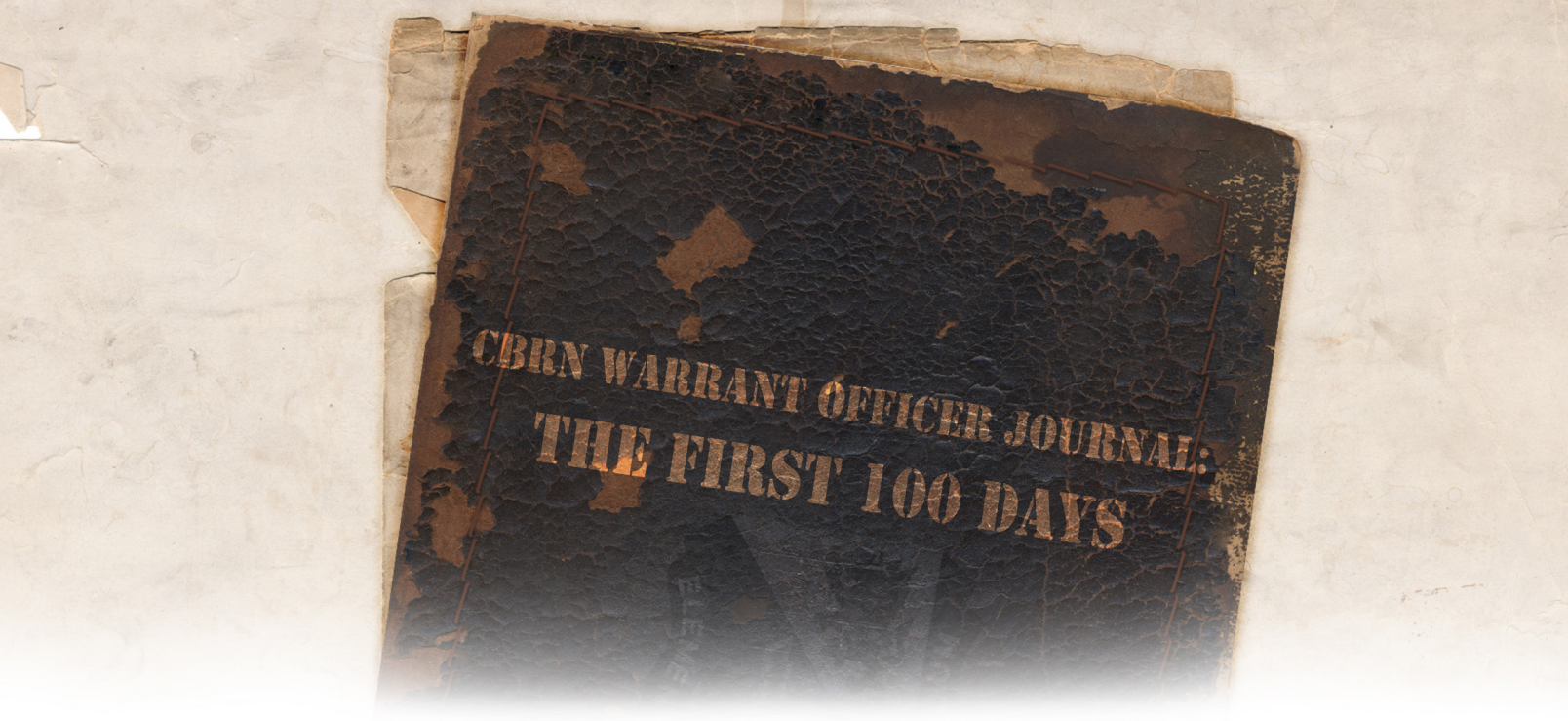
Each fiscal year, the Army hosts warrant officer selection boards to select the most highly qualified noncommissioned officers to attend Warrant Officer Candidate School, Fort Rucker, Alabama. This fiscal year, we had the honor and privilege of having eight of our very own CBRN noncommissioned officers selected as warrant officer candidates. Please join me in congratulating these eight newest Army CBRN warrant officer candidates and their Families:

- Sergeant First Class Frank E. Bebbs.
- Sergeant First Class Alejandra Gallego.
- Sergeant First Class Christopher V. Garcia.
- Sergeant First Class Sunwoo Lee.
- Sergeant First Class Kevin M. Smith.
- Staff Sergeant Casey B. Bartness.
- Staff Sergeant Reuben D. Reeves.
- Staff Sergeant Edwin T. Williams.

As we combat the effects of the global Novel Coronavirus (COVID-19) pandemic and we continue to navigate a new way of life, it is important that each of us remain safe, calm, and vigilant while protecting ourselves and others from the super-contagious virus. Continue to incorporate protective measures and common sense when unable to remain socially distant. We must stay the course until we reach the back side of this lingering pandemic. We will prevail and will someday return to some sense of normalcy.

In conclusion, I am honored to serve in this capacity and I look forward to the many challenges ahead. Continue to do the exceptional work that you do every day; it does not go unnoticed. I look forward to seeing and hearing from many of you in the coming months, whether you visit the Fort Leonard Wood, Missouri, area or I am out in the field near your location. Lastly, take care of yourself, your Family, and each other. Please remember our deployed Soldiers and their Families!

Dragon Soldiers! CBRN Warriors!
Elementis Regamus Proelium!



By Warrant Officer One James E. Chinda and Warrant Officer One Joshua D. Jimenez

Since 2011, the U.S. Army Chemical Corps has selected the most technically sound noncommissioned officers to transition to what has become a critical component to formations across the Army, the warrant officer. The Military Occupational Specialty 740A–Chemical, Biological, Radiological, and Nuclear (CBRN) Technician serves in a variety of positions from company to corps level, providing expertise and experience to assess, protect, and mitigate while in support of large-scale combat operations. The Army has determined that the warrant officer one is best suited to serve in one of three positions: hazard response operations technician, CBRN response operations technician, or assistant operations technician.

As noncommisioned officers transition from enlisted Soldiers to warrant officers one, expectations are unclear—and most individuals fear the unknown. Upon the completion of Professional Military Education, the role of the warrant officer one is better defined, but each Soldier's experience is different. The CBRN Basic Course provides baseline knowledge, but there is still a level of uncertainty as new warrant officers navigate the waters and find their paths. Unit level personnel expect CBRN technicians to be experts in all aspects of their field, and CBRN technicians are challenged with articulating CBRN capabilities and keeping units in the fight. The reality is that it is impossible to memorize all of the information that has been learned and to articulate it verbatim; but as a CBRN warrant officer, you have access to a wealth of knowledge through the resources available to you.

This article highlights the experiences of two CBRN warrant officers in their first 100 days after Warrant Officer Candidate School, encompassing their attendance at the Warrant Officer Basic Course and their arrival at their first duty station.

CBRN Warrant Officer Basic Course

The CBRN WOBC, Fort Leonard Wood, Missouri, is designed to prepare CBRN warrant officers to serve as technicians at the company and battalion levels. The course consists of 14 weeks of rigorous advanced training on systems and equipment that, if utilized correctly, can enable freedom of movement across the battlefield for maneuver forces throughout the Army. Additionally, the course focuses on staff functions, logistics, reconnaissance, decontamination, CBRN protection, networking, and officership.

"The seasoned experience as noncommissioned officers is one of the greatest assets of CBRN warrant officers, as they bring the 'best of both worlds' (noncommissioned officers and warrant officers) to the table."

The class is led by two experienced chief warrant officers who serve as instructors; a class mentor; the Regimental Chief Warrant Officer; and a variety of U.S. Army Chemical, Biological, Radiological, and Nuclear School staff. The instructors educate the class on a variety of information pertaining to the CBRN career management field.

The CBRN WOBC curriculum is designed to provide the CBRN warrant officer with information regarding every aspect of CBRN capabilities, including where to begin when seeking a more advanced level of expertise. Each year group of classmates provides a wealth of experience from a variety of backgrounds. (Our class encompassed individuals with reconnaissance, technical escort, chemical reconnaissance detachment, dismounted reconnaissance, and CBRN staff experience.)

This seasoned experience as noncommissioned officers is

one of the greatest assets of CBRN warrant officers, as they bring the "best of both worlds" (noncommissioned officers and warrant officers) to the table. It is their responsibility to share their experiences and bridge the knowledge gap to assist in creating balance in the class. As classmates open up and share their experiences, they become more comfortable with one another. In that way, WOBC assists in creating a team of individuals with resources available as they move forward in their careers. The faster the class becomes a cohesive unit, the more conducive the learning environment. It becomes evident that the CBRN warrant officer cohort was never about the individual, but about the team. A sense of belonging and confidence develops, and brand new warrant officers graduate knowing that they are not alone in the force as they make decisions. Once they realize that they are part of a team that has everyone's best interest at heart, they execute their daily duties with a stronger sense of belonging and pride. As the fourth Regimental Chief Warrant Officer, Chief Warrant Officer Three Humphrey B. Hills II, says, "We All We Got!"

First Duty Assignment

As a CBRN warrant officer one, you will most likely be assigned to Camp Humphreys, Korea. Upon arrival at your first duty assignment, expectations will be unclear, as the rate of permanent changes of station is extremely high. There is significant potential that you will not be able to meet face to face with the individual whom you are replacing in order to conduct a proper transfer of duties. However, this is a prime opportunity for you to demonstrate the ability of warrant officers to work together. Continuity is crucial for the transition process, and it will benefit all warrant officers who follow behind you. Items that can assist in the transition process include points of contact, concepts of operations, deliberate risk assessment worksheets from previous training events, and the company long-range training calendar for planning.

No matter what information is provided to you from previously assigned Service members, everyone has a unique experience. The 740A Warrant Officer Program is still growing, and it continues to expand with various assignment options. Each assignment presents unique challenges to be mastered within the wide variety of possibilities the cohort has to offer. Adaptability is the key to success in becoming comfortable when you find that you are uncomfortable. For the first 30 days, expect to observe the unit as your duties and responsibilities are defined. This "assessment phase" consists of gaining an understanding of the current processes and procedures that are in place while making minimal to no changes.

First assignments in Korea present endless opportunities. With the presence of a weapons of mass destruction threat, the CBRN readiness plan is embedded in the mission-essential task list. This makes the CBRN mission a top priority for maneuver commanders. As a warrant officer, be prepared to work in support of the United Nations Command, the U.S. Forces Korea, the Eighth Army, and the 2d Infantry Division for unified land operations and weapons of mass destruction elimination. Readiness is the No. 1 priority, as there is a real-world mission on the Korean peninsula.

Most importantly, as a new warrant officer, start to think about the span of influence you will have. You will serve as an example for others who follow in your footsteps; and depending on your interactions with them, they will have either an exemplary impression of all warrant officers or a horrendous one. You will have multiple opportunities to integrate your unit with others and to educate the force, creating combat multipliers across the peninsula. During your first 100 days, be prepared to bridge the gap and build your network. The more contacts you have and the more individuals with whom you can share information, the easier life becomes. Utilize the resources at your disposal; you are not alone, and there is no need for you to "reinvent the wheel."

Conclusion

CBRN technicians play a vital role in today's complex and rapidly growing combat environment. They directly influence command decisions at every level of CBRN operations and integration. The initial-entry development phase of the CBRN technician effectively prepares competent and confident warfighters, equipped with the tools and resources necessary to advise maneuver commanders. Training is critical; it directly affects execution, which is the deciding factor for any maneuver commander considering the addition of an asset to the team. Placing more emphasis on training the CBRN force according to doctrine produces more-effective Soldiers for our current dynamic operational environment. Focusing on training for efficiency and improving protective gear to remain competitive in the global fight will ensure CBRN readiness. Every new assignment involves a learning curve. All you can do is do your best to improve the organization, leaving it better than you found it. The CBRN warrant officer community is still growing, so it is imperative that you strive to make the best impression possible. You always have the implied responsibility of being a force multiplier. Remember where you came from, remember where you're going, and always consider the effects of your actions.

Warrant Officer One Chinda is an assistant team operations technician for the CBRN Response Team, 501st Chemical Company, 23d Chemical Battalion, Camp Humphreys, South Korea. He holds an associate's degree in general studies and a bachelor's degree in history from the University of Maryland. He is currently pursuing a master's degree in public administration, emergency services management through Columbia Southern University.

Warrant Officer One Jimenez is an assistant team operations technician for the CBRN Response Team, 501st Chemical Company. He holds an associate's degree in general studies from Central Texas College and a bachelor's degree in criminal justice administration with specialization in homeland security from DeVry University. He is currently pursuing a master's degree in homeland security through American Military University.

By Captain Thomas W. Inwood, Captain Karl Jahrsdoerfer, Captain Jason Lee, Captain Lisa Robinson, and Captain Mithun Sheth

From our origins in World War I to the present day, the U.S. Army Chemical Corps has continued to change, adapt, and evolve to overcome threats that have been faced by the United States and its interests in a more complex and competitive world. Although these changes to how we fight are codified through training and validation exercises of the operational force, the institutional changes to the officer training curriculum and the programs of instruction are understated. Over the past few years, the Officer Training Department, 84th Chemical Battalion, Fort Leonard Wood, Missouri, and the Directorate of Training and Leader Development, U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS), Fort Leonard Wood, have been working together to devise a dynamic curriculum that is focused on individual leader development. This curriculum allows for tough, rigorous training that develops the capacity and capability of junior chemical, biological, radiological, and nuclear (CBRN) officers. These changes have been pivotal in shaping technically and tactically proficient second lieutenants who are capable of supporting large-scale combat operations and preparing them for assignments as CBRN platoon leaders and battalion level CBRN staff officers.

Individual Leader Development

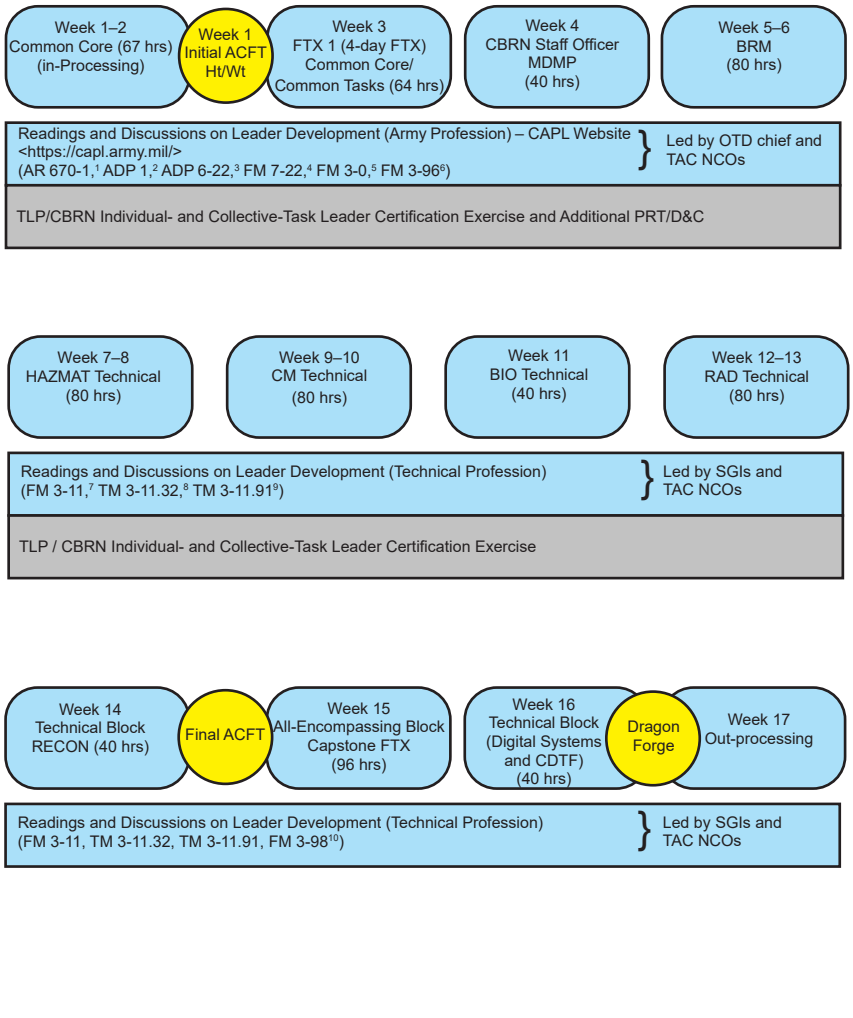
Prior to 2021, an assessment of a second lieutenant's leadership potential depended solely upon the periodic counseling of his or her CBRN Basic Officer Leader Course (BOLC) small-group instructor and what was contained on Department of the Army (DA) Form 1059, *Academic Evaluation Report*.[1] Project Athena assessments are now utilized and are a significant curriculum addition that augments small-group instructor feedback. Project Athena is a tool used to assess cognitive, personal, and leadership abilities, culminating with composite feedback that transcends the Army Professional Model and accounts for an individual's personality traits. The implementation of Project Athena allows students to concurrently identify their blind spots and highlight their leadership traits that could benefit from further grooming in an operational environment. In conjunction with the Project Athena assessments, lieutenants receive feedback on their leadership performance amongst their peers, in staff positions, with course work, during formative/summative evaluations, and when completing a final course capstone exercise. Using information obtained from the Project Athena assessment and individual small-group instructor counseling, the students create an individual development plan. This individual development plan is slightly different than the Army Career Tracker model, as it uses the results of the assessments to build a professional evaluation and timeline. The individual development plan focuses on Family and personal goals and on strengths and weaknesses, and it succinctly lays out a plan for individuals' careers, highlighting the jobs for which they may individually be best suited.

Another facet to the development of CBRN lieutenants is the sustained use of CBRN Captain's Career Course students as mentors. Instructors from BOLC and Captain's Career Course work together to pair BOLC lieutenants with Captain's Career Course captains based on similar duty stations and assignments. The lieutenants receive guidance and first-hand information about the installations and, if possible, the units they will move on to from their mentors. The mentorship program also allows for the continued development of professional relationships and the exchange of products such as standard operating procedures, after-action reviews, and other publications and useful resources.

The Officer Training Department, 84th Chemical Battalion, is currently working to augment senior officer mentorship in the form of a partnership initiative with the Maneuver Support Center of Excellence Noncommissioned Officer (NCO) Academy, Fort Leonard Wood. The intent is to introduce lieutenants to senior NCOs within the Chemical Corps. This partnership is expected to greatly assist in providing junior officers with a foundation of understanding about how to build relationships with their NCO counterparts and how to develop and learn from NCOs.

Dynamic Curriculum

Over the past 10 years, the CBRN BOLC course management plan has dynamically shifted from one in which lieutenants are developed solely as staff officers to one in which students are prepared for the rigors of both staff and platoon leader positions. Today, lieutenants train on 160 critical tasks, distributed in 13 modules, over a period of 17 weeks of classroom instruction and hands-on practical exercises (see Figure 1).



Legend:

ACFT—Army Combat Fitness Test
ADP—Army doctrine publication
AR—Army regulation
BIO—biological
BRM—basic rifle marksmanship
CAPL— Center for the Army Profession and Leadership
CBRN—chemical, biological, radiological, and nuclear
CDTF—Chemical Defense Training Facility
CM—chemical
D&C—drill and ceremonies
FM—field Manual
FTX—field training exercise
HAZMAT—hazardous material
hr—hour
Ht—height
MDMP—military decision-making process
NCO—noncommissioned officer
OTD—Officer Training Department
PRT—physical readiness training
RAD—radiological
RECON—reconnaissance
SGI—small-group instructor
TAC—tactical
TLP—troop leading procedures
TM—technical manual
Wt—weight

Endnotes:

[1]AR 670-1, *Wear and Appearance of Army Uniforms and Insignia*, 26 January 2021.

[2]ADP 1, *The Army*, 31 July 2019.

[3]ADP 6-22, *Army Leadership and the Profession*, 31 July 2019.

[4]FM 7-22, *Holistic Health and Fitness*, 1 October 2020.

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

[6]FM 3-96, *Brigade Combat Team*, 19 January 2021.

[7]FM 3-11, *Chemical, Biological, Radiological, and Nuclear Operations*, 23 May 2019.

[8]TM 3-11.32, *Multi-Service Reference for Chemical, Biological, Radiological, and Nuclear Warning and Reporting and Hazard Prediction Procedures*, 21 December 2017.

[9]TM 3-11.91, *Chemical, Biological, Radiological, and Nuclear Threats and Hazards*, 12 November 2019.

[10]FM 3-98, *Reconnaissance and Security Operations*, 1 July 2015.

Figure 1. CBRN BOLC flow chart

Much like students of other branch BOLCs, CBRN BOLC students spend the first 6 weeks on the common-core curriculum. The Army Centers of Excellence design and provide these modules to ensure that all officers have a collective baseline professional knowledge of Army officership. All Army officers are required to know the fundamentals of some basic areas such as basic rifle marksmanship, the maintenance program, property accountability, land navigation, the military-decision making process, troop leading procedures, training management at the platoon level, convoy and movement operations, and risk management. As of 2021, the troop leading procedures portion of the common-core curriculum has been expanded to a 2-day class that leads into the military-decision making process program of instruction. This expansion focuses heavily on planning at the platoon level and presents students with

multiple practical exercises to hone their mission-planning skills as platoon leaders. Additionally, the troop leading procedures training simultaneously lays the groundwork for mission-planning skills at the battalion level, which is critical to the future success of junior CBRN officers.

The next 11 weeks of the course focus solely on technical CBRN skills that CBRN officers require in order to succeed in staff officer and platoon leader positions. These blocks of instruction include fundamentals of radiation, CBRN mounted and dismounted reconnaissance operations, hazardous material operations and technician certifications, chemical and biological warfare staff and platoon planning, and decontamination operations. Additional updates to the technical curriculum include an introduction to the Nuclear, Biological, Chemical Reconnaissance Vehicle via the incorporation of a day of mission execution in the Nuclear, Biological, Chemical Reconnaissance Vehicle simulator. This simulator provides hands-on training in the operation and employment of Nuclear, Biological, Chemical Reconnaissance Vehicles in large-scale combat operations. Additionally, dismounted reconnaissance instruction, facilitated by hazardous dismounted reconnaissance instructors and personnel from the First Lieutenant Joseph Terry Facility, Fort Leonard Wood, reinforces the emphasis on target analysis and exploitation principles. Students receive instruction on laboratory glassware, CBRN equipment, sampling techniques, and technical decontamination.

Rigorous Training

Training in CBRN analysis and exploitation is a vital component of CBRN BOLC, as the Army continues to demand a stronger technical force. Significant changes have been implemented at the end of each technical block of instruction and capstone exercise to reinforce the students' CBRN technical knowledge and analytical capabilities. Immediately following the technical examination for any given week, students are randomly assigned to groups and are presented with a CBRN-related event or possible CBRN target for analysis. Students brief their analyses, recommendations, and proposed target execution to the small-group instructor and technical instructor for that block of instruction. This approach allows a venue in which students showcase their understanding of not only the technical material learned during that block of instruction but also operational and tactical impacts to a unit. Each day concludes with after action reviews and evaluations using training and evaluation outlines.

To graduate from CBRN BOLC, students must use all assets, resources, and technical knowledge that they have accumulated throughout the course to successfully complete a culminating capstone event. The culminating BOLC capstone event has also undergone major improvements over the last 3 years. The event spans a total of 6 days: 3 days of tabletop staff and platoon planning and 3 days of actions on objective based on the same plan. The culminating capstone event focuses on the self-development and operational learning domains covered over the previous 15 weeks and mimics the execution of a certification or validation exercise in which students are observed, coached, and mentored by small-group instructors serving as observer controllers. The classes are broken into smaller groups to facilitate more briefing opportunities and maximize instructor feedback. The culminating capstone event provides all students with the opportunity to fill a leadership position, as each platoon conducts a formal technical analysis briefing and operation order briefing to senior leaders and small-group instructors.

Next Steps

As the world has become more complex, the Army has shifted its focus from counterinsurgency tactics to multi-domain operations in competition against near-peer adversaries. This means that USACBRNS must continually refine its curricula to better prepare the CBRN staff officer and platoon leader for phased warfare consisting of minimized and concurrent planning timelines. Future curricula will challenge CBRN officers to integrate and develop relationships across the warfighting functions and think outside their own wheelhouses. In order to be successful in any operational environment, CBRN officers need to be masters of maneuver first and CBRN subject matter experts second. This allows them to better understand how their units shoot, move, and communicate in a complex environment, which, in turn, results in recommendations and more options for the commander.

The following link provides course information and the BOLC welcome letter for those who will be attending an upcoming course: <https://home.army.mil/wood/index.php/units-tenants/USACBRNS/Courses/BOLC>. For additional questions, please reach out to Captain Lisa Robinson, BOLC Division Chief, at <lisa.m.robinson97.mil@army.mil>.

Endnote:

[1] DA Form 1059, *Service School Academic Evaluation Report*, 1 March 2019.

Captain Inwood is a small-group instructor for CBRN BOLC. He holds a bachelor of science degree in chemistry from the University of Virginia, Charlottesville, and a master's degree in environmental management from Webster University.

Captain Jahrsdoerfer is a small-group instructor for CBRN BOLC. He holds a bachelor of arts degree in telecommunications from the University of West Florida, Pensacola, and a master's degree in defense and strategic studies from Missouri State University, Springfield.

Captain Lee is a small-group instructor for CBRN BOLC. He holds a bachelor of science degree in exercise science with a minor in biology from The Citadel, Charleston, South Carolina.

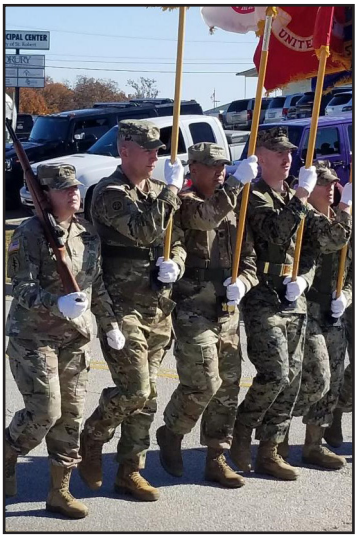
Captain Robinson is a small-group instructor for CBRN BOLC. She holds a bachelor of science degree in business management from Tennessee Temple University, Chattanooga, and a master's degree in environmental management from Webster University.

Captain Sheth is a small-group instructor for CBRN BOLC. He holds a doctorate of medicine (M.D.) from Poznan University of Medical Sciences, Poznan, Poland, and a master's degree in environmental management from Webster University.

CBRN Senior Leader Course

By First Sergeant Jose R. Jimenez

The Chemical, Biological, Radiological, and Nuclear (CBRN) Senior Leader Course (SLC), Noncommissioned Officer's Academy (NCOA), Maneuver Support Center of Excellence, Fort Leonard Wood, Missouri, provides students with the knowledge needed to become confident brigade staff CBRN noncommissioned officers (NCOs) who can provide technical CBRN expertise while planning/performing CBRN defense and CBRN consequence management activities in any operational environment. Upon graduation, these Soldiers apply the skills, knowledge, and leader attributes necessary to lead as platoon sergeants and/or first sergeants.



SLC small-group leaders lead the Joint Service Color Guard during a parade.

CBRN SLC consists of three phases. Phase 1 is tailored to in-depth leadership attributes during NCO common-core competencies. Phase 2 focuses on brigade and higher-level CBRN staff NCO duties and responsibilities, including utilization of the Joint Warning and Reporting Analog and Digital System and the Command Post Computing Environment throughout multiple scenarios building up to a situational training exercise. Phase 3 focuses on the military decision-making process, brigade and higher-level CBRN staff planning, reconnaissance and surveillance planning, fixed-site decontamination planning, and an overview of high-energy compounds, culminating with a staff exercise. The final graduation requirement involves validating the students' newly acquired leadership skills and their ability to perform site characterization and sampling by conducting Advanced Toxic Agent Training at the Chemical Defense Training Facility, Fort Leonard Wood. The CBRN SLC and the Advanced Leader Course are the only NCOA Professional Military Education courses that incorporate the One Army School System.

SLC small-group leaders lead the annual Wreaths Across America event.

CBRN SLC small-group leaders are individually selected from a group of eligible U.S. Army Chemical Corps sergeants first class. They endure a rigorous interview process and records review with the NCOA Regimental Command Sergeant Major, the NCOA Commandant, and the course chief for the CBRN SLC to ensure the selection of quality senior leaders to develop, train, and mentor other Chemical Corps senior enlisted leaders. CBRN SLC small-group leaders are part of the Army's most diverse NCOA; they include Regular Army, U.S. Army National Guard, and Army Reserve Soldiers who are responsible for the health and welfare, morale, and professional development of up to 500 sergeants and sergeants first class. Small-group leaders develop courses and manage course flow, execute the program of instruction requirements for five to seven classes per year, and advise the first sergeant on SLC content and training strategies. All small-group leaders showcase what it means to be stewards of the profession and exhibit *esprit de corps* by volunteering at community service events throughout the year, demonstrating the Army's commitment to the American people.

First Sergeant Jimenez is the SLC chief at the CBRN NCOA. He is currently working toward a bachelor's degree in business administration from Trident University.

Every Soldier is a Sensor:
Explosive-Vapor Detection on the Battlefield

By Dr. Dawn E. Riegner, Dr. Tessy S. Ritchie, Dr. Vincent P. Schnee, Major Daniel R. DeNeve, Cadet Alma O. Cooper, Cadet Mackenzie C. Curtin, Cadet Dalton J. Ennis, Cadet Dylan H. Golden, and Cadet Caleb C. Johnson

Introduction

The increasing sophistication of hidden explosives has become a growing threat not only on the modern battlefield but also from foreign and domestic terrorists. Current explosive-device detection methods employ the use of ground-penetrating radar, x-rays, and metal detectors; these instruments can provide insight into where a device is located and how it is assembled but are not capable of detecting if there is an explosive agent or determining what type it may be. Methods of detecting explosive agents include working dogs,[1] gas chromatography, spectrometry, and amplified fluorescence devices[2] such as Fido® X3.[3] While effective, these methods have drawbacks as well. Working dogs require extensive and expensive training, and their employment is limited by transportation requirements and environmental conditions.[4] Instruments tend to be expensive and bulky, and extensive training is required to use the equipment and interpret results. The development of a persistent, passive, and universally employable sensor for Soldiers and first responders is the goal of research currently underway at the U.S. Military Academy—West Point, New York.

Quantum dots (QDs) are a type of nanoscale semiconductor crystal that exhibits size-dependent fluorescent properties that can be tuned to a desired region of the electromagnetic spectrum by adjusting the synthesis parameters. QDs, which consist of hundreds to thousands of atoms, typically range in size from 2 to 30 nanometers (nm). Their unique chemical, electronic, and optical properties result from the quantum mechanical effects of confinement of charge carriers. QDs were chosen as chemical sensors due to their previously demonstrated ability to detect explosive compounds in solution through fluorescence.[5] Previous research showed that QDs synthesized in methanol could be titrated with explosive agents with the same solvent. The fluorescence of the QDs was then measured and observed to notably decrease over time. The decrease in fluorescence is believed to be the result of the explosives capturing the highly mobile electrons available in QDs, thus decreasing their illumination.[6]

Electrospun polymer fibers can serve as a vehicle to contain QDs. The process of electrospinning imparts a large surface-area-to-volume ratio, porous structures, exceptional mechanical strength, and the ability to fine-tune surface functionalities.[7] The technique of electrospinning is based upon the characteristics of repulsive electrostatic forces, which are used to draw polymer solutions into long, thin fibers.[8] Proof of QD incorporation into the fibers was demonstrated using microscopy and spectroscopic measurements. QD-doped fibers were exposed to the headspace vapors of four explosive compounds (2,4,6-trinitrotoluene [TNT], 2,5-dinitrotoluene [DNT], 1,3,5-trinitro-1,3,5-triazine [RDX], and triacetone triperoxide [TATP]) to determine the extent of fluorescence signal quenching due to exposure to the explosives.

Methods

Cadmium selenide (CdSe) QDs with fluorescence emission wavelengths centered at 586 nm were added to a solution of polyvinyl chloride (PVC) polymers. PVC was chosen because it does not autofluoresce in the same region as the QDs. The PVC solution was electrospun into fibers and compared to a control specimen without QDs.

QD-doped and nondoped fibers were viewed under a stereomicroscope with an ultraviolet (UV) light source to determine the degree to which QDs were successfully incorporated. Spectroscopic measurements confirmed a broadly monochromatic intensity when QDs were integrated into the fibers.

Physical characterization using confocal microscopy under visible light revealed a similarity in physical appearance between fibers with and without QDs. However, as shown in Figure 1, an optical microscope image of PVC polymer fibers with QDs exposed to a UV light source clearly reveals the incorporation of QDs into the fibers.

Following physical characterization, the fibers were evaluated with a Horiba Fluoromax-4® spectrofluorometer to determine their ability to respond to explosive vapors. While TNT, DNT, and RDX explosive analytes could be purchased, TATP is a very sensitive explosive

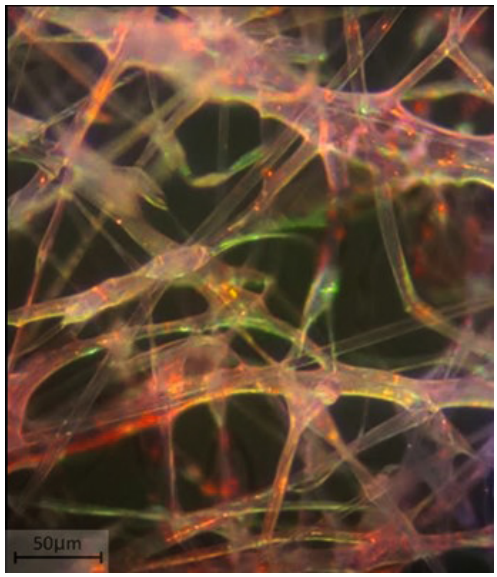


Figure 1. Optical microscope image showing incorporation of QDs in PVC polymer fibers under UV light at 400x magnification. The red illumination confirms the presence of QDs within the fibers.

that needed to be synthesized using a safe, temperature-controlled method.[9] The explosives were transferred to separate clean quartz cuvettes, and a 2.0–2.1-milligram (mg) sample of electrospun QD-doped PVC polymer was then suspended inside each cuvette, as shown in Figure 2. Extra precaution was taken to ensure that the fiber did not come into physical contact with the explosive in the bottom of the cuvette. The cuvette was capped and placed in a fluorometer with an excitation wavelength of 350 nm. The fibers were exposed to this excitation wavelength every 5 minutes for 1 hour and then once every hour for a total run time of 24 hours. The emission spectra were collected from 420 to 700 nm.

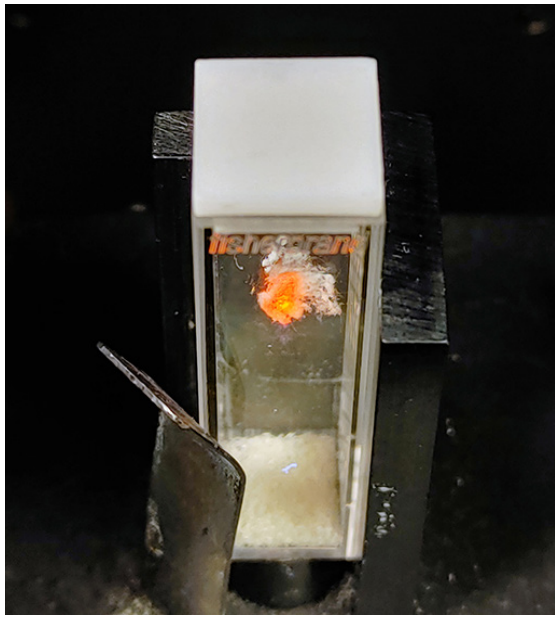


Figure 2. QD-doped PVC polymer suspended in a cuvette containing an explosive agent. The orange glow is due to the presence of QDs.

Results and Discussion

Fluorescence emission results were compared to results with control specimens of PVC polymers containing no QDs, and it was confirmed that the QD-doped fibers responded differently when to exposed to the vapors of each explosive (see Figures 3–6, pages 14–15), thus demonstrating the feasibility of the use of QDs as a potential detection technique for a variety of chemicals. While previous research demonstrated the ability of QDs to detect explosives in a solution phase,[10] these findings demonstrate applicability in field-expedient conditions since the QD-doped electrospun fibers can be used to detect the headspace vapors of explosives.

It was also discovered that the fluorescence of the QD-doped fibers decreased over time for each explosive, demonstrating the quenching response for QD-doped fibers when exposed to different explosive analytes (Figures 3–6). Significant quenching did not typically occur until after several scans had been conducted, with this delay being reasonably interpreted as the amount of time that it took for the explosive vapor to build up to a sufficient density in the headspace of the cuvette. Given the volume of the 3.5-milliliter (ml) cuvettes and that no action was taken to unequivocally seal the cuvettes with parafilm, the buildup of vapors in the headspace is expected to approximate real-world threat conditions such as those found in the confines of a vehicle, a dwelling, or a cardboard box. While all of the tested explosives experienced a measured rate of quenching over time, the quenching rates for RDX and TATP were lower in magnitude than for TNT and DNT. While these differences might be attributed physical properties such as vapor pressure and the experimentally constrained amount of TATP used, the differences in magnitudes and rates of quenching present a positive development in attempting to create a sensor that demonstrates a differentiated response.

The Next Step

While emission spectroscopy was used to provide analytical data for the purpose of demonstrating the findings, emissions quenching could feasibly be observed with the naked eye using a small UV flashlight or, more conveniently and precisely, through a small wearable device containing a QD-doped polymer test strip. The QD doping and electrospinning parameters used in this research were not optimized, and further work is necessary to improve the kinetics of the quenching response. Future refinements could be used to test QDs on other fibers and to potentially demonstrate a differentiated response, thus providing a multimodal detection array capable of specifically identifying a wide range of chemical functional groups, including specific types of explosive or chemical threats. The observed responses may allow polymers and QDs to be integrated into a robust and complex matrix to identify real-time threats within a reasonable time frame.

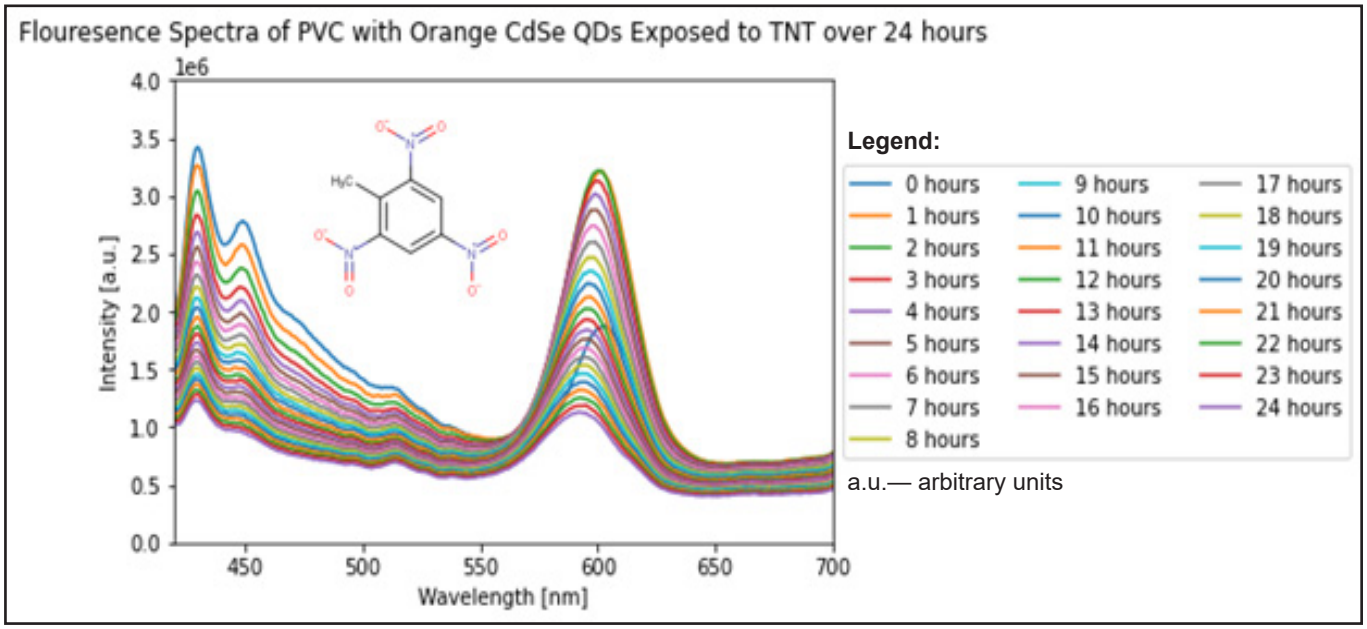


Figure 3. Measured quenching response of 2.0 mg of QD-doped PVC fiber to the presence of 0.3 mg of TNT

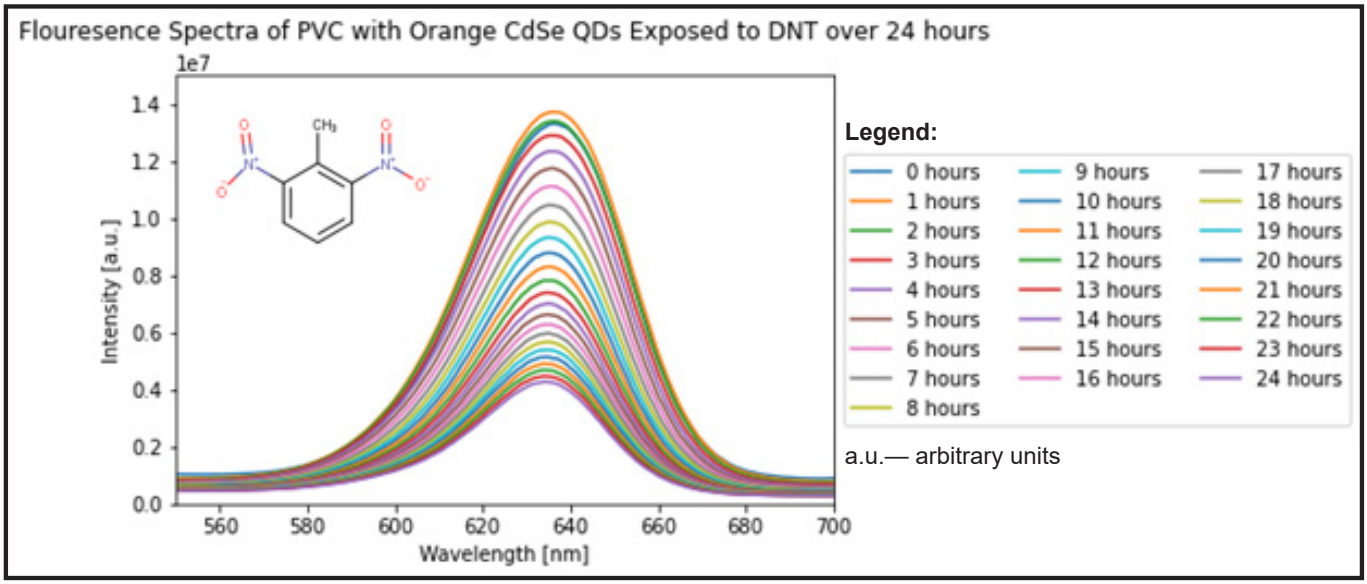


Figure 4. Measured quenching response of 2.0 mg of QD-doped PVC fiber to the presence of 0.5 mg of DNT

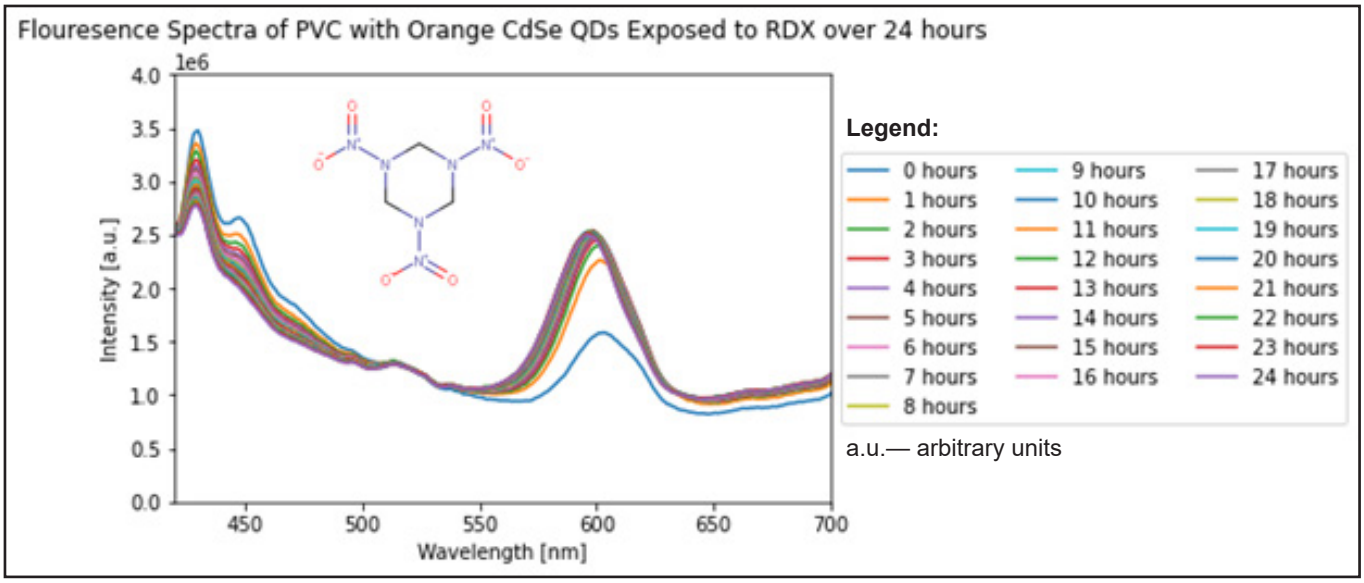


Figure 5. Measured quenching response of 2.0 mg of QD-doped PVC fiber to the presence of 0.5 mg of RDX

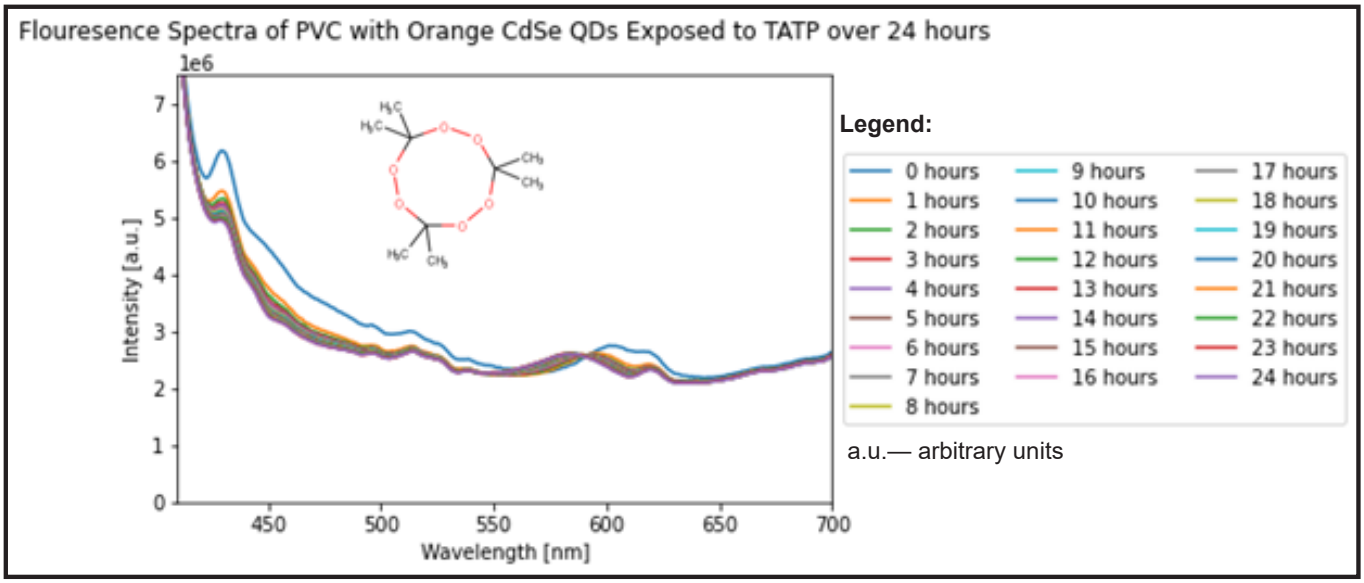


Figure 6. Measured quenching response of 2.0 mg of QD-doped PVC fiber to the presence of 0.1 mg of TATP

Conclusion

Explosive-detection canines have long been known as the gold standard for detecting explosives, but canines require extensive and expensive training and are not allocated to every operational echelon. The inherent cost and limited operational use of canines necessitate suitable technological alternatives, particularly in austere environments. The method of explosive detection outlined in this article could potentially be adapted and employed as a sensor for all first responders—without the need for extensive training or expensive detection equipment.

By capitalizing on the optical and electronic properties of QDs, the U.S. Military Academy research demonstrates that PVC polymer fibers doped with CdSe QDs respond to explosive vapors with unique signatures. Specifically, the fluorescence intensity of the QD-doped fibers becomes quenched, decreasing over time following exposure of the fiber to explosive agents. Initial findings demonstrate the potential to differentiate between the functional groups of chemical vapors. The ease of incorporating QDs into fibers, combined with their robust nature and broad response, represents favorable qualities for the development of a multimodal and highly sensitive sensor array capable of detecting chemical and explosive threats.

Because the use of explosives will continue to evolve both on the battlefield and as a means of terrorism, detection capabilities must undergo continuous innovation to mitigate capability gaps and discourage the deployment of explosives. The quick and accurate detection of homemade explosives and improvised explosive devices is of critical importance to protecting the United States, the North Atlantic Treaty Organization, and allied forces conducting offensive and stability operations.

Endnotes:

[1]Lucia Lazarowski et al., "Selecting Dogs for Explosive Detection: Behavioral Characteristics," *Frontiers in Veterinary Science*, 2 September 2020, <https://doi.org/10.3389/fvets.2020.00597>, accessed on 12 April 2022.

[2]Samuel W. Thomas et al., "Amplifying Fluorescent Polymer Sensors for the Explosives Taggant 2,3-Dimethyl-2,3-Dinitrobutane (DMNB)," *Chemical Communications*, 2005, <https://doi.org/10.1039/B508408C>, accessed on 12 April 2022.

[3]"Fido® X3 Product Description and Specifications," <https://www.cbrnetechindex.com/Print/4269/flir-systems-inc/fido-x3>, accessed on 12 April 2022.

[4]Army Regulation (AR), 190-12, *Military Working Dog Program*, 23 October 2019.

[5]Manuela F. Frasco and Nicko Chaniotakis, "Semiconductor Quantum Dots in Chemical Sensors and Biosensors," *Sensors*, 14 July 2009, <https://doi.org/10.3390/s90907266>, accessed on 12 April 2022.

[6]William J. Peveler et al., "Multichannel Detection and Differentiation of Explosives with a Quantum Dot Array," *ACS Nano*, 18 November 2015, <https://doi.org/10.1021/acsnano.5b06433>, accessed on 12 April 2022.

[7]Zheng-Ming Huang et al., "A Review on Polymer Nanofibers by Electrospinning and Their Applications in Nanocomposites," *Composites Science and Technology*, November 2003, <https://doi.org/10.1016/S0266-3538(03)00178-7>, accessed on 12 April 2022.

[8]Je-Huan He, "On the Height of Taylor Cone in Electrospinning," *Results in Physics*, June 2020, <https://doi.org/10.1016/j.rinp.2020.103096>, accessed on 12 April 2022.

[9]Edwardo Espinosa-Fuentes et al., "An Easy Method to Prepare D3 and C2-TATP Crystals," *Propellants, Explosives, Pyrotechnics*, 2016, pp. 713–718, <https://doi.org/10.1002/prep.201500245>, accessed on 12 April 2022.

[10]Carolina Carillo-Carrion et al., "Determination of TNT Explosive Based on its Selectively Interaction With Creatinine-Capped CdSe/ZnS Quantum Dots," *Analytica Chimica Acta*, 20 August 2013, pp. 93–100, <https://doi.org/10.1016/j.aca.2013.07.004>, accessed on 12 April 2022.

Dr. Riegner is a professor of chemistry at the U.S. Military Academy. She holds a Ph.D. in chemistry from the University of Texas–Austin.

Dr. Ritchie is the chief chemist and director of the Instrumentation Core Facility, Department of Chemistry and Life Science, U.S. Military Academy. She holds a Ph.D. in chemistry from the University of Maryland, College Park.

Dr. Schnee is a physical scientist at the U.S. Army Combat Capabilities Development Command; Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Center Night Vision and Electronic Sensors Directorate. He holds a Ph.D. in analytical chemistry from the University of Montana, Missoula.

Major DeNeve is an assistant professor, Department of Chemistry and Life Science, U.S. Military Academy. He holds a master's degree in chemistry from Vanderbilt University, Nashville, Tennessee.

Cadet Cooper is pursuing a bachelor's degree in mathematical science from the U.S. Military Academy.

Cadet Curtin is pursuing a bachelor's degree in chemical engineering from the U.S. Military Academy.

Cadet Ennis is pursuing a bachelor's degree in life science from the U.S. Military Academy.

Cadet Golden is pursuing a bachelor's degree in chemistry from the U.S. Military Academy.

Cadet Johnson is pursuing a bachelor's degree in chemical engineering from the U.S. Military Academy.

CBRN Advanced Leader Course: Standardized Multicomponent Training

By First Sergeant Jody L. Mease

Over the past 2 years, the Chemical, Biological, Radiological, and Nuclear (CBRN) Advanced Leader Course (ALC), Noncommissioned Officer (NCO) Academy, Maneuver Support Center of Excellence, Fort Leonard Wood, Missouri, has undergone several deviations to course flow. These changes came in response to incorporating the noncommissioned officer common-core competencies[1] into Professional Military Education as a means to consecutively and progressively connect curricula throughout the NCO learning continuum.

The CBRN ALC cadre prioritizes its commitment to educating, training, and developing confident and competent squad leaders and CBRN staff NCOs. Incorporating demanding tactical, technical, and Army values-based training enables CBRN ALC students to graduate with the assurance that they are capable of providing mobility, freedom of action, and protection to the forces they support.

"Incorporating demanding tactical, technical, and Army values-based training enables CBRN ALC students to graduate with the assurance that they are capable of providing mobility, freedom of action, and protection of the forces they support."

As CBRN NCOs, we realize that we must synchronize unit mission requirements in order to ensure mission success. We advise the commander on ways to survive, fight, and win in a contaminated CBRN environment. CBRN ALC provides Soldiers with the knowledge they need to be confident battalion staff CBRN NCOs who can serve as technical CBRN experts while planning/performing CBRN decontamination, CBRN reconnaissance, and radiological safety activities in any operational environment.[2]

One Army School System

The 6-week CBRN ALC course is one of a few career management fields to standardize education under the One Army School System (OASS). Implemented for CBRN ALC in 2014, the OASS offers technical and specialized skills for all CBRN Soldiers. Operating under the OASS has positively impacted the course by producing more agile and adaptive leaders who will serve at the strategic level in the future.

The CBRN ALC cadre is dedicated and devoted to providing outstanding multicomponent standardized training that is responsive to the needs of the total force. Regular Army (Component I) and U.S. Army Reserve (Component III) small-group leaders jointly provide a culture of professionalism and excellence for all students; this has helped shape the Chemical Corps.

CBRN ALC personnel work hand in hand with the Army National Guard and U.S. Army Reserve CBRN Deputy Assistant Commandant; the Army National Guard and U.S. Army Reserve Proponency NCO; and the 3d Chemical Brigade, 102d Training Division, Fort Leonard Wood, to ensure that Soldiers are provided the opportunity to attend the right class at the right time regardless of component. In order to improve readiness, individual Soldiers, readiness/training NCOs, and unit leaders must ensure that Soldiers with class reservations for CBRN ALC meet all prerequisites and attend Professional Military Education on time and to standard.

Course Flow

CBRN ALC is comprised of three phases to accommodate Army National Guard and U.S. Army Reserve students. Each phase consists of a 2-week (6 days per week) training schedule.

The Phase 1 curriculum consists of 112 academic hours of hazardous material technician certification and common-core competencies. (As of 1 October 2020, hazardous material operation certification is no longer a part of the program

(Continued on page 19)

The Evolution of the CBRN Warrant Officer

By Chief Warrant Officer Three Humphrey B. Hills II

With assessment gaps in the readiness of chemical, biological, radiological, and nuclear (CBRN) defense personnel and equipment, a need to provide sound recommendations and expert advice on readiness enhancement to maneuver commanders, the Army, and joint Services was identified. From that need arose a vision of creating a technical position in the U. S. Army Chemical Corps; today, that position is designated as Military Occupational Specialty (MOS) 740A–CBRN Technician. The CBRN Warrant Officer Program was initiated in 2010, and 740As were subsequently integrated into the force to incorporate technical expertise and systems integration. CBRN warrant officers are now distributed across the Regular Army, Army National Guard, and U.S. Army Reserve.

In the summer of 2010, the Army selected the initial 14 warrant officer candidates to attend the Warrant Officer Candidate School, Fort Rucker, Alabama. The candidates selected possessed a wealth of CBRN experience and had previously served in leadership positions such as squad leaders and platoon sergeants in CBRN units, CBRN reconnaissance detachment team leaders, doctrine analysts/writers, instructors, and operations sergeants, with an average of 12.5 years of active federal service. Initial training of these candidates began in April 2011.

Upon graduation from Warrant Officer Candidate School and appointment to warrant officer one, these warrant officers attended and completed the U. S. Marine Corps Chemical Warrant Officer Basic Course (WOBC), Fort Leonard Wood, Missouri, graduating in August of 2011. They were the first warrant officers to be awarded the MOS of 740A. Because there was no established Army CBRN WOBC until 2015, Army MOS 740As continued to attend the Marine Corps Chemical WOBC from 2011 to 2015. Then, at that point, the U.S. Army Chemical, Biological, Radiological, and Nuclear School, Fort Leonard Wood, instituted its own Army-led CBRN WOBC. Upon graduation from WOBC, the newly qualified warrant officers ventured out to their units of assignment in field artillery, air defense artillery, and military intelligence battalions.

In the beginning, the integration of CBRN warrant officers into these formations was challenging, as not many senior Army professionals had a concise understanding of exactly what CBRN warrant officers were bringing to their formations. Although there had previously been a vision for these officers, once they were dispatched to the field, they began replacing the CBRN lieutenants in the formations. This was a new development for those commanders and staffs. Losing one capability while gaining another, without any clear understanding, posed many unforeseen challenges to the units—and the warrant officers faced unforeseen challenges as well. Although a duty description was developed, most CBRN warrant officers were assigned different tasks depicted by their unit of assignment. This posed many challenges, as no two warrant officers executed the same set of responsibilities. There was one single common responsibility among CBRN warrant officers—validation of the unit status report, now known as the Defense Readiness Reporting System–Army.

In 2015, a force design update was approved for the Chemical Corps. Under the update, CBRN warrant officers were removed from field artillery, air defense artillery, and military intelligence formations and inserted into CBRN companies and CBRN battalions across the Army, where they were redistributed as company CBRN technicians; assistant team leaders for chemical, biological, radiological, nuclear, and explosives response teams; and CBRN battalion technicians and into division and corps CBRN protection cells. The maneuver community experienced some turbulence as a result of these changes, as it previously adapted to having CBRN warrant officers instead of lieutenants in its ranks. The overall consensus was that CBRN warrant officers added organizational value above and beyond the mere validation of the Defense Readiness Reporting System–Army.

Since the inception of the CBRN warrant officer cohort, the CBRN proponent has made critical advancements with regard to the accession and selection of qualified candidates. In addition, the Corps established and continues to redefine the world-class Professional Military Education and specialized training that equips MOS 740As with the knowledge, behaviors, and skills necessary to best serve commanders at echelons from company to army level, in all aspects of CBRN defense and CBRN intelligence. The cohort continues to expand, and codified positions such as the Regimental Chief Warrant Officer, command chief warrant officer, brigade senior warrant officer, Human Resources Command career manager, White House Military Office CBRN technician, U.S. Army Nuclear and Countering Weapons of Mass Destruction Agency CBRN technician, Defense Threat Reduction Agency CBRN technician and, most recently, a training-with-industry position, have all been established. The efforts in evolving the 740A cohort are ongoing and continue to be on the glide path, keeping pace with Army modernization efforts.

The scope of responsibility of the CBRN warrant officer will be narrower in 2023 and beyond. In the past, warrant officers reported to their units and executed whatever tasks the lieutenants had previously been assigned. Although this initiative has been beneficial in establishing continuity while a CBRN warrant officer operated in a CBRN officer's capacity, it has severely limited the potential of the warrant officer to really delve deeper into the requirement of integrating CBRN defense systems and becoming the subject matter expert. Warrant officers must avoid being

generalists and should focus on deepening, rather than broadening, their skills.

Army units continue to assess readiness levels for CBRN defense equipment through organizational inspections and chemical defense equipment reports. The ultimate focus of MOS 740As should be assisting subordinate units with improving CBRN readiness by actively engaging with personnel (MOS 74 series or CBRN defense course-trained) who execute the duties of CBRN officers, noncommissioned officers, or specialists. This can and will be accomplished through meticulously reviewing inspection results, establishing low-density training, and two-way communication. Higher-than-normal levels of leader engagement and direct involvement with subordinate units would ensure that CBRN readiness would become a higher priority. As the Army continues to modernize, the engagement of warrant officers becomes that much more imperative.

CBRN warrant officers possess a wealth of knowledge and skills that enhance unit readiness while providing sound recommendations to commanders in addition to training and mentoring members of the organization. Senior leaders continue to rely upon CBRN warrant officers to provide concise and dynamic solutions to complex problems related to CBRN defense, readiness, sustainment, and intelligence. Key attributes for CBRN warrant officer success are the ability to identify gaps, exercise critical thinking, and use problem-solving techniques to assist with increasing unit readiness at each echelon. This point will be amplified in Army organizations in 2023 and beyond, as 740As begin achieving the rank of chief warrant officer four.

We look forward to the continued growth and maturity of the CBRN Warrant Officer Program. The CBRN Regiment and the Army are much better because of the implementation of MOS 740A. Continuing the advertisement and demonstration of expertise going forward will not only enhance the Warrant Officer Program, but will also ensure that the most highly qualified and highly skilled candidates are recruited and selected to join this elite group of CBRN professionals. It is imperative that our 740As reach across the warfighting functions and leverage fellow warrant officers from other branches to maximize opportunities for cross-training, networking, and participating in activities that can assist in their personal growth and professional development. Although we have come a long way since the inception of the program, there is still work to be done.

Chief Warrant Officer Three Hills is the 4th Regimental Chief Warrant Officer of the Chemical Corps. He is a year group 2011 CBRN warrant officer—one of the original pioneers of the program. He previously served as the Regular Army 740A Career Manager at the Human Resources Command, Fort Knox, Kentucky; the senior warrant officer for the 48th Chemical Brigade, Fort Hood, Texas; and a CBRN technician in two field artillery battalions. He holds a bachelor's degree in criminal justice from Columbia College, Missouri.

("CBRN Advanced Leader Course . . . ," continued from page 15)

of instruction for CBRN ALC; instead, it is now a prerequisite for attending the course.) With the additional requirement of common-core competencies, Phase I is no longer waived.

Phase II covers the 128-academic-hour Operational Aspect and Basic Radiological Safety Course.

Phase III focuses on 129 academic hours of CBRN staff functions; the Joint Warning and Reporting Analog and Digital System; and a situational training exercise, which leads to Advanced Toxic Agent Training at the Chemical Defense Training Facility, Fort Leonard Wood. Students are evaluated on performance-oriented assessments, which measure and assess their written and oral communication skills, leadership abilities, and contributions to group projects.

Additional mentorship is offered to students through engagements from senior leaders throughout the Chemical Corps and one-on-one engagements specific to Regular Army, Army National Guard, and U.S. Army Reserve students. Mentorship is key to building competency, leadership skills, and self-awareness, and it promotes an environment in which to learn and develop as a leader. The Project Athena[3] leader self-development tool has recently been incorporated into the course to assist with assessing, developing, and retaining talent. The feedback received will enable self-awareness and, in turn, promote self-development. Leaders who are self-aware and who put in the necessary work stand apart from their peers.

Upon successful completion of CBRN ALC, sergeants and staff sergeants should be confident in their ability to respond to hazardous materials incidents at the technician level and able to apply the skills, knowledge, and leader attributes that are necessary to lead Soldiers at the squad level.

"NCOs Lead the Way!"

Endnotes:

[1]"NCO Common Core Competencies," *NCO Worldwide*, <https://www.ncoworldwide.army.mil/News/Article-Display/Article/1952992/nco-common-core-competencies-nco-c3/>, accessed on 7 April 2022.

[2] "Individual Training Plan (ITP) for the Chemical, Biological, Radiological, and Nuclear (CBRN) Operations Specialist," *U.S. Army*, 5 February 2020, p. 3-1.

[3]*Project Athena Leader Self-Development Tool*, Center for the Army Profession and Leadership, <https://capl.army.mil/athena/#/>, accessed on 7 April 2022.

First Sergeant Mease is the CBRN ALC course chief at NCOA. She holds an associate's degree in general studies from Central Texas College and is currently pursuing a bachelor's degree in criminal justice with a focus on forensic science through American Military University.

MOS Changes to Modernize the Chemical Corps: A CBRN People Strategy Proposal

By Major Chester T. Garner

The U.S. Army Chemical Corps is modernizing. Precision decontamination, integrated autonomous systems, sensor suite upgrades, and a host of related programs represent the future of chemical, biological, radiological, and nuclear (CBRN) defense. Ongoing modernization efforts seek to improve the Chemical Corps ability to "enable movement and maneuver to conduct large-scale ground combat operations in a CBRN environment."[1] However, along with these changes, we must ask: What does modernization mean for our Soldiers? How will the technical load of CBRN Soldiers transform as we evolve? How can we ensure that our Soldiers are not merely able to adapt, but actually thrive and excel as CBRN defense experts to meet the needs of the Army? Is anything hindering our efforts to develop expertise and meet those needs?

The U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS), Fort Leonard Wood, Missouri, is in the process of answering these questions, and discussions have turned to an examination of our personnel structure. The proposed structure changes that have been identified by USACBRNS thus far constitute a series of conceptual updates to the Chemical Corps that are collectively refered to as the CBRN People Strategy, which is currently under consideration at USACBRNS and across the CBRN community. In recent months, conversations surrounding the CBRN People Strategy have taken place from junior to senior levels. There is significant support for these proposals, including the proposal that would have the widest impact—expansion of the enlisted Military Occupational Specialty (MOS) 74D–CBRN Specialist into a series of three distinct MOSs. This article examines the MOS expansion proposal in the context of the above questions.

Lessons From the 54-series

Upon hearing about a possible enlisted MOS expansion, the first thought for many in the CBRN community is that we have been there before. The CBRN enlisted MOS structure evolved from the convoluted and outdated 54-series to a single MOS 54B around 1983. Later, 54B became 74D as a designation only change in 2003. Why go back to something that has already been tried? What is different now? These are completely valid questions and part of a very broad discussion. However, it might be more appropriate to ask what conditions led to the 54-series in the first place? What was it about that model that worked, and what was it that did not? At least part of the answer lies with what the Army required of the Chemical Corps during previous eras. When functions like the employment of flame, offensive chemical weapons, and later smoke (all part of various 54-series descriptions) no longer applied, the multi-MOS series made less sense. Furthermore, the career progression model of the 54-series was unbalanced and no clear common core of CBRN defense proficiencies existed. Restructuring to a single MOS was the correct move at that time. To paraphrase the old adage, though, the only constant in life—and in the Army—is change.

Technical Load

The combination of know-how and skill required of CBRN Soldiers is referred to as their "technical load." Since the move to a CBRN defense MOS, programs, task complexity, and equipment have gradually been added. The mental burden and physical skill requirements of CBRN Soldiers have increased in the decades since 1983. This increase in technical load can quickly result in technical expertise being spread thin. Many modernization programs solve specific issues, but simultaneously add to the technical load. For example, information on current preventive maintenance checks and services for the Nuclear, Biological, Chemical Reconnaissance Vehicle is contained on 10,206 pages across 15 technical manuals. And dismounted reconnaissance sets, kits, and outfits are comprised of 59 major components and require thousands of pages of manuals to operate and maintain. Can one Soldier master all of these systems? Autonomous decontamination systems are another example of technology that will extend the CBRN defense capacity and efficiency of our formations, but will also increase technical load. Advances in materiel result in some great improvements; however, they also result in risk if we do not also consider alternatives that fall within the other doctrine, organization, training, materiel, leadership and education, personnel, and facilities domains. Our personnel structure must also account for technical load changes.

Personnel Management

Consider some of the realities of the current Army personnel structure. The Army manages people by MOS above the division and installation levels.[2] The result is often a skill mismatch across formations and installations. For example, the number of individuals with the Mounted CBRN Reconnaissance (L6) Additional Skill Identifier (ASI) may be at 110 percent strength across an installation, but CBRN reconnaissance platoons on that installation may be only partially manned with L6-qualified individuals. This is common (and nearly unavoidable) for Regular Army formations. Personnel

managers at the installation level juggle multiple competing priorities, and ASIs become mildly interesting side notes. The resultant mismatch impacts the time required for CBRN units to achieve and maintain mission readiness.

Reliance on ASIs presents additional risks. ASI programs may be discontinued without much notice. (The CBRN Technical Escort [L3] course narrowly avoided discontinuation in 2021). In addition, ASI management often leads to suboptimal scenarios. For example, USACBRNS instructors have been called upon to teach ASI courses from which they themselves just graduated. Many times, these ASI course instructors, through no fault of their own, have not spent time in one of the corresponding formations. The current system of training, slotting, and managing CBRN personnel presents a set of challenges that is risky and avoidable.

Career Progression

Another impact of the current slotting system is the interruption of technical career progression. Organizational learning, where the bulk of expertise is arguably developed, becomes random. Our Corps can do better than that. Many Regular Army enlisted personnel currently have only a handful of opportunities to serve in CBRN units. Repeat assignments in a single formation type are even rarer. This means that there are few opportunities for enlisted CBRN Soldiers to master tasks and equipment from the sub-team to the platoon level. Team members rarely become team leaders and, later, platoon sergeants in the same formation type. If they did, they would benefit from additional layers of applicable knowledge as they progressed through their careers. Instead, they most likely face a disjointed sampling of formation types. We have long affirmed that this is somehow essential to produce well-rounded CBRN Soldiers, but is that true? Feedback from the hundreds of Soldiers and leaders who have been introduced to the CBRN People Strategy does not support this assumption. Rather, the result is technical dilution, which actually stunts expert development. Competent leaders at multiple levels may still be novices in their technical craft. This leads to a reduced degree of shared understanding and less-effective mission command.

Can we reasonably expect Soldiers to become experts in their craft during one tour of duty? Many do become proficient; but in the Active Component, they soon rotate out of those positions. When they return to a CBRN formation, that formation is often a different type, with a new mission and a new equipment set. This affects the unit ability to execute mission-essential tasks to the right degree of success. The enlisted Soldiers and noncommissioned officers (NCOs) who reach high levels of proficiency during the course of a single duty tour are examples of achieving success in spite of, rather than because of, the personnel structure. Can such high "switching costs" on Soldier technical development be justified?

None of these factors should be perceived as diminishing the incredible achievements of our enlisted Soldiers and NCOs over the years. The professionalism, commitment, motivation, and talent of our personnel have never been in question. Rather, these issues highlight the abilities of our Soldiers and NCOs. But what if we could build a structure that does not artificially limit the development of experts? Recent Army-wide self-examinations reveal the importance of maximizing the effectiveness of our Soldiers. In addition, potential future force reductions point to the need to refine our structure in order to unleash the potential of our talented Soldiers and leaders.

Proposed Solution

A degree of broad-spectrum CBRN defense knowledge will always be necessary; however, the current personnel structure lends itself to the development of generalists more so than experts. Can we optimize the structure to meet our requirements? This is where the CBRN People Strategy and the expansion of the enlisted MOS series come in. At a minimum, any change to our personnel structure must help—

- Develop experts across CBRN defense core functions and associated tasks.
- Facilitate the appropriate placement of CBRN defense experts across the current and future force structure.
- Meet the expressed mission of the Chemical Corps with the correct level of success.
- Complement modernization efforts within the constraints of current growth policies.
- Present a viable career path for enlisted CBRN personnel.

The model proposed for enlisted personnel through the CBRN People Strategy meets these criteria.

Expansion of the enlisted CBRN MOS into a specialized series is at the heart of the proposed structural changes. Revamped Professional Military Education that is broad in some areas and focused in others would replace ASI courses. For the purpose of this article, the expanded MOSs are referred to as 74C–CBRN Assessment Specialist, 74D–CBRN Support Specialist, and 74E–Mounted CBRN Reconnaissance Specialist. The series would be founded on a common backbone of CBRN warrior knowledge and skill, with each MOS also representing a discreet area of expertise. Each MOS would be aligned with specific positions and formation types, with a subset of flexible positions filled by any of the three (through "dual coding"). The positions and opportunities for each of the MOSs would be carefully balanced to avoid many of the problems that plagued the previous MOS 54-series as well as MOS series of other multi-MOS branches (military police). If we were to carefully and deliberately emplace this structure, the Chemical Corps would be able to focus technical expertise, improve personnel management, and ensure career progression while continuing to meet mission requirements.

Implementation

Building layers of deep, expert knowledge is really only possible with specialization. The proposed model would incorporate a balanced degree of specialization into existing institutional training. Rather than being presented with a sampling of the full breadth of CBRN equipment and tasks

during Advanced Individual Training, Soldiers would receive common foundation training followed by MOS-specific entry level specialty training. They would then bring an undiluted level of proficiency to their first CBRN unit assignment. Specialization would make the most sense with MOSs split roughly along the following lines:

- MOS 74C. Specializes in dismounted assessment tasks and skills similar to those taught in the L3 course.
- MOS 74D. Receives in-depth training in the Joint Effects Module/Joint Warning and Reporting Analog and Digital System, maneuver support planning, and decontamination operations.
- MOS 74E. Encompasses mounted reconnaissance, surveillance, and equipment currently covered in mounted CBRN Reconnaissance (L6) and Biological Integration Detection System Training (L4) Courses.

Upon arrival at their units, organizational learning could begin at a deeper, more impactful level. Advanced Leader Course and Senior Leader Course students would also receive additional weeks of common and MOS-specific training at the required levels.

At a senior level, the 74-series would transition to MOS 74Z–Senior CBRN Specialist. The transition point is debatable, but the strongest case may be for transitioning at the master sergeant level. This would allow sergeants first class to culminate their technical career progression as leaders (platoon sergeants) in familiar unit types. The master sergeant transition point also makes sense because lieutenant platoon leaders in those formations would no longer attend an ASI course. The platoon would be more reliant on a technically expert sergeant first class to serve as the senior subject matter expert in the formation, allowing the officer to focus on leading the formation. The practical reality would be that every Soldier in that formation would be better trained for his or her job.

Authorizations would be aligned to ensure a balance of staff and tactical CBRN formation time. Leadership opportunities across each MOS and component would be proportionally similar to what they are now. Changes to Department of the Army (DA) Pamphlet (Pam) 600-25, *U.S. Army Noncommissioned Officer Professional Development Guide*,[3] would recognize both staff and troop leadership roles as key developmental positions.

In discussions about the CBRN People Strategy, stakeholders often ask, "What problem are we trying to solve?" A more useful question would be, "How does this make us better?" This personnel structure would set up the Chemical Corps for current and future success, resulting in better-trained Soldiers across the force. Institutional and organizational training would build upon each other. We would be postured to make further structural adjustments in the future.

Certain things would facilitate the implementation process. Because the proposed MOS changes would affect only a portion of the CBRN population, MOS 74D would likely remain the default for current enlisted CBRN Soldiers. Soldiers would then be able to opt in or out of consideration for the other two MOSs. A board would be established to identify which Soldiers would be part of the expansion MOSs based on relevant experience, legacy ASIs, and interest. It would be necessary to define MOS transfer policies and procedures. Newly enlisted Soldiers would sign directly into one of the three MOSs before embarking on the training program.

Further Analysis

From the beginning, the intent of any changes has been to find the true optimal solution for the Army, the Chemical Corps, and our Soldiers. The proposed model is certainly a work in progress, but changes like these take years. Careful analysis must drive the decision-making process, and input from the field is important. Staff efforts to build a complete picture of impacts and side effects are currently underway. USACBRNS staff is now conducting research in the following areas:

- Defining future demands of the Chemical Corps.
- Balancing career opportunities across each MOS.
- Balancing career opportunities across each component.
- Learning from sister branches with similar MOS series.
- Managing the future of maneuver demands on the Chemical Corps.
- Improving effectiveness of the proposed strategy on expertise.
- Improving personnel management.
- Achieving the desired end state.

Conclusion

The U.S. Army Chemical Corps needs a more manageable structure in order to better position our Soldiers where they can develop and have the most impact. Implementation of the CBRN People Strategy proposals outlined in this article would allow the Chemical Corps to build and maintain CBRN defense experts for the future Army. Although the solution may not be perfect and may come with a different set of challenges, the described purpose, intent, and desired end state are undoubtedly worth discussion. With the right balance of depth and breadth, we can be better at what we do. The Corps seeks to make the mantra of "mission first, people always" a reality. If handled correctly, these proposals would help do that. We owe it to our Corps and to coming generations of CBRN warriors to consider all domains of modernization.

Endnotes:

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[2]Army Regulation (AR) 614-200, *Enlisted Assignments and Utilization Management*, January 2019, p. 11.

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Major Garner is the chief of personnel development at USACBRNS. He holds a bachelor's degree in biophysics from Brigham Young University, Provo, Utah, and a master's in business administration degree from Emory University, Atlanta, Georgia.

Unmanned Military Vehicles: Illuminating the Future of CBRN

By Staff Sergeant Jesus Ambrocio

The advent of unmanned military vehicles has developed into an explosion on the battlefield and, with it, has come an opportunity to radically change chemical, biological, radiological, and nuclear (CBRN) reconnaissance. There is an established presence of unmanned aerial systems (UASs) on the battlefield, with the primary models of unmanned aerial vehicles (UAVs) being fixed-wing variants that provide intelligence, surveillance, and reconnaissance capabilities to commanders. With decreases in UAV price and increases in their capabilities, there is a CBRN mission set suited for them. As the Army continues to test its Robotic Combat Vehicle–Medium,[1] unmanned ground vehicles (UGVs) will add additional capabilities to our formations. These emerging technologies will safeguard the lives of our Soldiers on the battlefield.

Fixed-Wing UAVs

Fixed-wing UAVs, commonly known as "drones," have been present on the battlefield since 2001,[2] with the U.S. Air Force fielding most of the units. These drones are operated remotely—sometimes from around the globe. The Army has used smaller fixed-wing drones, which are able to carry a simple payload and provide limited reconnaissance and surveillance; they are now being fielded by company size and smaller units. The training required to operate the smaller drones consists of only short, 10- to 30-day courses.[3] When exploring possible CBRN capabilities of small, fixed-wing drones, the payload is key. Fixed-wing vehicles offer stable platforms on which to add CBRN detection equipment. Through the payload capabilities and short training time, fixed-wing platforms offer a proposition of great value to CBRN reconnaissance.

Rotary-wing UAVs

Rotary-wing-based UASs are a more recent addition to the battlefield. As consumer and professional rotary-wing UAVs, or quadcopters, have appeared on the market, their military applications have become a multiplier in theorized multi-domain operations. For example, recent testing by United Kingdom Royal Marines demonstrated the capability of these systems to transport blood for transfusions to the front line.[4] Quadcopters offer more unique flight capabilities than their fixed-wing counterparts; however, the flight time and range of quadcopters are limited. The size of quadcopter payloads is also more restricted, which further reduces their capabilities. However, the ability to change the payload of quadcopters on demand offers units flexibility in conducting their missions. Continuing quadcopter software developments enable the orchestration of UASs swarms, the flexibility for multi-UASs synchronization, and a unique tactical advantage for CBRN threat detection.

UGVs

In recent years, great strides have been made in the use of UGVs—the most notable of which was the use of UGVs for explosive ordnance disposal, as demonstrated during the Global War on Terrorism.[5] As technologies improve, deployed systems have also improved. In 2019, the Department of the Army awarded a contract for 200 UGVs to fill varying roles. UGV platforms offer more robust payload capabilities than UASs. Several detectors and samplers as well as weapons systems can be fitted onto a UGV.

Artificial Intelligence

Artificial intelligence (AI) has drastically changed how the Department of Defense views AI-enhanced systems, including unmanned military vehicles. And AI-controlled UASs and UGVs have, in turn, changed how we view AI on the physical battlefield. Quadcopters can return to their point of origin if communications are lost or hold their position despite changing weather conditions. AI-controlled UGVs, which continuously adapt to their environment, can follow squad leaders across varied terrain. As the complexity of AI-controlled systems increases, the number of operators necessary is reduced to one. This abstraction concept enables the orchestration of systems and results in the acquisition of advanced capabilities.

Rotary-wing UAV (quadcopter)

The Future of CBRN Reconnaissance

Unmanned military vehicles offer the Chemical Corps new angles of approach for CBRN reconnaissance. Recent innovations in CBRN detection have resulted in miniaturized detectors and equipment, thereby increasing the potential use on unmanned military vehicle platforms.[6] Key technological improvements enable UAVs and UGVs to carry the payloads required to accomplish CBRN mission sets. Live feeds of air, moisture, and explosive trace detection results offer the potential capability to integrate payload data with robust software packages to supply information to the tactical operations center and allow commanders the decision-making flexibility that is required in contested battlespaces. In addition to CBRN detection systems, live video is also available via unmanned military vehicle platforms. This offers the command real-time visuals, adding even more capability. The reduced size of the CBRN detectors and equipment is accompanied by a reduction in overall package weight; in turn, shipping and transportation weights are also reduced, enabling smaller units to organically transport the systems without the need for external logistics. Moreover, the reduction in size of CBRN systems is also accompanied by a logistical reduction in the power draw. The Army stands to save money through the reduced logistical footprint.

Our Corps is driving the effort for Army alignment with the framework outlined in the Army Modernization Strategy[7] with new procurements of UGVs. The alignment is being completed concurrently with the upgrade of the Nuclear, Biological, Chemical Reconnaissance Vehicle (NBCRV) sensor suite. The latest upgrade implements modular functionality, enabling Soldiers to adapt according to their mission set.

The capability that unmanned military vehicle platforms offer represents a unique opportunity for the Chemical Corps to provide its organizations with compatible capabilities that can integrate with Army systems at an affordable cost, while ultimately reducing harm to our Soldiers. As more systems are deployed and more lessons are learned, refinements of tactics, techniques, and procedures will modernize the way we fight and catalyze the Army vision of 2035. Working within the modernization framework, these systems will change our concepts, doctrine, and training. Procurement of the systems will change what we fight with as well as how we perform hazard response and detection. The combination of these two lines of effort will generate education and development opportunities for Soldiers and leaders working in this new domain. Unmanned military vehicles are here, and they will continue to be an asset on the modern battlespace. How we make use of them will define our impact on the battlefield.

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[6]Patricia Sabatini, "Teledyne FLIR's Pittsburgh Lab to Develop Chemical, Biological Detection Tool for Pentagon," *Pittsburgh Post-Gazette*, 7 February 2022, <https://www.post-gazette.com/business/tech-news/2021/12/08/Teledyne-FLIR-s-Pittsburgh-lab-chemical-biological-detection-tool-Pentagon/stories/202112070122>, accessed on 11 April 2022.

[7]Army Modernization Strategy, U.S. Army, 2021.

Staff Sergeant Ambrocio is an operations noncommissioned officer with the 84th Chemical Battalion, Fort Leonard Wood, Missouri. He holds a bachelor's degree in computer networking and cybersecurity from the University of Maryland Global Campus.

The Future of Contamination Mitigation

By Colonel Scott D. Kimmell (Retired)

Of the three core capabilities that our Regiment provides, contamination mitigation (CONMIT) is the most resource-intensive in terms of time, logistics, and personnel due to decontamination. Decontamination, a subset of CONMIT, is the single-most neglected capability with regard to modernization across the spectrum of doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF). Detailed equipment decontamination is still reliant on 1960s technology, which grossly applies decontaminant at high pressure and temperature to the entirety of a vehicle or surface suspected of contamination. We can do better than that.

Under current functional constructs within the protection and sustainment warfighting functions, contamination is viewed in crude binary terms: Something is clean, or it is dirty. However, to modernize decontamination, we must reconsider the purpose of CONMIT and assess the requirements of the future force in terms of decontamination capability in support of large-scale combat operations in multi-domain operations. According to Army Techniques Publication (ATP) 3-11.32, *Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Passive Defense*, "Chemical, biological, radiological, and nuclear (CBRN) contamination mitigation should support rational, risk-based personnel and asset employment decisions by providing clear, quantitative measures relative to the time and logistics necessary."[1] Commanders and staffs generally view problems along a spectrum of risk and are more than willing to accept reductions of risk over the absence of risk when time is a factor. Under this paradigm, we should adjust how we view decontamination or, better stated, CONMIT writ large. Absolutes are neither achievable nor acceptable in the new operating construct of MDO. There simply is not enough time. Therefore, for large-scale combat operations, we should focus on reducing hazard effects to a level that is acceptable to the force in time and space. Mitigating hazards to an acceptable level, instead of removing them completely, should be the modernization objective. This would allow commanders the decision space to adjust the protective posture and enable freedom of action in CBRN environments while ensuring the lethality and survivability of combat power.

Fundamental to modernization of CONMIT is analysis of the construct by which we sense, detect, and assess CBRN hazards. We continue to make gross assessments of the extent of contamination based on how we execute decontamination operations. If contamination is detected on a vehicle or other piece of equipment, then the entire surface is decontaminated. However, if we could apply a more precise way of detecting contamination, then we could then decontaminate only the contaminated areas, thus, significantly reducing the amount of time and resources required and returning combat power in a timely manner. An all-inclusive DOTMLPF solution is required, as material capabilities are only a subset of the larger problem.

At present, two potential ideas that leverage a "whole of DOTMLPF" approach are under development. Both are products of the ongoing CBRN Campaign of Learning, a process comprised of multiple learning events such as Combined Arms Maneuver Contaminated Operating Environments Tabletop Exercises I and II, CONMIT Tabletop Exercises I and II, and the Brigade Combat Team–Marine Air-Ground Task Force Tactical Operations Center Exercise. Casting aside the "how we've always done it" way of thinking, the current levels of decontamination (immediate, operational, thorough, and clearance) and the objectives of each continue to be analyzed and assessed. From these learning events, it has become clear that there is a greater necessity for organic risk reduction capability at the point of need and reliance on CBRN formations to provide direct support for more extensive decontamination operations. Simply put, movement and maneuver formations should be enabled to immediately reduce risk in order to sustain combat power.

Mitigation of contamination exceeding organic risk reduction capabilities is intended to be the responsibility of direct-support CBRN formations in close proximity to the combat formation. This would obviate the need for the M26 decontamination apparatus at battalion level and enable self-sustainment for risk reduction at crew/squad levels. CBRN formations would then be in direct support for more extensive decontamination operations at echelons below brigade.

These efforts would naturally redefine the current levels of decontamination through modernization across CBRN DOTMLPF. Immediate, operational, thorough, and clearance decontamination would evolve into organic and direct-support decontamination. Evolving technologies would

allow for greater risk reduction capabilities at the lowest level, while significantly reducing the manpower, time, and logistics required at the CBRN direct-support level.

Two materiel efforts on the cutting edge of CONMIT modernization are the tactical decontamination kit and the tactical CONMIT system. These two capabilities, coupled with a reconfiguration of the four levels of decontamination into two (organic and direct support), are intended to provide a more capable and less-resource-intensive solution to preserving lethality.

The tactical decontamination kit is comprised of three materiel capabilities combined to provide vehicle crews with the ability to identify and reduce suspected contamination on vehicles and weapons systems—the Chemical Identification Agent Spray–Nerve and Blister, the Joint Service Equipment Wipe, and the Joint General-Purpose Decontaminant. These three capabilities, combined with the supporting equipment (a carrying bag, a 5-gallon water can, an application system, and expendable protective suits), can be stowed in a vehicle and employed by a two-person team. The way ahead should involve updating institutional training to include the tactical decontamination kit in the Military Occupational Specialty 74D–CBRN Specialist Advanced Individual Training and Advanced Leader Course to enable CBRN noncommissioned officers to train and equip company level formations.

The tactical CONMIT system is a semiautonomous supported capability in prototype development. This system relies on precision detection capability, modernized decontaminants, and robotics to allow a CBRN decontamination squad to provide platoon level capability. Equipped with three unmanned ground vehicles, the first unmanned vehicle at Station 1 scans a contaminated combat vehicle to identify areas of contamination and forwards that information to the decontamination unmanned ground vehicles at Station 2. At Station 2, the decontaminated unmanned ground vehicles apply the decontaminant via an unmanned decontaminant spray applicator. After a short wait time, the combat vehicle proceeds to Station 3 for risk mitigation assessment. The combat vehicle is either released back to formation or returned to Station 1 for decontaminant reapplication. The tactical CONMIT system will replace the legacy decontamination systems (M12/M26) in hazard response company platoons and significantly reduce manpower, time, and resource requirements. Due to its maneuverability and agility (resulting from fewer personnel and less equipment), the hazard response company will be able to remain forward in support of the brigade combat team and expedite the return of risk-mitigated combat power.

These DOTMLPF-based ideas and two major materiel efforts form the basis of the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS), Fort Leonard Wood, Missouri, Commandant's vision for modernizing CONMIT and decontamination. While the concepts, ideas, and prototypes may not remain intact through development, they establish a modernization azimuth from which to change our stance when it comes to how we will assess and mitigate CBRN hazards for the Army in the future.

Endnote:

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

Digital artist depictions for the concept of the employment of semiautotonomous decontamination

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Colonel Kimmell (Retired) is the deputy commandant of USACBRNS. He retired from the Army after 30 years of service. He holds a bachelor's degree in geology from Eastern Illinois University, Charleston, and master's degrees in education, advanced military studies, and strategic studies and is a U.S. Army War College graduate. Mr. Kimmell's last assignment was as assistant commandant of USACBRNS.

By Captain Pat Hamlin, Captain Maria Kienle, Captain Ian Munoz, Captain Christina Posick, and Captain Ashley Sperry

In 2017, the U.S. Army updated Field Manual (FM) 3-0, *Operations*, which focuses on the four-plus-one (Russia, China, Iran, North Korea, and transnational violent extremism) approach in large-scale combat operations.[1] This update caused a ripple effect across several pieces of chemical, biological, radiological, and nuclear (CBRN) doctrine, which were adapted from 2019 to 2021, and necessitated changes in the CBRN Captain's Career Course (C3). Over the last 2 years, stakeholders, including 84th Chemical Battalion small-group leaders (SGLs) and the Directorate of Training and Leader Development, U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS), have completed significant course upgrades. CBRN C3 still covers theory and doctrine but now includes more application, analysis, and access to usable documents at the end of the course. Utilizing a team of high-quality and extremely dedicated SGLs, CBRN C3 is not only a place to share knowledge but also a place to help students become inspired to explore and discover the adult learning model.

Individual Leadership Development

Previously, the primary guide for student assessments was Department of the Army (DA) Form 1059, *Service School Academic Evaluation Report,*[2] which imitates DA Form 67-10-1A, *Officer Evaluation Report Support Form,*[3] by highlighting performance in terms of the Leadership Requirements Model. Today, C3 students can expect to be assessed and developed in several additional ways.

Since Fiscal Year 2021, five assessments that are part of Project Athena have been administered in all C3 classes. Project Athena places emphasis on self-development through increased self-awareness. The assessments cover the areas of social skills, adaptability, critical thinking, and self-awareness and elicit superior, peer, and subordinate responses. The assessments confirm what leaders already know about themselves, and they help reveal blind spots. Project Athena is a data-driven approach that encourages incremental progression across a career.

After completing Project Athena, students begin working on their individual development plans (IDPs). The IDP is an expanded version of the "baseball card" that most have completed. The standard "baseball card" focuses on short- and long-term goals, the career timeline, Family considerations, key developmental positions, and promotion/selection boards; however, the C3 IDP encourages students to utilize the results of their Project Athena assessments to develop an immediate action plan midway through the course, with the goal of improving before graduation. SGLs are trained to provide guidance and coaching for those looking for a personalized approach to their self-development. Following course completion, the IDP can accompany the student to his or her next duty assignment and can serve as a conversation starter during initial counseling sessions.

Beyond personal development, students attending CBRN C3 will have the opportunity to apply for the Talent-Based Career Alignment (TBCA) Program. The purpose of TBCA is to retain high-performing junior officers by guaranteeing a midcareer pathway so that the officer will know his or her company grade key developmental assignment and follow-on broadening assignment before graduating from C3. There are approximately 30 assured midcareer pathways currently available. These include broadening opportunities such as the Army Congressional Fellowship, the Major General Wright Master's of Business Administration Program, and positions in organizations such as the Security Forces Assistance Command, the U.S. Army Cadet Command, and functional areas. Future students who are interested in TBCA should begin studying for the Graduate Record Examination; all students are required to take the Graduate Record Examination, and the scores will be used as part of applicant evaluation criteria for TBCA.

In addition to the opportunity to pursue a master of science degree in environmental management through Webster University, students who are preliminarily or currently

enrolled in, or who have completed, CBRN C3 are eligible to earn a master of science degree with emphasis in countering weapons of mass destruction (CWMD) through Missouri State University. The objective of this program is to enhance professional skills in policy development and threat analysis in preparation for assignments at the highest levels. All necessary courses can be completed online while the student is a resident at Fort Leonard Wood, Missouri, or elsewhere, as the university will work with students to complete the degree wherever they may be assigned. If you have questions regarding this opportunity or want information on how to apply, please feel free to contact Dr. John Rose at <johnprose@missouristate.edu> or Ms. Darci Nelson at <darcinelson@missouristate.edu>. Both can be reached by phone at (703) 218-3565.

Dynamic Curriculum

The CBRN C3 curriculum is driven by the course management plan (CMP) and program of instruction (POI). Most are familiar with the CMP and POI approved in 2016 as well as the associated training events. The highlights of the 2016 CMP were the temporary duty travel to Dugway Proving Ground, Utah, for Advanced Chemistry and Biology Courses and to Kirtland Air Force Base, New Mexico, for Defense Nuclear Weapons School Courses. Those trips are no longer available under the approved Fiscal Year 2022 CMP and POI. Instead, CBRN C3 students attend a week-long course taught by functional Technical Escort Course instructors from the Hazardous Dismounted Reconnaissance Course, Fort Leonard Wood. While there were training experiences from the two temporary-duty trips that cannot be replicated at Fort Leonard Wood, the major training objectives have been identified and the instructors are continuously improving the training to close that gap. USACBRNS is exploring local venues (outside of Fort Leonard Wood) that might be available to host a tour of a large-scale production facility as well as investigating the possibility of sending SGLs and/or Hazardous Dismounted Reconnaissance Course instructors on temporary duty to some of the Nation's premiere CBRN defense facilities to be better positioned to teach and expand CBRN C3.

The C3 technical blocks for CBRN defense each remain a week long. The 2016 version of the course was heavily focused on developing warrior scientists through substantial emphasis on the science of CBRN. But a rudimentary level of knowledge is not useful for a CBRN captain operating on a brigade or higher-level staff. The shift to large-scale combat operations in multi-domain operations required the addition of instruction on the operational and tactical application of CBRN defense through timely assessments, tactical protective measures, and mitigation of CBRN hazards to enable freedom of action for maneuver commanders. A similar shift occurred with the technical examinations, which were previously simple assessments of comprehension of fundamental information and basic tasks. The technical examinations now assess the comprehension of information and tasks through application in scenarios from today's threat environment. The solutions to questions presented in these examinations cannot be found explicitly in any doctrine or on any slide the students may have seen; they require that students apply what they have learned and make recommendations to their brigade commander. The science of CBRN is a critical part of the U.S. Army Chemical Corps, but the art is what CBRN officers bring to the fight.

A significant addition to the CBRN C3 POI is command week. The 22-week-long course previously had no time dedicated to students learning about, and preparing for, company command—which is of great interest to the students since company commander is the key developmental position prior to promotion to major. In the company command block of instruction, SGLs share best practices for activities associated with preparing to take command, writing a command philosophy, managing unit training, and managing and maintaining property. During this week, successful former and current company commanders, first sergeants, CBRN chief warrant officers, and battalion commanders are invited to participate in various panels, where students have the opportunity to ask questions and receive advice.

Finally, the CWMD instruction and tabletop exercise portion of CBRN C3 have undergone an overhaul. Students receive lessons on CWMD pillars and doctrine, from the national to tactical levels; and following the lessons, they participate in a tabletop exercise, which includes scenarios and products developed by the Defense Threat Reduction Agency, creating a level of realism that most have not encountered in their careers. Students exercise critical thinking and provide the necessary recommendations to a commander during the CWMD tabletop exercise. Expanding this effort even further, CWMD partners have been incorporated into working in the interagency environment. This is an important initiative because students are exposed to the whole-of-government approach and how the Department of Defense interfaces with multiple civilian agencies in the CWMD effort early in their careers.

Tough, Rigorous Training

Throughout common-core instruction, CBRN C3 students learn the fundamentals of the operations process and conduct two iterations of the military decision-making process. The technical and tactical competency of CBRN officers on brigade staff is crucial. In April 2022, an SGL visited the National Training Center to observe the Global Defender 22 rotation. The goal of this visit was to consolidate feedback about CBRN officers and their integration into maneuver that can be actioned, sustained, or improved through curricula in the officer courses.

Using the common-core operational environment in the Baltics, an additional week-long follow-on training in which the students plan as battalion CBRN officers is included. Following orders production at the battalion level, students spend the week working on troop leading procedures from the battalion order. Execution of the troop leading procedures provides information that a subordinate unit needs in order to plan and prepare for missions and reveals where previous planning efforts fell short. The exercise aids students in fully understanding the capabilities, resources, and planning considerations available as a hazard response company commander/brigade CBRN officer, while it lays the foundations required to critically think, advise, and adapt to a CBRN environment. This ensures that the first time a captain writes a company operations order is not while he or she is in command.

A situational training exercise is the CBRN C3 culminating event. Prior to this point, students received 2 days each of mounted and dismounted reconnaissance operations instruction from the functional course instructors. During the situational training exercise, students plan missions, brief orders, and prepare and execute the missions at the company commander level for thorough decontamination, mounted reconnaissance, and dismounted sensitive-site assessment and exploitation. The purpose of the situational training exercise is to level the field of experience between those students who have been assigned to CBRN units prior to the course and those who have served solely outside of CBRN units. Executing missions with a high level of detail equips students with the knowledge necessary not only to integrate into maneuver units but also to enable them to succeed when there is a viable CBRN threat. Students then execute another repetition of dismounted operations with live nerve agent at the Chemical Defense Training Facility, Fort Leonard Wood. Renovations to the Chemical Defense Training Facility have added significant value to the scenarios that students plan, prepare for, and encounter once they enter the hot zone.

Next Steps

In the near future, due to common-core adjustments, CBRN C3 will undergo modernization, transforming from its current 240 hours of in-person instruction to only 71.5 hours, with the majority of the class moving to nonresident, online coursework. Students will be required to complete prerequisite distance learning prior to their course report date. Along with this change, 168.5 POI hours will be allocated back to proponent-specific priorities. Several options for using these hours to best prepare Chemical Corps captains have been generated and are currently under consideration. Three lines of effort for expansion have already been approved by the USACBRNS Commandant: decision making, a CBRN technical staff exercise, and a combined arms event.

The distance learning courseware that the Reserve Component uses for technical blocks of instruction will also be implemented. A preassessment and entry requirement to the course will allow for in-depth instruction in person. Students will arrive at the course with an established foundation in science so that resident technical instruction can be focused more on the application and analysis required at the brigade level.

CBRN C3 personnel are constantly looking for feedback, not only from students but also from the leaders for whom C3 students will be working. Please contact Captain Ashley Sperry at <ashley.m.sperry.mil@army.mil> if you have any recommendations for modifications to the curriculum or if you are an incoming CBRN C3 student and have questions about expectations or preparation for course requirements.

Endnotes:

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

[2]DA Form 1059, *Service School Academic Evaluation Report*, 1 March 2019.

[3]DA Form 67-10-1A, *Officer Evaluation Report Support Form*, 1 March 2019.

Captain Hamlin is an SGL for CBRN C3. He holds a bachelor's degree in business management from Coastal Carolina University, Conway, South Carolina, and is pursuing a master's degree in defense and strategic studies with a focus on CWMD from Missouri State University, Springfield.

Captain Kienle is an SGL for CBRN C3. She holds a bachelor's degree in chemistry from Virginia Commonwealth University, Richmond, and a master's degree in environmental management from Webster University.

Captain Munoz is an SGL for CBRN C3. He holds a bachelor's degree in ocean engineering from Texas A&M University, College Station, and is pursuing a master's degree in defense and strategic studies with a focus on CWMD from Missouri State University.

Captain Posick is an SGL and the division chief for CBRN C3. She holds a bachelor's degree in biology from Eastern Nazarene College, Quincy, Massachusetts, and a master's degree in biotechnology and business administration from the University of Maryland University College, Adelphi.

Captain Sperry is an SGL for CBRN C3. She holds a bachelor's degree in hearing, speech, and language sciences and a minor in linguistics from Ohio University, Athens, and a master's degree in defense and strategic studies with a focus on CWMD from Missouri State University.

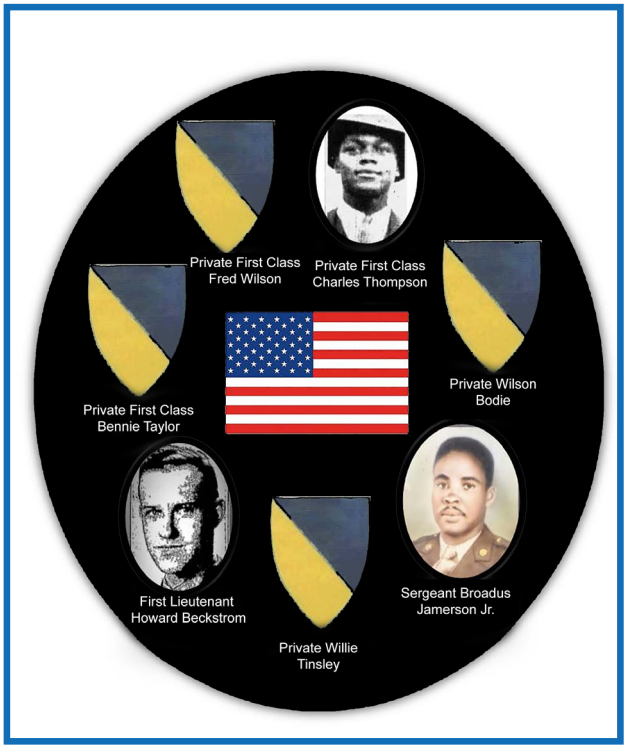
2021 Honorees of the U.S. Army Chemical Corps

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. A detachment from the 701st Chemical Maintenance Company (Aviation) was inducted into the Hall of Fame in June 2021.

Detachment From the 701st Chemical Maintenance Company (Aviation)



Across the United States and in the Sicily-Rome American cemetery, Nettuno, Italy, there are monuments dedicated to the memory of seven Chemical Warfare Service members who sacrificed their lives in service to our Nation on 2 December 1943. Over the nearly 80 years since this tragedy, the stories of these Service members have faded in the background and largely been forgotten due to the combination of wartime secrecy and the importance of their mission. All seven of the Soldiers were in a detachment from the 701st Chemical Maintenance Company (Aviation), Algeria—a unit that was trained in the movement, storage, maintenance, handling, and loading of aerial chemical munitions. Since World War II, these types of missions have been conducted by technical escort units, which have protected and transported some of our Nation's most deadly chemical warfare agents. Unfortunately, during World War II, most negro Soldiers were relegated to service units. The 701st was one of these segregated units, with predominately negro enlisted Soldiers and white officers. The loss of these seven Chemical Warfare Service Soldiers may represent the first casualties of the technical escort mission.

When America was drawn into World War II, we quickly adopted a retaliation-only policy with regard to the use of chemical weapons. While America would not instigate their use, we were prepared to retaliate against enemies who used chemical weapons against us or our allies. In order to lend credibility to this deterrence policy, the United States transported operational quantities of chemical munitions into the various theaters of combat and stored them there, allowing for Allied retaliation within 24 hours of enemy use. In November 1943, the detachment from the 701st Chemical Maintenance Company boarded the *S.S. John Harvey* "liberty ship," bound for Bari Harbor, Italy. The cargo included more than 5,000 tons of munitions, with as many as 24,000 M-47 mustard agent bombs. On the evening of 2 December 1943, Bari Harbor was crammed full of Allied ships, queued up to unload their cargo. This provided a target-rich environment for German bombers, who took advantage of the situation with a coordinated massive air bombardment. Many crews immediately abandoned ship; however, as the attack raged on, observers noted that the crew of the *S.S. John Harvey*, including the members of the detachment, worked tirelessly for hours, fighting fires and trying to prevent the loss of their ship and its cargo. Tragically, the entire crew was lost when the *S.S. John Harvey* exploded. Sadly, no members of the detachment were recovered.

We remember the selfless service and sacrifice of the following members of the detachment:

- First Lieutenant Howard Dale Beckstrom.
- Sergeant Broadus J. Jamerson Jr.
- Private First Class Wilson Brodie.
- Private First Class Bennie G. Taylor.
- Private First Class Willie Tensley.
- Private First Class Charles E. Thompson.

Writing in support of their nomination for induction into the Chemical Corps Hall of Fame, Lieutenant General Thomas W. Spoehr (Retired) states, "The record shows that these seven Soldiers' actions [were] above and beyond the call of duty and reflect great credit on the Chemical Corps, meeting the standards for induction into the Chemical Corps Hall of Fame. Specifically, the actions of these Soldiers in relentlessly fighting the fires onboard the *SS [John] Harvey* in an endeavor to prevent the fires from reaching the lethal cargo of mustard gas munitions represents a 'significant act of heroism' of an 'extraordinary nature.' "

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 into the Distinguished Member of the Corps in June 2021.

Colonel Debra A. Thedford (Retired)

Colonel Debra A. Thedford (Retired) was born in Meridian, Mississippi. After receiving a bachelor's degree in mathematics from Tougaloo College, Jackson, Mississippi, in 1981, she began her military career and was commissioned as a second lieutenant in the U.S. Army Chemical Corps. After 28 years of honorable service, she retired as a colonel. With more than 40 years of experience, she is a recognized chemical, biological, radiological, and nuclear (CBRN) expert.

Colonel Thedford served at several levels of command and staff during her military career, including numerous assignments in the United States and abroad. These included commander of the Pine Bluff Chemical Activity, Pine Bluff, Arkansas, and director of the Chemical and Biological Defense Program in the Office of the Deputy Under Secretary of Defense, Washington, D.C., and culminated in the director of Training and Leader Development at the U.S. Army CBRN School, Fort Leonard Wood, Missouri.

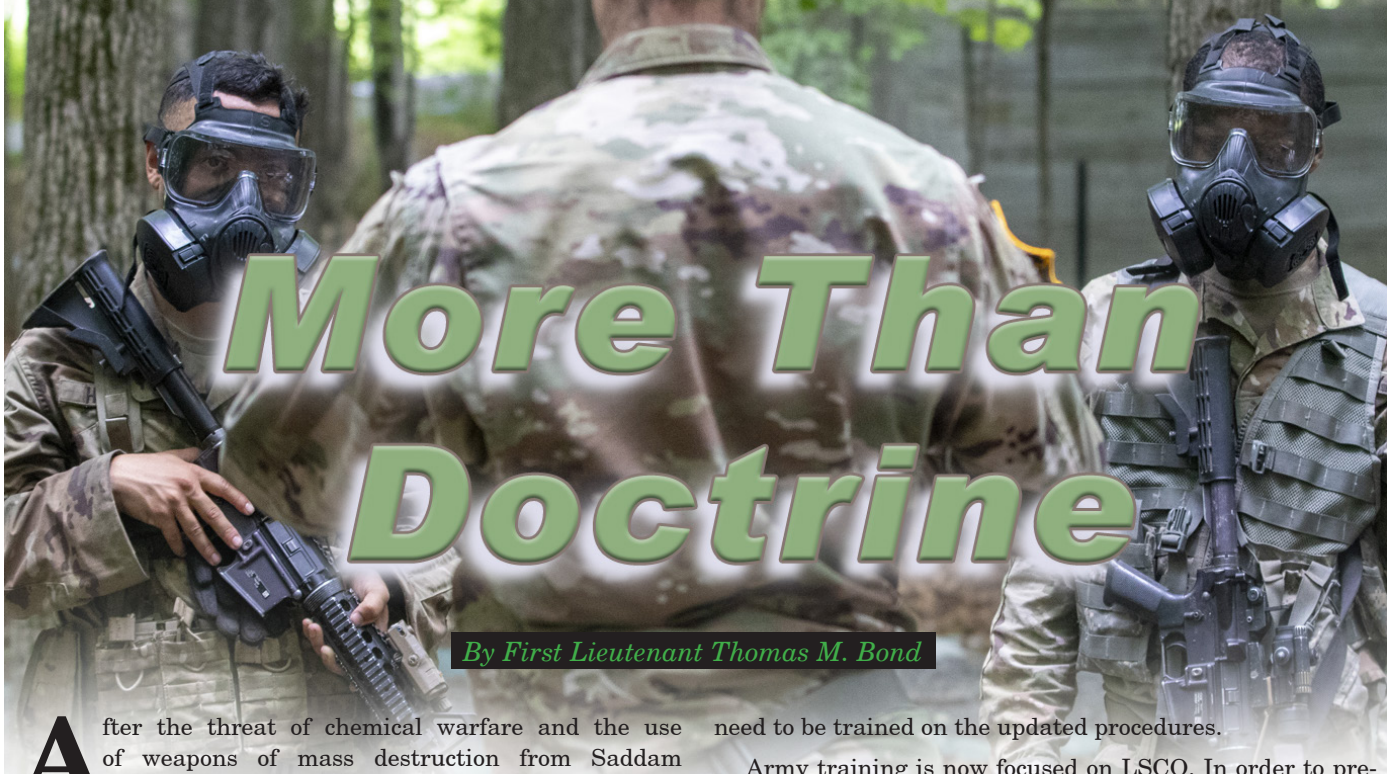
Colonel Thedford retired from the Army in 2009 and continued her commitment to public service. She is tirelessly committed to mentoring, coaching, and leading military and civilian leaders to ensure their success. As a volunteer, she is always available to support CBRN Soldier, Sailor, Airmen, and Marine activities and local northeastern Maryland teenagers who are committed to science, technology, engineering, and mathematics education. As a longstanding, valuable, and distinguished member of the Lieutenant General Thomas W. Spoehr Chapter of the Chemical Corps Regimental Association, Colonel Thedford is primarily responsible for planning and coordinating the annual National Capital Region Green Dragon Ball. She is a lifetime member of the Chemical Corps Regimental Association, a lifetime member of The ROCKS,© Inc., and a member of several other professional organizations.

Colonel Thedford is a Senior Service college graduate, a Certified Acquisition Professional in engineering, and a program management Master Black Belt. She holds master's degrees in operation research system analysis engineering and national resource strategy. Her awards and decorations include the Legion of Merit, Defense Meritorious Service Medal, Army Meritorious Service Medal with three oak leaf clusters, Army Commendation Medal, Army Achievement Medal with one oak leaf cluster, Commander's Award for Civilian Service, Achievement Medal, National Defense Service Medal, Global War on Terrorism Service Medal, and Korean Defense Service Medal.

Colonel Thedford is the associate director for Strategic Initiatives, Combat Capabilities Development Command Chemical Biological Center, Aberdeen Proving Ground, Maryland. In this capacity, she leads the strategic functions of a world-class science and engineering laboratory, including several initiatives in strategic planning, international programs, technology transfer, protocol, and communications.

Colonel Thedford is involved in many community organizations such as the Alpha Kappa Alpha Sorority, Inc., Delta Omega Omega Chapter. She is an active member of Mount Zion Baptist Church and serves as the second vice president of the Alexandria City Chapter, Top Ladies of Distinction, Inc.

Ms. Lindberg is the regimental historian at the U.S. Army CBRN 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.



More Than Doctrine

By First Lieutenant Thomas M. Bond

After the threat of chemical warfare and the use of weapons of mass destruction from Saddam Hussein's Iraqi regime did not live up to initial fears, there was no need for the U.S. Army Chemical Corps in the counterinsurgency fight. And now that the wars that have been waged by the United States for the last 20 years have died down, the Chemical Corps is trying to establish its place, considering the new focus on large-scale combat operations (LSCO). The revision of Army doctrine is the first step in the right direction.

Within the last 3 years, Field Manual (FM) 3-11, *Chemical, Biological, Radiological, and Nuclear Operations*;[1] Army Techniques Publication (ATP) 3-11.37, *Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Reconnaissance and Surveillance*;[2] and ATP 3-11.42, *Multi-Service Tactics, Techniques, and Procedures for Domestic Chemical, Biological, Radiological, and Nuclear Response*,[3] have been updated. And ATP 3-11.74, *Chemical, Biological, Radiological, and Nuclear Platoons*, was published this past year.[4] While these publications represent progress, more needs to be done to establish the Chemical Corps role in LSCO. If the Chemical Corps leadership understands its doctrine, masters the basics, and is able to speak in terms of maneuver, then it will find its place within LSCO.

Doctrine revisions are only relevant if leaders and Soldiers take the time to read and apply the doctrine to training. An understanding of updated doctrine needs to be the foundation of a chemical, biological, radiological, and nuclear (CBRN) leader's professional development. After all, you cannot think "outside of the box" if you do not know what is "in the box." The fact that electronic documents are searchable using the CTRL-F function on a keyboard does not mean that those documents should only be referenced when a problem arises. Leaders need to study and really understand CBRN doctrine. As doctrine is updated, unit standard operating procedures and training also need to be addressed and revised. And when units make these changes, Soldiers need to be trained on the updated procedures.

Army training is now focused on LSCO. In order to prepare for LSCO, attention must remain centered on the basics. There will be no massive forward operating bases for resupply during LSCO. Soldiers can expect to fight in an environment that may be contaminated. Some Soldiers may say, "I'm not going to bring my mask. If a chemical attack happens, I'm just going to die anyway." The second statement is false. Of the roughly 1 million chemical casualties in World War I, just 90,000 died.[5] Had Soldiers been equipped with masks and individual protective equipment from the beginning, that number would have been substantially lower.

CBRN officers and noncommissioned officers assigned to non-CBRN units must convey the importance of individual level CBRN tasks and ensure that CBRN training is implemented in unit individual skills portions of training, as some Soldiers do not know how to don their mission-oriented protective posture gear or use basic CBRN detectors (M8/M9 detector paper). Expert Infantry Badge and Expert Soldier Badge testing currently contain two CBRN lanes: React to a CBRN Attack and Treat a Head Wound in a CBRN Environment. This ensures some training on CBRN tasks, but it should be only the beginning; all Soldiers should know how to detect possible contaminants, protect themselves in a contaminated environment, and decontaminate themselves. All individual CBRN tasks should be integrated into unit training.

Above all, CBRN leaders and Soldiers need to be able to speak in terms of maneuver. Although CBRN units will, most likely, not constitute a main effort, they will have an important role as enablers. Therefore, CBRN leaders should have an understanding of combined arms. As an enabler in support of the main effort, CBRN leaders must "sell" themselves to their unit. At combat training center rotations, CBRN units sometimes sit around not conducting any missions because commanders do not know how to properly

engage them. CBRN platoons can serve in key roles in maneuver unit intelligence collection plans, but commanders will not know this unless they are informed. CBRN leaders need to be subject matter experts because others will look to them as their "go to" personnel once they hear, "Gas! Gas! Gas!" Seeking training opportunities such as the Scout Leaders Course (which covers mounted reconnaissance), Ranger School (which covers platoon tactics and leadership), or Expert Soldier Badge training (which demonstrates mastery of individual level tasks) will enhance a CBRN leader's tool belt. The skills acquired will give CBRN leaders a better idea of how to support and enable the fight in LSCO.

Overall, the updated doctrine serves as a foundation for the role of the Chemical Corps in LSCO. But, CBRN leaders and Soldiers need to understand the doctrine, master the basics within their unit, and speak in terms of maneuver. If "Gas! Gas! Gas!" is screamed over the radio during deployment in a peer fight, will our Soldiers be ready?

A Soldier conducts a CBRN task during testing.

Endnotes:

[1]FM 3-11, *Chemical, Biological, Radiological, and Nuclear Operations*, 23 May 2019.

[2]ATP 3-11.37, *Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Reconnaissance and Surveillance*, 31 March 2021.

[3]ATP 3-11.42, *Multi-Service Tactics, Techniques, and Procedures for Domestic Chemical, Biological, Radiological, and Nuclear Response*, 22 December 2021.

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

[5]Sarah Everts, "A Brief History of Chemical War," *Science History Institute*, 11 May 2015, <https://www.sciencehistory.org/distillations/a-brief-history-of-chemical-war>, accessed on 24 March 2022.

First Lieutenant Bond is the reconnaissance officer for the 7th Engineer Battalion, 10th Mountain Division, Fort Drum, New York. He was previously a battalion CBRN officer for the 1st Battalion, 32d Infantry Regiment, Fort Drum, and a CBRN reconnaissance platoon leader for the 7th Engineer Battalion. He holds a bachelor's degree in advertising from the University of San Francisco, California.

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

—General George H. Decker,

U.S. Army Chief of Staff, 1960–1962

The Talk of the Town

By Ms. Sharon McCann

U.S. Army doctrine is not known for its revolutionary new concepts. Doctrine provides the force with proven principles, descriptions of fielded equipment, time-tested tactics, and best practices. Nevertheless, I am fortunate to be involved in doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) through the development of doctrine for the U.S. Army Chemical Corps and would like to share some information for those who want to peek behind the curtain of the DOTMLPF domains.

New Decontamination Equipment

The power-driven M12 decontamination equipment is older than most active chemical, biological, radiological, and nuclear (CBRN) Soldiers. Great strides have been made to field new equipment. Some examples include the M333, Chemical Kit, Decontaminating (Joint General-Purpose Decontaminate for Hardened Military Equipment); M334, Decontaminating Kit, Individual Equipment (Joint Service Equipment Wipe); and M339 Contamination Indicator Decontamination Assurance System. Procedures that will fundamentally change how operational and thorough decontamination are conducted are being developed and tested. These types of changes affect all DOTMLPF domains, which potentially means that we will see new doctrine, changes in organizational structure, new training, the fielding of new material, new leadership training and education at all levels within and outside of the Chemical Corps, new facilities, and policy changes.

Hazard Awareness/Understanding and Integrated Early Warning

Hazard awareness and understanding (HAU) is not a new concept. It has been included in Joint Publication (JP) 3-11, *Operations in Chemical, Biological, Radiological, and Nuclear Environments,*[1] since 2018, and it was elevated to an integrating activity in doctrine with Field Manual (FM) 3-11, *Chemical, Biological, Radiological, and Nuclear Operations* in 2019.[2] HAU refers to the knowledge that CBRN Soldiers possess regarding the intricacies of each of the CBRN hazards, which includes toxic industrial materials. Additionally, it encompasses an awareness of current threat capabilities and operational environment variables and an understanding of U.S. capabilities and vulnerabilities in CBRN environments. Despite best efforts, HAU barely scratches the surface of providing commanders with the situational understanding necessary to make risk-based decisions. There is always risk involved in CBRN decisions; mitigation to zero risk is a daunting challenge and is not achievable with some hazards.

The concept of integrated early warning elevates HAU to a new level and seeks to integrate intellectual, electronic, and mechanical components beyond the CBRN knowledge and equipment capabilities required to achieve early warning. integrated early warning goes hand in hand with the "Every Soldier is a Sensor" concept, which stresses the importance of all Soldiers paying attention to their surroundings to capture information that could be useful in assembling a picture of their environment. In terms of integrated early warning, every sensor could add to the CBRN picture (and more) by gathering information from all (not just CBRN) battlefield sensors. This information, along with artificial intelligence/machine learning and information gained by drones, intelligence, missile defense, medical surveillance, and CBRN reconnaissance, contributes to constructing a common operating picture to achieve early warning and provides HAU upon which commanders and leaders at all levels can act.

Fourth-Generation Agents

There are aspects of fourth-generation agents[3] that constitute sensitive, controlled unclassified information, but CBRN Soldiers cannot be afraid to learn and talk about them because they cannot provide commanders with HAU if they fail to comprehend these aspects. Those who require self-development should start with doctrine. Declassified information is being added to doctrinal publications as they get updated.

While it might not be obvious, there is always a flurry of activity at the U.S. Army CBRN School and the Maneuver Support Center of Excellence, both at Fort Leonard Wood, Missouri. If you would like to know more, check out the CBRN Community on milSuite at <www.milsuite.mil/book/community/spaces/apf/protectionnet/cbrncommunity>

Endnotes:

[1]JP 3-11, *Operations in Chemical, Biological, Radiological, and Nuclear Environments*, 29 October 2018.

[2]FM 3-11, *Chemical, Biological, Radiological, and Nuclear Environments*, 23 May 2019.

[3]*Fourth Generation Agents: Reference Guide,* U.S. Department of Health and Human Services, January 2019, <https://chemm.hhs.gov/nerveagents/FGA.htm>, accessed on 31 March 2022.

Ms. McCann is the Deputy Chief, CBRN Doctrine Branch, Fielded Force Integration Directorate, Maneuver Support Center of Excellence. She retired from the U.S. Army as first sergeant of the 12th Chemical Company, Schweinfurt, Germany, in 2010. She holds a bachelor's degree in homeland security and emergency management from Ashford University, San Diego, California.

DOCTRINE UPDATE

U.S. Army Maneuver Support Center of Excellence Fielded Force 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; Fielded Force 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	*Operations in Chemical, Biological, Radiological, and Nuclear (CBRN) Environments*	29 Oct 18	Current.
JP 3-11 focuses on maintaining the joint force ability to conduct the range of military operations in a CBRN environment. 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	*Homeland Defense*	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	*Civil Support*	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, including intelligence support, health services, mortuary affairs, and other support and sustainment considerations.			
JP 3-40	*Countering Weapons of Mass Destruction*	27 Nov 19	Current.
JP 3-40 outlines a CWMD strategic apporoach 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	*Chemical, Biological, Radiological, and Nuclear Response*	9 Sep 16	Current.
JP 3-41 describes CBRN response activities to highlight the unique Department of Defense (DOD) response capability and responsibility to minimize the effects of a CBRN incident. It incorporates the new DOD-integrated chemical, biological, radiological, and nuclear response enterprise (CRE) capabilities and joint force matrix and clarifies supporting roles during international CBRN response.			
JP 3-72	*Joint Nuclear Operations*	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	*Multi-Service Tactics, Techniques, and Procedures for Weapons of Mass Destruction Elimination Operations*	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	*Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Passive Defense*	13 May 16	Under revision. This publication will be split 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	*Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Planning*	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	*Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Reconnaissance and Surveillance*	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	*Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Consequence Management Operations*	30 Jul 15	Current. Under review with the creation of a new publication, ATP 3-11.42, *Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Domestic Response*.
ATP 3-11.41 provides commanders, staffs, key agencies, and military members with a key reference for planning and conducting CBRN consequence management. This publication provides a reference for planning, resourcing, and executing CBRN consequence management in support of domestic or foreign agencies responding to a CBRN incident. The principal audience for this multi-Service publication consists of CBRN responders who plan and conduct CBRN consequence management operations in domestic, foreign, or theater operational environments, including military installations.			
ATP 3-11.42	*Mutli-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Domestic Response*	22 Dec 21	Current.
ATP 3-11.42 will combine guiding principles to multi-Service forces within the CRE that are conducting domestic CBRN response operations in support of DOD missions and national objectives. It will focus on planning, preparation, and execution at the tactical level. ATP 3-11.42 will incorporate changes in doctrine from updated JP 3-11, JP 3-28, and JP 3-41 and explain how the WMD–civil support team (CST) concept of operations is integrated into the CRE structure. It will incorporate key doctrinal elements from ATP 3-11.41, ATP 3-11.46, and ATP 3-11.47.			
ATP 3-11.46 AFTTP 3-2.81	*Weapons of Mass Destruction–Civil Support Team Operations*	20 May 14	Current. Under review with the creation of a new publication, ATP 3-11.42, *Mutli-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Domestic Response.*
ATP 3-11.46 serves as the foundation for WMD-CST doctrine.			
ATP 3-11.47 AFTTP 3-2.79	*Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives Enhanced Response Force Package (CERFP) and Homeland Response Force (HRF) Operations*	26 Apr 13	Current. Under review with the creation of a new publication, ATP 3-11.42, *Mutli-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Domestic Response.*
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	*Technical Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives (CBRNE) Force Employment*	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	*Chemical, Biological, Radiological, and Nuclear Platoons*	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	*Combined Arms Countering Weapons of Mass Destruction*	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	*Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) Command*	28 Aug 18	Current.
ATP 3-37.11 provides doctrine to facilitate the operations and training requirements of the CBRNE command. It also provides commanders, staffs, key agencies, and Service members with a key reference on the CBRNE command for operational and tactical planning and CBRN and explosive ordnance disposal structure, capabilities, and principles of employment.			
FM 3-11	*Chemical, Biological, Radiological, and Nuclear Operations*	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	*Multi-Service Reference for Chemical, Biological, Radiological, and Nuclear (CBRN) Warning, Reporting, and Hazard Prediction Procedures*	15 May 17	Current. Change 2 will be published soon to promulgate ATP-45(F2).
TM 3-11.32 provides reference material for CBRN warning messages, incident reporting, and hazard prediction procedures.			
TM 3-11.42 MCWP 3-38.1 NTTP 3-11.36 AFTTP 3-2.82	*Multi-Service Tactics, Techniques, and Procedures for Installation Emergency Management*	28 Jul 21	Current.
TM 3-11.42 addresses the installation commander's response to an incident that takes place on an installation. The scope of this revision has been expanded from CBRN defense to all-hazards installation emergency management, which includes the management of CBRN events. The publication defines the roles of DOD installation commanders and staffs and provides the TTP associated with installation planning and preparedness for, response to, and recovery from all hazards in order to save lives, protect property, and sustain mission readiness.			
TM 3-11.91 MCRP 3-37.1B NTRP 3-11.32 AFTTP 3-2.55	*Chemical, Biological, Radiological, and Nuclear Threats and Hazards*	13 Dec 17	Current. Change 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 information about 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.			

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