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The Professional Bulletin of the Chemical Corps

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Army Chemical Review

The Professional Bulletin of the Chemical Corps

PB 3-12-2, Winter 2012

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

Brigadier General Peggy C. Combs

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

I was honored to assume the duties of the 27th Chief of Chemical and Commandant, U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS), on 7 September 2012. I would like to publicly thank Colonel Vance P. "Phil" Visser, who had faithfully served as our 26th Chief of Chemical and USACBRNS Commandant since August 2010. He provided exceptional leadership and a wealth of contributions that will positively impact the Regiment for years to come. Under his watch, we obtained the full rate production decision on the Stryker nuclear, biological, and chemical reconnaissance vehicle and the dismounted reconnaissance sets, kits, and outfits; cultivated relationships with unified action partners; and aggressively pursued the Corps vision for the future. His contributions not only improved our capabilities in the short term, but also postured the Regiment to excel in the Army of 2020. Colonel Visser has moved on to assume duties as the Chief, Protection Division, Requirements Integration Directorate, Army Capabilities Integration Center, Joint Base Langley-Eustis, Virginia, where he continues to serve our Regiment and our Army.

I am absolutely thrilled to return to the Home of our Regiment at Fort Leonard Wood, Missouri—and to serve as the 27th Chief of Chemical. As the Army and Joint Force prepare for a new and challenging operational environment, this is an especially critical time for our Regiment. The new operational environment will be marked by an emphasis on countering the attempts of Asia-Pacific and Middle East adversaries to develop technologies (including weapons of mass destruction) to overmatch U.S. military strengths.[1] At this critical juncture, it is imperative that we take the time to plan and prepare our Regiment to assume its role in this new environment. We must get this right, and I look forward to joining you and your teams to focus on this effort. Actions during my first 120 days at the helm will include—

- **Assessing.** In conjunction with senior leaders throughout our Regiment and the greater CBRN enterprise, we are conducting a holistic examination of the Chemical Corps Regiment. This broad examination includes the entire range of doctrine, organization, training, materiel, leadership and education, personnel, and facilities functions and emerging missions in order to ensure that the Regiment is prepared to succeed within the Army and the Joint Force of 2020. We are composing a new Regimental Operational and Organizational Concept, which will provide the basis for all remaining analyses, including the complete restructuring of our Regiment. I look forward to your comments as we move forward with the coordination of this critical document.
- **Communicating.** Since arriving aboard, I have met or spoken with nearly all colonels in the Regiment and am now in the process of speaking with the battalion commanders and division CBRN officers. I am also conducting focus groups that are comprised of captains and noncommissioned officers who are attending courses here at Fort Leonard Wood. In addition, Regimental Command Sergeant Major Gabriel Arnold is beginning to engage every command sergeant major and sergeant major within our Regiment. These communications will continue throughout my tenure.

  Due to our diverse, critical duty experiences, each of us has a unique perspective. These perspectives will provide the input necessary to refine our efforts and posture our Regiment for the future. As a matter of fact, we have already used insights obtained during early engagements as input for the Regimental Operational and Organizational Concept. If we have not spoken with you and you would like to share your perspective, please do not hesitate to contact me at (573) 563-8053 or <peggy.c.combs@us.army.mil> or Regimental Command Sergeant Major Arnold at (573) 563-6133 or <gabriel.s.arnold @us.army.mil>. We value your feedback.
- **Messaging.** Throughout the past 11 years, the Army has focused largely on counterinsurgency operations. During that time, our Regiment has supported the fight, while also maintaining a course that has dramatically transformed our capabilities, missions, and organizations. Major efforts have included the—
  - Establishment of the 20th Support Command (Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives [CBRNE]).
  - Establishment of the 48th CBRN Brigade.

- Conversion of the technical escort capability into an institutionalized, modified table of organization and equipment capability.
- Addition of warrant officers to the Regiment.
- Completion of the First Lieutenant Joseph Terry CBRN Responder Training Facility.
- Addition of the responsibility for all-hazard response (and associated professional credentials).
- Addition of sensitive-site analysis/exploitation to competencies and the core mission set.
- Fielding of the nuclear, biological, and chemical reconnaissance vehicle and dismounted reconnaissance sets, kits, and outfits and associated field analytical capabilities.
- Emergence of the homeland defense mission set through the evolution of the CBRNE consequence management reaction force to the defense CBRN response force.

Many senior military and civilian leaders and a generation of younger leaders and Soldiers lack a full understanding of our transformed capabilities and how we support our Army, the Joint Force, and our Nation. This knowledge gap will be filled by launching an aggressive strategic, operational, and tactical messaging campaign, which is currently under development. The goal of this campaign is for all of our team members to be armed with a single, easily understood message that conveys who we are, what we do, and where we are headed. I look forward to your feedback as we prepare to launch this campaign.

- **Engaging.** It is absolutely crucial that our Regiment cultivate partnerships and gain advocates in order to complete our transformation and address emerging mission requirements. This is especially true as we head into an era of decreasing resources. The Regiment benefits when senior leaders in Washington, D.C., maneuver commanders in the field, and partners in industry know who we are, what we do, and what we need. To this end, Regimental Command Sergeant Major Arnold and I have "hit the road" and met with a host of these leaders from around the globe. We will continue this effort throughout my tenure, and we look forward to meeting with you on our travels.
- **Promoting teamwork and professional development.** At a total personnel strength of 20,600 among all three components (Regular Army, U.S. Army Reserve, and Army National Guard), our Regiment is indeed "small but mighty." To put this into perspective, our Regiment represents about 2 percent of the total Army personnel strength of just less than 1 million.

  Since the presidency of Ronald Reagan, every U.S. president has stated that the greatest threat faced by our Nation is the proliferation and use of weapons of mass destruction. Our small but mighty regiment is the only dedicated, full-time, professional force within the Joint Force that is available to provide the first line of defense against our Nation's greatest threat. Therefore, we must multiply our numbers by leveraging teamwork and professional development. I urge each of you to reach out to other CBRN professionals serving at your station, camp, or post and to establish professional relationships and forums to strengthen teamwork and professional development. Share good ideas with each other, and pass the lessons learned to the USACBRNS so that we can share them with the Regiment. We will also conduct an assessment of our online professional forums to ensure that they are working to unite our Regiment, and we welcome your input as we strive to improve this resource.

I look forward to visiting our CBRN teams and Soldiers and hearing your ideas about how to modify strategy, implement change, and prepare the Regiment for the Army of 2020. As I prepare this article for publication, Regimental Command Sergeant Major Arnold and I have already begun our battlefield circulation. We look forward to seeing you in action and working with each of you to improve our Regiment.

The motto of our Regiment is "Elementis regamus proelium," or "We rule the battle through the elements." I believe these "elements" are our operational intellect, technical competence and capabilities, and the professionalism of our 20,600 dedicated, motivated, and committed CBRN professionals!

On behalf of our Regiment, our Army, and our Nation, thank you for what you do every day. I am proud to be your Chief of Chemical and the commandant of the USACBRNS!

Endnote:

[1]U.S. Army Training and Doctrine Command (TRADOC) Pamphlet (Pam) 525-3-0, *The Army Capstone Concept (Operational Adaptability: Operating Under Conditions of Uncertainty and Complexity in an Era of Persistent Conflict, 2016–2028)*, 21 December 2009.

Regimental Command Sergeant Major

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

Activities and Events

Command Sergeant Major Gabriel S. Arnold

The past 6 months have gone by quicker than any other 6-month period of my military career. They began with the presentation of an Order of the Dragon shadow box to the Family of Sergeant Chris Workman. Sergeant Workman, Company A, 2d Battalion, 25th Combat Aviation Brigade, 25th Infantry Division, Wheeler Army Airfield, Hawaii, was a fantastic CBRN warrior who performed real-world radiological decontamination operations in support of Operation Tomadachi. Sergeant Workman volunteered to deploy to Afghanistan to serve as a UH-60 Black Hawk door gunner. Tragically, his aircraft crashed en route.

Shortly after the shadow box presentation, I traveled to the Joint Special Operations Command, Fort Bragg, North Carolina, where I received a fantastic education from Master Sergeant Greg Martin and Lieutenant Colonel Chad Bauld and was also briefed by Master Sergeant Kevin Cox of the Combat Applications Group. Our CBRN warriors who are "behind the fence" are doing amazing things; and yes, many of those things are CBRN-related.

Next, I went to I Corps (or "America's Corps"), Joint Base Lewis-McChord, Washington, where I participated in an excellent professional development discussion with Command Sergeant Major Victor Whitehorn and the 110th Chemical Battalion (Technical Escort) as well as Command Sergeant Major Luis Rivera and the 23d Chemical Battalion. I was disappointed that many other CBRN warriors across Joint Base Lewis-McChord were unable to join us, but we will shoot for their presence on my next visit. The trip ended with a change-of-responsibility ceremony in which Command Sergeant Major Matthew Barnes relinquished his 4-year responsibility as the garrison command sergeant major of Joint Base Lewis-McChord. The impact of Command Sergeant Major Barnes on that installation was second to none. Medal of Honor recipient Sergeant First Class Leroy Petry was one of many who attended the ceremony.

I then traveled to Atlanta, Georgia, to watch U.S. Army Reserve team members participate in Exercise Red Dragon. Led by Lieutenant Colonel Francisco Velez and Command Sergeant Major Brenda Acosta, CBRN Soldiers from the 450th Chemical Battalion, Houston, Texas, established a mass casualty decontamination site as part of Command and Control Chemical, Biological, Radiological, and Nuclear Response Element-B. These warriors are well trained and ready to execute; they performed magnificently.

Throughout my travels, leaders at all levels of command consistently tell me that Soldiers are not as disciplined as they should be. Discipline begins with good, hard physical training conducted to standard every day; and leadership starts at the top. So—regardless of rank—I ask you: Where are you when it's time for physical training? According to General Raymond Odierno, the 38th Chief of Staff of the Army, "[Physical training] should be conducted every morning by everyone with leadership oversight and, most importantly, by visible leaders."[1] The areas of physical fitness and weight control are among my biggest concerns; everyone should be involved and working toward eliminating any problems.

The month of June was extremely busy with the planning, preparation, and execution of the U.S. Army Chemical Corps Regimental Week and Joint, Interagency, Intergovernmental, Multinational, Industry, and Academia CBRN Conference. (See page 32.) I would like to specifically highlight the Best Joint CBRN Warrior Competition, which was conducted by the 84th Chemical Battalion, Fort Leonard Wood, Missouri. This year, 27 two-person teams (with grades ranging from private first class to captain and including a two-man team from the U.S. Marine Corps) competed in the event. It was a great competition; and in the end, Staff Sergeant Maliek Kearney and Staff Sergeant Zachery Jones, Company A, 22d Chemical Battalion (Technical Escort), Aberdeen Proving Ground, Maryland, emerged as the victors. Congratulations to the competitors—and to those who conducted the competition—on a job very well done.

In July, Sergeant Major Joe Bonds of the Personnel Development Office, U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS), Fort Leonard Wood, and I traveled to the U.S. Army Human Resources Command, Fort Knox, Kentucky, where we met with a Chemical Branch team led by Lieutenant Colonel William Gibbs and Master Sergeant Kevin Leveille. These Soldiers and their team are doing a great job of managing our Corps. We are trying hard to balance Regular Army assignments between CBRN formations and brigade combat teams. I encourage you to reach out, contact the Chemical Branch, and get involved in your future!

In August, two of the best leaders of our Corps transitioned. After serving as the 26th Chief of Chemical and commandant of USACBRNS for 2 years, Colonel Vance P. Visser relinquished his responsibilities. Colonel Visser is a great leader with a vision of a successful future for our Corps. He provided us with a Regimental Campaign Plan, which establishes a path for the

The essential characteristics of the Army profession—trust, military expertise, esprit de corps, honorable service, and stewardship—will be achieved through professionals of character (values-based) who have a commitment (to one another, the organization, the Army, and the Nation) and who are competent (experts in their craft).

CBRN profession for 2020 and beyond. I want to personally thank Colonel Visser for his service; he will be missed. And I want to welcome our new commandant and the 27th Chief of Chemical, Brigadier General Peggy C. Combs. The future of our Corps is in good hands.

Army Profession

You will not hear me speak without mentioning the Army Profession of Arms. I encourage everyone to read *Army: Profession of Arms (2011: The Profession After 10 Years of Persistent Conflict)*.[2]

The essential characteristics of the Army profession—***trust, military expertise, esprit de corps, honorable service, and stewardship***—will be achieved through professionals of character (values-based) who have a commitment (to one another, the organization, the Army, and the Nation) and who are competent (experts in their craft).

Winners of the Best Joint CBRN Warrior Competition

We have the opportunity to use *Army: Profession of Arms (2011: The Profession After 10 Years of Persistent Conflict)* as an umbrella to shape our Army. The issues of sexual harassment and assault, hazing, standards, disciplined behavior, and toxic leadership can be tied to the handbook to describe what is expected of our professionals. For example, an incident involving sexual harassment would represent an obvious breach of ***trust*** with regard to our Soldiers and the American people in general. Please attempt to use *Army: Profession of Arms (2011: The Profession After 10 Years of Persistent Conflict)* in your approach to various issues. We plan to add information from the book to our Best Joint CBRN Warrior Competition, but the initiative should begin in our companies and battalions. I encourage you to also add information from *Army: Profession of Arms (2011: The Profession After 10 Years of Persistent Conflict)* to all promotion, Soldier, and NCO boards.

You can expect to see an upcoming Army Profession Campaign that uses a phased (quarterly) approach to resolving command issues. I encourage you to begin preparing now. Please contact Sergeant Major Dave Stewart at <david.l.stewart.mil@mail.mil> and his team at the Center for the Army Profession and Ethic at <http://cape.army.mil/> for assistance with education and training products.

I am proud of each and every one of you; and I look forward to visiting your posts, camps, and stations to teach, coach, mentor, and learn from you. Remember, 98 percent of Americans wake up every day and enjoy freedom, but only 2 percent of Americans wake up every day and defend it. C-B-R-N . . . Could Be Right Now. Let's be ready!

Elementis regamus proelium!

Endnotes:

[1]General Raymond Odierno (speaker), Army Training and Leader Development Conference, 11–13 July 2012.

[2]*Army: Profession of Arms (2011: The Profession After 10 Years of Persistent Conflict)*, Center for the Army Profession and Ethic, Combined Arms Center, U.S. Army Training and Doctrine Command, Schatz Publishing Group, October 2010, <http://cape.army.mil/repository/ProArms/Army%20Profession%20of%20Arms,%20v19,%2007OCT10,%20low%20resolution.pdf>, accessed on 8 August 2012.

Farewell From the 26th Chief of Chemical

Colonel Vance P. Visser

Fellow Dragon Warriors:

Greetings from Fort Leonard Wood, the home of your Regiment. It has been an awesome, but busy, 6 months since my last letter to you. Members of our Regiment have continued to engage the enemy in combat while also supporting training and exercises at home (chemical, biological, radiological, and nuclear [CBRN] response enterprise) and abroad (in the United Arab Emirates, Jordan, and the Republic of Korea). I am humbled by your collective performance and am proud to be a part of your team.

While our forces remain engaged in combat operations in Afghanistan, Army and Joint Force leaders are actively and aggressively preparing for the future by undertaking Army 2020 and Joint Force 2020 initiatives, which include examining the future operational environment and appropriately shaping and preparing our future forces for success. At the time of this writing, the Army had not yet published a final report or issued final guidance; however, several indications of the focus for the future had been provided:

- The complex and uncertain environment expected through 2020 and beyond.
- The Asia-Pacific and Middle East regions.
- A range of threats including conventional, unconventional, terrorist, criminal, and violent extremists.
- Antiaccess and area denial environments created by U.S. adversaries.
- Adversarial technologies intended to overmatch U.S. military strengths.
- The continued proliferation of weapons of mass destruction.
- Decreasing fiscal resources.
- Increasing requirements for defense support of civil authorities.

Throughout the past several months, the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS) has engaged in collaborative and parallel planning efforts with the U.S. Army Training and Doctrine Command; Headquarters, Department of the Army; the Joint Staff; and a variety of other organizations to ensure that the Regiment is prepared to execute in the future operational environment. Although these efforts will continue for some time, I would like to share a few of the early observations:

- The window of opportunity to influence the Army of 2020 and the Joint Force of 2020 is now open; how long it will remain open is undetermined.
- The future operational environment will not simply represent a return to the pre-2001 status quo. Our adversaries have learned from their experiences, and future adversaries will challenge the United States along many asymmetrical lines of action.
- Even in the midst of a concerted, Army-wide downsizing effort, the demand for proactive, specialized CBRN capabilities continues to increase.
- A renewed emphasis on training and other resources is required to prepare all Army forces to operate and win in CBRN environments; the Chemical Corps Regiment plays a vital role in this preparation.

As we continue to prepare for the future operational environment, I encourage each of you to join us in shaping our Regiment, our Army, and the Joint Force. Share your thoughts and ideas with us through the Chemical Knowledge Network (CKN) at <www.us.army.mil/suite/page/ckn>, the quarterly secure video teleconferences, the *Army Chemical Review* professional bulletin, or direct engagements with USACBRNS personnel.

My time as the 26th Chief of Chemical and commandant of USACBRNS has come to an end. I have been blessed with the opportunity to work with so many fine Soldiers, civilians, and members of the joint CBRN community during the past 2 years. Please accept my sincere appreciation and respect for all that you have done, and continue to do, in support of our great Nation. I would also like to offer my specific gratitude to two outstanding battle buddies—Command Sergeant Major

Ted Lopez (Retired) and Regimental Command Sergeant Major Gabriel Arnold. Both of these noncommissioned officers are tireless advocates for our Corps and our Soldiers.

In closing, I want to welcome our 27th Chief of Chemical and new commandant of USACBRNS, Brigadier General Peggy C. Combs, who joins us from her recent assignment as the Deputy Commanding General, U.S. Army Cadet Command, Fort Knox, Kentucky. She is the right leader to move our Regiment into the future; and I wish her, and each of you, great success in all that you do. May God bless you all as you continue to serve our Regiment, our Army, and our great Nation.

Elementis regamus proelium!

Chemical Corps Regimental Association

2013 CCRA Nominations for Hall of Fame and Distinguished Member of the Corps

Nominations are being accepted for the 2013 Chemical Corps Regimental Association (CCRA) Hall of Fame and Distinguished Member of the Corps honors.

- **Hall of Fame.** This award is extended to chemical, biological, radiological, and nuclear personnel (living or deceased) who spent their professional careers serving the Chemical Corps or who performed a significant act of heroism. Nominations are open to military and Department of Defense civilian personnel who have been retired from active federal service for at least 2 years. Their service to the Corps must have been extraordinary.
- **Distinguished Member of the Corps.** This award is extended to living or deceased members who served the Corps in their professional lives and continued to serve it in their personal lives. Nominations are limited to personnel who have been retired from active federal service (military and/or civilian) for at least 2 years. Active Army military and current (nonretired) federal civilian personnel are not eligible for the program.

For nomination criteria and submission requirements, see the CCRA Honors Programs Web site at <http://www.chemical-corps.org/cms/programs.html>. Nomination packets should be sent to—

Commandant
U.S. Army Chemical, Biological, Radiological, and Nuclear School
Regimental Historian
ATTN: ATSN-CM-H
Fort Leonard Wood, MO 65473-8926

All packets must arrive before **5 April 2013**. For more information, call (573) 563-7339 or e-mail <david.c.chuber.civ@mail.mil> or <christy.l.lindberg.civ@mail.mil>.

PREPARING CBRN SOLDIERS TO EXPERTLY ENGAGE COTS EQUIPMENT

By Captain Jason Burnes

Soldiers are the greatest asset of the U.S. Army. U.S. Army Chemical Corps Soldiers should be highly trained, successful, chemical, biological, radiological, and nuclear (CBRN) experts who can adapt to any situation. But this goal is becoming more and more difficult to achieve as attempts are made to merge our science- and technology-based military occupational specialty with the ever-expanding realm of commercial, off-the-shelf (COTS) equipment. Fundamental aspects of learning can be used to shape CBRN Soldiers into experts in their field; and a return to these fundamentals is necessary in order to make the most effective use of the training on, and implementation of, future equipment. However, some of the essential stages of learning appear to be omitted from the discussion contained in U.S. Army Training and Doctrine Command (TRADOC) Pamphlet (Pam) 525-8-2, *The U.S. Army Learning Concept for 2015*.[1]

Stages of Learning

Large corporations can design and build technologically advanced devices at a much faster rate than the U.S. government can. Therefore, many of the innovative capabilities that are used on the battlefield are provided by large corporations with in-theater field service representatives who provide training and perform maintenance. But no matter how innovative the technology, the equipment is ineffective unless Soldiers have the skills necessary to properly use it.

According to Paul M. Fitts and Michael I. Posner, there are three stages of learning—cognitive, associative, and autonomous—and individuals gradually progress from one stage to the next as they learn a particular skill, but they can also revisit earlier stages to reinforce basic facts or connections.[2]

Cognitive Stage

In the cognitive learning stage, individuals begin to understand the skills needed to complete a certain task—and they attempt to complete that task. Numerous errors are likely to occur, and much effort is required during this stage. After a practice period, individuals acquire basic skills upon which to build. Individuals are then able to recognize future situations that call for the use of the acquired skill set.

Soldiers at all levels must go through the cognitive learning stage. CBRN Soldiers must be familiar with the basic chemistry and physics used to form the basis for detection systems. They need to know what happens to a mixture of liquids when boiled, how endothermic and exothermic reactions differ, and why different wavelengths of light are emitted from different elements when their electrons become deexcited. This knowledge helps form a fundamental basis of facts leading to the associative learning stage—a stage in which the interconnectivity of facts is established.

Associative Stage

The associative learning stage typically progresses faster than the cognitive learning stage. Due to the existing knowledge base, errors encountered during skill performance are detected and eliminated. This further strengthens and reinforces the processes involved in learning the skill.

For CBRN Soldiers, the associative learning stage takes place in a laboratory environment, where students can practice the application of skills that they acquired during the cognitive learning stage. For example, Soldiers who previously learned that an infrared laser can excite the electrons within different atoms to various energy levels—and that different wavelengths of light are emitted when those electrons are deexcited—can begin to contemplate how different materials react to different types of light.

Autonomous Stage

The autonomous learning stage has been described as the "doing stage."[3] In this stage, the learned skill becomes habitual in nature, requiring little mental effort. Key markers for this stage of the learning process include the speed and accuracy of skill completion.[4]

The learner-centric 2015 learning environment contains "context-based, collaborative, problem-centered instruction. Classroom learning will shift from instructor-centered, lecture-based methods to a learner-centered, experiential methodology. Engaging the learners in collaborative practical and problem-solving exercises that are relevant to their work environment provides an opportunity to develop critical 21st century Soldier competencies such as initiative, critical thinking, teamwork, and accountability along with learning content.

The autonomous learning stage for a CBRN Soldier learning to operate new detection equipment should focus on the use of a set of basic detection equipment, and the Soldier's main task should be to understand the conceptual operation of the hardware and sensors. Soldiers not only become proficient with a set of basic tools, but they also become capable of troubleshooting problems. When Soldiers in this learning stage encounter a problem, they use their conceptual knowledge to analyze the components of the situation. This stage of learning cannot take place without previous cognitive and associative learning.

Expert Level

Once the Soldier has progressed through the three stages of learning, the next step involves becoming an expert. This is the level that must be achieved to effectively employ COTS solutions. Experts have an advanced ability to recognize "chunks," or repeated patterns of elements,[5] which is how they begin to apply their knowledge to new problems. Expert Soldiers who observe the operation of a new piece of detection equipment can begin to cross-reference this new experience with their well-developed knowledge base. In a short period of time, they assimilate their new knowledge into their established skill set and begin accomplishing the mission using tools in new and creative ways.

Problems With Army Learning

TRADOC Pam 525-8-2, which aims to lead training and education in an entirely new direction, states, "Current learning is typically instructor-led, timed to predetermined course lengths, and not synchronized to meet individual learner needs. Current instruction is based on individual tasks, conditions, and standards, which worked well when the Army had a well-defined mission with a well-defined enemy. Similarly, while critical thinking is frequently a course objective, instruction primarily delivers only concepts and knowledge. Mandatory subjects overcrowd programs of instruction (POIs) and leave little time for [the] reflection or repetition needed to master fundamentals. Passive, lecture-based instruction does not engage learners or capitalize on prior experience."[6]

And there are other problems that affect Army learning. According to TRADOC, "The Army often assigns instructors arbitrarily, rather than through a selection process that accounts for subject matter expertise or aptitude to facilitate adult learning."[7] Difficulties also arise when instructors develop skill gaps due to multiple deployments in non-military occupational specialty or branch assignments. And Soldiers generally do not consider instructor positions to be career-enhancing assignments.[8] Furthermore, TRADOC claims that the open-book tests currently administered to students lack rigor and fail to measure student success—and also that little effort or concern is invested in assessments of how well learners are grasping new material.

The Army Solution

The learner-centric 2015 learning environment contains "context-based, collaborative, problem-centered instruction. Classroom learning will shift from instructor-centered, lecture-based methods to a learner-centered, experiential methodology. Engaging the learners in collaborative practical and problem-solving exercises that are relevant to their work environment provides an opportunity to develop critical 21st century Soldier competencies such as initiative, critical thinking, teamwork, and accountability along with learning content. Students master knowledge and comprehension level learning objectives outside the classroom through individual learning activities such as reading; self-paced, technology-delivered instruction; or research."[9] This learning model makes use of a supporting infrastructure that includes subject matter experts and facilitators from the centers of excellence, a knowledge management structure, digital learning media products, and policies that are flexible enough to adapt to shifting operational and learner demands.

Problems With the New Learning Model

The learning model described in TRADOC Pam 525-8-2 is based on the premise of adult learning, which is promoted when the learner's previous knowledge is activated before learning new information. For example, the learner might observe a demonstration and then apply new knowledge to the situation. Demonstration and application are based on real-world problems, and the learner is expected to integrate new knowledge into everyday practices. But what happens when a Soldier does not understand the demonstration? And what happens when two Soldiers misunderstand two different parts of the same demonstration? Will they actually be able to integrate any new knowledge?

The concept of adult learning is essentially the same as the concept of moving from the autonomous stage of learning to the expert level. With the new Army learning model, the desire is to bypass the cognitive (building a base level of facts) and associative (making connections between those facts) stages of learning. If the subject matter were routinely encountered in the American way of life—and if all Soldiers entering

training had previous experience in working with scientific principles—that might be possible. However, because of the diversity of the American way of life, this is clearly not the case. Soldiers hail from many different regions, bringing their own knowledge and unique set of experiences with them.

A Shining Example

One program that illustrates a very deliberate approach to training via the three stages of learning is a program that has been implemented at the U.S. Naval Nuclear Propulsion School. Sailors who are accepted into the program are transformed from high school graduates to fully capable nuclear operators.

In the first stage of the transformation, Sailors are presented with a basic mathematics review and they learn about basic machines and the fundamentals of electricity. This is followed by a study of mathematics, methods of heat transfer, and physics. This completes the cognitive stage of learning; a foundation of facts has been firmly established.

Sailors are then presented with instruction on nuclear reactor principles, chemistry, materials, radiation fundamentals and—depending on their jobs—electrical or mechanical theory. These classes build upon the cognitive knowledge base and provide students with the tools they need to form associations among the bits of information they previously acquired.

As Sailors progress to the autonomous stage of learning, they apply the skills they learned by working at a prototype reactor. During the autonomous stage, Sailors are aware of the meaning behind the gauge readings and they know what is occurring within the reactor to produce those readings. After 6 months of training on the reactor, they depart for their ship. Although the reactors used for training are earlier models of those currently used on ships, the Sailors gradually become experts on the operation of any type of reactor.

Conclusion

The CBRN Soldier is very similar to the nuclear Sailor. They both need to have a solid background in scientific principles in order to draw connections and solve problems. Companies are constantly trying to sell the latest, most technologically advanced tools to the Army; but without an operator, those tools are useless. Likewise, for units with Soldiers who are unfamiliar with the different types of equipment available and who lack the key fundamentals necessary to understand and adapt to new methods and equipment, the equipment is of no value.

According to TRADOC, there is no well-defined Army learning mission. Instruction primarily delivers only concepts; mandatory subjects leave little time for the reflection or repetition needed to master fundamentals; passive, lecture-based instruction does not engage learners; the Army often arbitrarily assigns instructors to positions that are not perceived as career-enhancing assignments; and open-book tests lack rigor.[10]

To effectively change the way in which Soldiers learn, the Army must change its culture toward learning. The Army should ensure that instruction includes the time necessary to deliver concepts and that students have the time necessary to master the fundamentals. Instructors should be trained on the methods of engaging students, and they should focus on creating tests that truly assess student knowledge and continually monitor student performance. In the Army culture, instructors who successfully perform in this manner must be rewarded for exceling in a difficult position.

The problems with Army learning can be fixed, but changes must be made in order to properly develop future Soldiers. These changes will be difficult—but not impossible. (The Navy has used this approach for decades.) Throughout years of testing, billions of dollars are spent to develop new weapons systems "from the ground up." Likewise, the American Soldier must be developed from the ground up in order to produce a technologically advanced individual with the foundation needed to successfully operate rapidly advancing technological equipment and to help America fight future wars.

Endnotes:

[1]TRADOC Pam 525-8-2, *The U.S. Army Learning Concept for 2015*, 20 January 2011.

[2]Paul M. Fitts and Michael I. Posner, *Human Performance*, Eugene: Brooks/Cole, Belmont, California, 1967.

[3]Christina Stothard and Robin Nicholson, "Skill Acquisition and Retention in Training: DSTO Support to the Army Ammunition Study," Electronics and Surveillance Research Laboratory, Defence Science and Technology Organisation, Department of Defence, Commonwealth of Australia, 2001.

[4]Ibid.

[5]John R. Anderson, editor, *Cognitive Skills and Their Acquisition*, Lawrence Erlbaum Associates, Inc., Hillsdale, New Jersey, 1981.

[6]TRADOC Pam 525-8-2, 20 January 2011.

[7]Ibid.

[8]Ibid.

[9]Ibid.

[10]Ibid.

Reference:

William R. Bickley et al., "Army Institutional Training: Current Status and Future Research," U.S. Army Research Institute for the Behavioral and Social Sciences Research Report 1921, March 2012.

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Developing CBRN Training and Education Requirements

By Mr. Peter G. Schulze

This updated article, which was previously published in the Summer 2008 Maneuver Support Magazine,[1] *outlines a process used to develop the training and education requirements for weapons of mass destruction (WMD)–civil support teams (CSTs). The 20th Support Command and 48th Chemical Brigade recently asked the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS) to review recommended changes to technical escort training, education, and certification requirements. On the surface, this seemed like a simple request—but it was one that could have a significant impact on the ability to execute complex technical missions and sustain a well-deserved historical reputation. This article stresses the importance of using a structured performance analysis model to align potential performance requirements or issues to a consistent and appropriate set of solutions. The Chemical Regiment continues to be responsible for the critical mission of protecting the force and this Nation against the full range of chemical, biological, radiological, and nuclear (CBRN) hazards resulting from an attack or man-made incident. The criticality and visibility of this mission—especially as related to the technical escort capability—require a strategic perspective that recognizes the need to be responsive to a changing threat environment by adopting a "lifelong approach" to enhancing knowledge and skills and by providing the unit commander with the latitude needed to exercise individual and small-unit training initiatives. Only through an open, objective, analytical process can we justify and achieve the training and education necessary to succeed in countering the full range of CBRN threats facing our Nation.*

WMD-CST members are motivated Soldiers and Airmen who have mastered complex technical tasks and can perform them under the most hazardous of conditions.[2] Individual teams are state-controlled organizations and may vary in quality; however, as a group, they are one of the most capable, all-hazard (chemical, biological, and radiological), domestic response assets within the Department of Defense (DOD). The ability to realize this potential is impacted by many issues, among the most critical of which are—

- Procuring proper technology improvements in a timely manner, given the challenges of the DOD acquisition process.
- Receiving dedicated leadership commitment for the materiel, training, education, and personnel investments necessary to sustain the capability.
- Providing for consistent, effective training and education across the institutional, self-development, and operational domains.

The focus of this article is on the latter issue. The article examines how the U.S. Army Maneuver Support Center of Excellence (MSCoE), working with the National Guard Bureau (NGB), initiated a performance analysis process that led to an effective training and education program in support of the WMD-CST mission.

Training and Education: A Long-Term Investment

Training and education can make or break any technology implementation and determine when, and if, the investment in a materiel solution will continue to pay dividends in expected capability. For this reason, MSCoE and the NGB formed a partnership dedicated to implementing training and education solutions that can be traced to the required mission. In a larger sense, these organizations fully appreciate the value of knowledge and the true benefit of a continuum of training and education throughout the tenure of assigned personnel. The complexity of CST systems, the nature of the CST organization, the congressional visibility of the program, and the assigned CST mission contribute to a construct that is difficult to quantify around the doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) analytical processes of a single Service. As a result, the partnership pursued a multi-Service, multiagency perspective to analyze requirements and develop training and education solution sets. While this is not a typical approach for traditional Army analytical practices, the perspective aligns well with a complex set of commercial, off-the-shelf systems; the associated need for technological innovation and cognitive improvement; the need to operate with civil authorities; the multi-Service composition of the team; and DOD training transformation.

DOD has published a vision for the transformation of training and educating the total force to better prepare them to deal with the challenges they will face today and tomorrow.[3] MSCoE and the NGB applied that vision to support a strategic goal which recognized the need to be responsive to a changing threat environment through a "lifelong approach" to enhancing knowledge and skills and allowing the unit commander maximum latitude to exercise individual and small-unit initiatives. This approach applies the theoretical tenets of the 2006 "Strategic Plan for Transforming DOD Training"[4] and Army Doctrine Reference Publication (ADRP) 7-0, *Training Units and Developing Leaders*,[5] into a capabilities-based training and education program designed to be responsive to technical innovation and evolving threats.

Historical Paradigm

Any examination of the WMD-CST training and education program should begin with the initial tasking that followed the Office of the Inspector General, DOD, Audit Report No. D-2001-043, "Management of National Guard Weapons of Mass Destruction–Civil Support Teams."[6] According to this report, "Training programs and materials for WMD-CST personnel were not sufficiently identified, developed, approved, and implemented."[7] On 1 February 2001, the Deputy Secretary of Defense approved a decision document that laid out the corrective actions proposed to address the department's concerns with the program. It required that DOD, under the lead of the Assistant Secretary of Defense (Reserve Affairs), conduct a formal program review and report to the Deputy Secretary of Defense no later than 1 August 2001. On 10 September 2001, the Deputy Secretary of Defense approved the results of that program review, which directed the adoption of interim training standards and required the Army to institutionalize training and complete a formal task analysis for the WMD-CST program. The responsibility for the analysis was assigned to the Commander, MSCoE, when the Army Assistant Chief of Staff for Operations and Plans designated the U.S. Army Maneuver Support Center (now MSCoE) as the WMD-CST proponent on 28 June 2002.

MSCoE established an integrated concept development team (ICDT), which was approved on 29 May 2003. In partnership with the NGB, the ICDT established a formal process for reviewing each of the six functional areas of the CST—survey, command, operations, medical, communications, and administrative/logistics—and the common-core requirements. Beginning in August 2004, the WMD-CST ICDT Doctrine, Training, and Leadership (DTL) Working Group—led by the Directorate of Training and Leader Development, USACBRNS—refocused previous efforts. The working group proposed an analytical plan that was consistent with DOD training transformation and WMD-CST program goals and aligned with CST commanders' priorities.

Analytical Foundation

Before the establishment of the ICDT, the WMD-CST community had developed a sense of independence from rigid, stovepiped DOD processes. As a result, the building of an appropriate training and education program required significant cooperation from the CST community and negotiations and consensus among diverse stakeholders, including—

- USACBRNS.
- U.S. Army North.
- Joint Program Management Office.
- U.S. Army Training and Doctrine Command.
- U.S. Army Medical Department Center and School.
- U.S. Army Signal School.

Each stakeholder had a unique set of perspectives, agendas, perceived requirements, and processes to be considered and addressed in order to document and institutionalize WMD-CST training and education. Despite these and other competing institutional activities that play a part in domestic consequence management, MSCoE was—and continues to be—the unifying organization that supports NGB efforts toward establishing and sustaining the overall success of the WMD-CST program.

The ICDT cochairs (Domestic Operations Director, Joint Staff, NGB; and Chief of Staff for Army National Guard Affairs, MSCoE) encouraged the management approach of integrating many institutional products, stovepipes, redundant processes, and gaps into a program that would effectively serve the members of the WMD-CST community and their missions. The strategic training and educational goal is to promote joint and interagency interoperability by—

- Enhancing cognitive skills.
- Advancing procedures for the use of detection, analytical, and communications equipment.
- Improving techniques for operations in a hazardous environment.
- Developing adaptive leaders.

This goal emphasizes the development of individuals and units based on operational expectations concerning required tangible skills and desired intangible attributes (including the ability to reason using emotion—or to use emotions to promote thinking and cognitive activity). To fully implement this goal, the DTL Working Group devised an overarching plan designed to take advantage of—and maximize opportunities within—the institutional, self-development, and operational domains.

In an environment where Soldiers, Airmen, and leaders must transfer and apply learned skills to an unlimited set of conditions, limiting training and education to the institutional domain does not provide for "mastery" learning, where iteration occurs between learning, experience, and continued learning until mastery is achieved.[8] Determining which domain provides the most effective intervention and reinforcement throughout the learning process is critical for personnel who are expected to operate in complex situations and ambiguous hazardous environments. Figure 1 illustrates the interaction of training and education domains, skill levels, experience, and the operational environment.

Variations of this construct, while well articulated in DOD and Army documents, are not typically encouraged or applied

Figure 1. Training Interaction Model

by proponents and customers of institutional training domains. There is a natural tendency to fall back on institutional training and education as the cure for performance problems, often resulting in costly solutions that do not address the root of the problem. Identifying critical training and education solutions throughout the training and education domains reduces the overall cost and increases the effectiveness of the WMD-CST training and education program. Despite significant pressure by the WMD-CST community, training providers, and proponents to conclude all analytical efforts with formal institutional solutions, the structured, analytical approach of the DTL Working Group mitigated the natural tendency to rely on specific institutional solutions.

Analytical Construct

The process used to develop, validate, and institutionalize WMD-CST training and education requirements continues to be a deliberate, anticipatory MSCoE and NGB effort. Given the unique team personnel, the complex array of equipment, the regulatory environment, and the DOD Inspector General visibility, the process requires a more comprehensive analysis than that previously attempted by MSCoE. The DTL Working Group realized that the traditional DOTMLPF needs-analysis was not structured to support a program designed to operate from a multi-Service, multiagency perspective. (An Army DOTMLPF needs-analysis is nonprescriptive and is often applied as a gap-analysis tool, generating perceived requirements for each DOTMLPF component without a causal or comprehensive set of performance problems and potential solution sets for the entire system.) The importance of using a structured, performance analysis model stems from the need to align potential performance issues with the appropriate solutions. The visibility of the CST program necessitated an accurate analysis of potential performance issues in order to rapidly implement a targeted set of solutions. Therefore, under the guidance of the DTL Working Group, the USACBRNS staff approached the analysis from a human performance technology (HPT) perspective. The framework of the performance analysis was based on the application of a modified version of Thomas Gilbert's Behavior Engineering Model, which is known throughout the HPT professional community.[9] The modification of the original Behavior Engineering Model was initiated by USACBRNS staff in December 2006 to support military-specific doctrine, organization, training, materiel, and personnel performance issues. The model has continued to mature and is now derived in part from Anthony Marker's Synchronized Analysis Model.[10] Under this variation of the Behavior Engineering Model, performance indicators are placed in various stratified levels, allowing the analyst to pinpoint potential barriers to full performance at individual, professional, organizational, and external levels.

Figure 2, page 14, illustrates USACBRNS use of the current model to organize volumes of data and apply cause-and-effect relationships to achieve one of many defined performance expectations. This data organization was applied to the analysis process to validate actual or potential performance gaps that could lead to the development or modification of training and education solutions.

While the application of HPT is new to the Army, HPT has been successfully used throughout industry—and in other branches of Service, including the U.S. Navy and U.S. Coast Guard. The application of HPT processes to CST program support aligned performance gaps with solutions and provided the CST community with a sound rationale for specific DTL Working Group recommendations. The success of any performance improvement process is gauged by its ability to accomplish measurable results that are in line with the mission and goals of the organization. Because the DOD Inspector General had previously criticized the WMD-CST program for failing to connect training and education to documented requirements, the process was designed in part to realign appropriate training and education solutions with mission requirements and to foster a culture of continuous improvement based on changing operational imperatives. As a result, the USACBRNS—

- Revised the basic Civil Support Skills Course to include full International Fire Service Accreditation Congress compliance and to reduce the length of the course by 4 days.
- Established a formal review cycle for updating and modifying required training and education.
- Reduced the execution costs of the Civil Support Skills Course by 30 percent.
- Stratified the domain and competencies for CST training and education requirements, as documented in the NGB Yearly Planning Guidance.
- Reduced or eliminated redundant training.
- Developed the improved Unified Command Suite.
- Developed the standards-based Analytical Laboratory System Course.[11]
- Developed the CST Combined Arms Training Strategy.

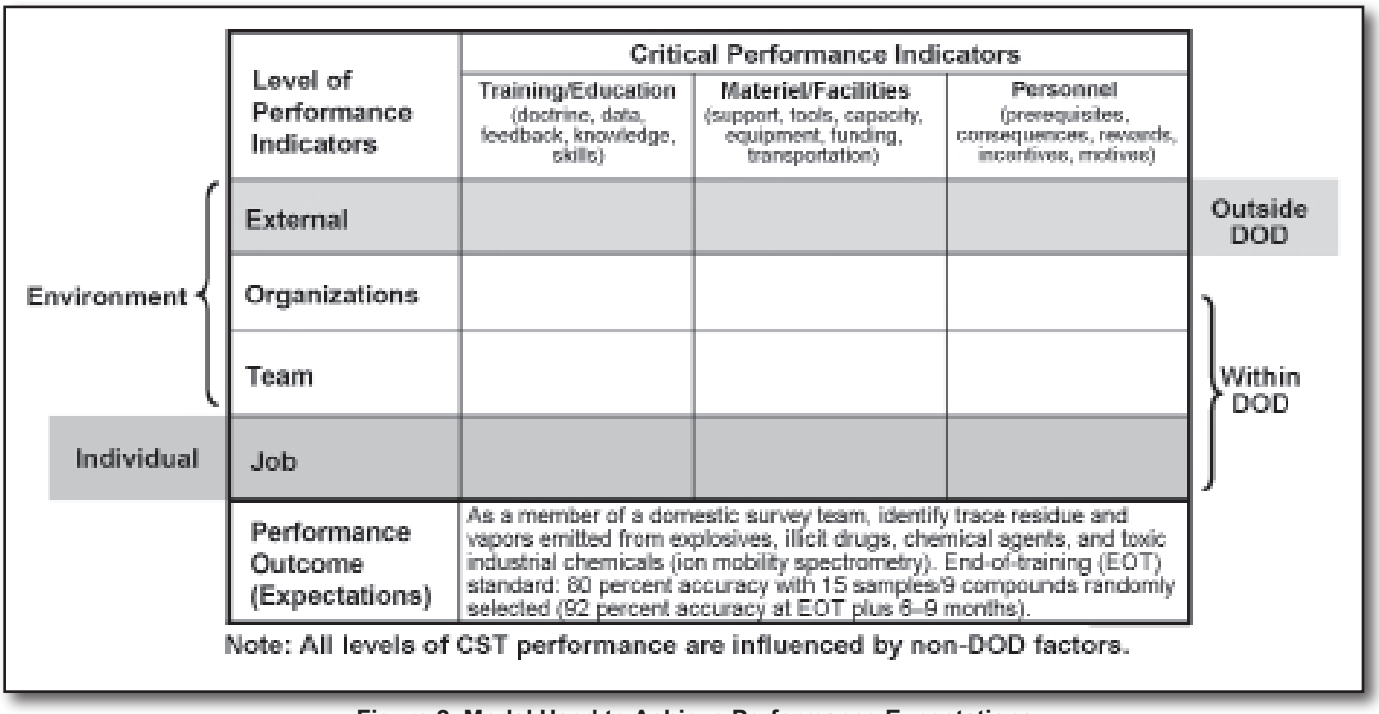


Figure 2. Model Used to Achieve Performance Expectations

Performance issues that could not be mitigated by a training and education solution were referred to applicable CST personnel or materiel working groups. While measurable success in the application of HPT to the WMD-CST program continues, some systemic problems remain. Most of these problems are related to an inability to apply clearly defined performance measures and outcomes within established institutional processes and associated unit training products. Fortunately, MSCoE, NGB, and USACBRNS continue to provide leadership and strategic oversight through an informal review process. This contributes to a culture of planned improvement and will lead to increasing WMD-CST program capabilities.

Summary

The challenge for the WMD-CST DTL Working Group was to develop a comprehensive training and education program to support a joint unit within Army organizational and institutional constraints. Throughout the years, the DTL Working Group has successfully navigated many of the complex institutional processes. It has provided a unified voice that had supported and reinforced communication and negotiation among stakeholders with their own sets of perspectives, agendas, perceived requirements, and processes, keeping them focused on supporting the WMD-CST mission. The unified leadership of MSCoE, NGB, and USACBRNS has contributed to the overall success of the program by ensuring that all members are focused on a training and education goal that supports the following objectives:

- Strengthen CST operations by preparing teams for evolving concepts.
- Improve team readiness by aligning education and training to mission requirements.
- Provide support for unique local needs.
- Develop individuals and teams that intuitively think along multiagency lines.
- Develop individuals and teams that improvise and adapt to emerging crises.
- Achieve a unity of effort from a diversity of means.

When tasked by the ICDT to solve a set of WMD-CST-specific training problems, the DTL Working Group produced an analytical plan that contained a systematic, performance-based set of solutions with broad applicability. These solutions focus on tying performance issues to their causal relationships and implementing appropriate solutions. Overall, the approach taken by the DTL Working Group supports a continuous, adaptive process which ensures that all individuals and CST units receive the timely, effective education and training necessary to enable success in joint and multiagency domestic WMD response operations.

Endnotes:

[1]Peter G. Schulze, "Maneuver Support Center and Weapons of Mass Destruction–Civil Support Team Training and Education," *Maneuver Support Magazine*, Summer 2008.

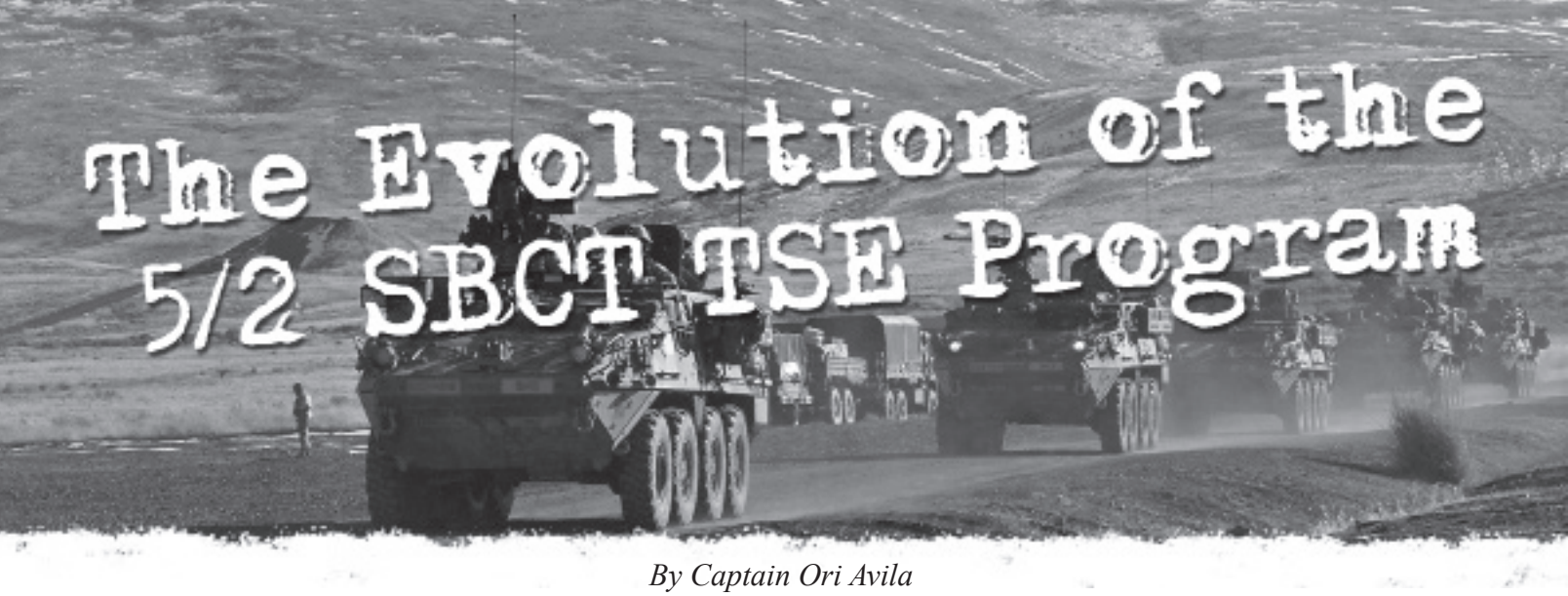
[2]Government Accountability Office Report (GAO)-06-498, "National Guard Needs To Clarify Civil Support Teams' Mission and Address Management Challenges," 31 May 2006.

[3]"Strategic Plan for Transforming DOD Training," DOD, 8 May 2006.

[4]Ibid.

[5]ADRP 7-0, *Training Units and Developing Leaders*, 23 August 2012.

(*Continued on page 16*)



The Evolution of the 5/2 SBCT TSE Program

By Captain Ori Avila

Without good intelligence, counterinsurgents are like blind boxers wasting energy flailing at unseen opponents and perhaps causing unintended harm. With good intelligence, counterinsurgents are like surgeons cutting out cancerous tissue while keeping other vital organs intact. Effective operations are shaped by timely, specific, and reliable intelligence, gathered and analyzed at the lowest possible level and disseminated throughout the force.

—*Field Manual (FM) 3-24*, Counterinsurgency[1]

While deployed to Afghanistan from 2009 to 2010, the Stryker Brigade Combat Team (SBCT), 5th Brigade (now 2d Brigade), 2d Infantry Division (5/2), Joint Base Lewis-McChord, Washington, identified the need to rapidly disseminate information to maneuver commanders to drive current and future operations. Because 5/2 SBCT chemical, biological, radiological, and nuclear (CBRN) Soldiers routinely performed duties that included—but were not limited to—confirming the presence or absence of unknown substances and subsequently identifying unknown substances through stringent analysis, brigade leaders recognized an opportunity to train the previously underutilized assets. The related duties routinely performed by these CBRN Soldiers were aligned and retasked so that CBRN Soldiers filled a new role in the intelligence arena—gathering non-CBRN-related data and drawing conclusions and making assumptions based on that data.

The role of CBRN Soldiers within the intelligence spectrum is clearly established—they bridge gaps that are parallel to their inherent collection and exploitation capabilities and requirements. The advent of company intelligence support teams, and the use of CBRN Soldiers in manning those teams, requires a new perspective on the use of CBRN Soldiers throughout the force.

At the battalion level, CBRN officers and noncommissioned officers have been removed from operations and training (S-3) offices and placed in intelligence (S-2) offices, where their unique analytical capabilities are used for link analysis and targeting. At the brigade level, CBRN reconnaissance assets (which have been made a part of the analysis and control element) are used to presumptively identify unknown substances, facilitating the dissemination of raw data to appropriate brigade intelligence assets for further analysis and development.

The 5/2 SBCT Tactical Site Exploitation Platoon

Today, nonstandard tactical site exploitation (TSE) elements exist in limited units throughout the U.S. Army. The TSE platoon within what is now the 2d SBCT, 2d Infantry Division (formerly the 5/2 SBCT) has been trained and is equipped to conduct standard site searches and to collect and document evidence using forensically sound methods. Using their expertise, platoon members ensure that the evidence collected is fully admissible in American and host nation court systems.

In addition to basic TSE capabilities, the platoon is also capable of—

- Conducting evidentiary triage at the point of capture.
- Protecting and preserving the integrity of evidence.
- Conducting on-site digital media exploitation in a forensically sound manner.
- Presumptively identifying unknown substances (powders, liquids, solids).
- Facilitating the dissemination of raw data to appropriate brigade intelligence assets for further analysis and development.
- Providing immediate feedback to maneuver commanders and S-2 sections.

The locations of captured materials and the TSE reports are incorporated into the brigade visualization, which fuses intelligence with governance, reconstruction, and development information. Information about exploited materials is available throughout the organization (from company to brigade level) and is frequently used to adjust priority intelligence requirements for the brigade commander.

Outcome for the 5/2 SBCT TSE Platoon

The CBRN Stryker reconnaissance platoon is equipped with sufficient offensive capability to allow the platoon the freedom to maneuver on the battlefield without added security elements. The nuclear, biological, and chemical reconnaissance vehicle—a specialized Stryker variant—was developed to detect and identify CBRN threats by integrating chemical, biological, and radiological capabilities. The Stryker nuclear, biological, and chemical reconnaissance vehicles and CBRN capabilities are brigade assets and are tasked according to brigade priorities.

Following the completion of an assigned mission, the TSE platoon is responsible for ensuring that the reports are immediately disseminated to the supported unit. The TSE platoon also provides updates at predetermined intervals. Finally, the TSE platoon ensures that end-of-mission reports are uploaded to pertinent electronic databases for mass dissemination to subordinate elements, adjacent units, and other governmental agencies.

The TSE platoon links the overall TSE mission with the intelligence structure of the brigade and ensures that intelligence gaps and pending inquiries with various intelligence functions are identified and addressed. In addition, the platoon produces TSE overlays for the brigade area of operations, thereby helping to target the enemy. Ultimately, the TSE platoon ensures that any derived information is inserted into the brigade targeting cycle to drive future operations.

The combination of the TSE mission and the intelligence structure of the brigade serves as an extension of the brigade analysis and control element. The exploitation cell consists of intelligence analysts who are trained in the area of document exploitation and are equipped to assist with the TSE analysis task. This structure facilitates the consolidation of detainees and captured equipment, documents, and electronic media in one location. Once the TSE platoon completes its mission and analysis, information is securely distributed.

The company intelligence support teams manage company TSE teams that perform preliminary evaluations of electronic media and relinquish copies to the organic company battle staff for initial analysis. Detainees and TSE-captured supplies and equipment are subsequently turned over to the tactical internment facility for in-depth analysis and prosecution. Upon completion of the analysis, company intelligence support teams and company battle staffs disseminate information and reports via a secure internet protocol router and present them to the TSE liaison officer. If not engaged in another mission, the TSE platoon may assist in evaluating and analyzing captured company level electronic media. The TSE platoon has more robust equipment, analytical capabilities, and expertise for further in-depth exploitation.

The success of the 5/2 SBCT strategy in Afghanistan and its impact on the Taliban network, previously entrenched within Kandahar Province, is largely attributable to the intelligence structure of the brigade. The 5/2 SBCT had been preparing to deploy to Iraq for 2 years before the change of mission to Afghanistan; this demonstrates the flexibility of the brigade TSE program.

Endnote:

[1]FM 3-24, *Counterinsurgency*, 15 December 2006.

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(*"Developing CBRN Training . . ." continued from page 14*)

[6]"Management of National Guard Weapons of Mass Destruction–Civil Support Teams," Office of the Inspector General, DOD, Audit Report No. D-2001-043, 31 January 2001.

[7]Ibid.

[8]Michelle K. McGinn and Wolff-Michael Roth, "Preparing Students for Competent Scientific Practice: Implications of Recent Research in Science and Technology Studies," *Educational Researcher*, Vol. 28, No. 3, 1999.

[9]Thomas F. Gilbert, *Human Competence: Engineering-Worthy Performance* (Tribute Edition), Pfeiffer: Silver Spring, Maryland, 1 March 1996.

[10]Anthony Marker, "Synchronized Analysis Model: Linking Gilbert's Behavior Engineering Model With Environmental Analysis Models," *Performance Improvement*, Vol. 46, Issue 1, January 2007.

[11]American National Standards Institute Z490.1-2001, *Criteria for Accepted Practices in Safety, Health, and Environmental Training*, American Society of Safety Engineers, August 2001.

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The Einstein Award and the ALS Operator Course

By Ms. Beverley P. Finley

I recently performed an evaluation of the Analytical Laboratory System (ALS) Operator Course, and the experience was very interesting and impressive. In addition to the regular course instructors, one of the most recent Einstein Award recipients was on hand to serve as an outside guest speaker.

The Einstein Award is an award presented to weapons of mass destruction (WMD)–civil support team (CST) operators who complete the WMD-CST proficiency analytical tests with 100 percent accuracy. Although 100 percent accuracy (as opposed to the 70 or 80 percent accuracy usually required to "pass" a test) represents a very high level of performance, let's face it—in today's world of life-and-death challenges, the WMD-CST mission really demands 100 percent accuracy. The small group of elite WMD-CST operators who actually achieve this high degree of technical expertise and proficiency in the area of chemical-, biological-, radiological-, and nuclear-agent identification are recognized by the chief of the Combating WMD Division of the National Guard Bureau. These operators historically represent the top 10 percent of the WMD-CST laboratory community.

The CST operators competing for the Einstein Award obtain their formal education from the ALS Operator Course, which covers the skills and knowledge required to prepare for and respond to a WMD incident as part of the state emergency management response system. The ALS Operator Course is specifically designed to provide select personnel with training in operator level use, information on sample analysis techniques and procedures, and a working knowledge of the technical and tactical skills necessary to accomplish the missions as a CST ALS operator. Upon completion of the course, students are capable of operating a variety of specialized equipment to process and identify suspected hazmat.

Recipients of the prestigious Einstein Award receive an all-expense-paid trip to the ALS Operator Course (which is currently conducted at Fort Leonard Wood, Missouri) to serve as guest speakers in the Subject Matter Mentoring Program portion of the course. Because the award recipients arrive at the course directly from the field, they can share information about their operational environments and about the lessons they have learned. Therefore, Einstein Award recipients are excellent reachback sources; the sharing of their standing operating procedures serves two purposes:

- It allows the students to become aware of items that may need to be incorporated into their unit standing operating procedures.
- It allows the students to become familiar with the way in which operations are conducted at other facilities. (In the event that collaboration is required for future exercises or missions, this advanced information sharing should cut down on the transition time often experienced when various units or entities come together to work jointly.)

In addition, the presence of an Einstein Award recipient in the ALS Operator Course venue also provides a great networking opportunity for the students.

As the military adapts and becomes more flexible in its response to current threats, the Chemical Corps Regiment is keeping pace. The ALS Operator Course, in conjunction with the associated Einstein Award recipients, is just one example of such Chemical Corps adaptability. And WMD-CST operators who compete for and achieve Einstein Award recognition are examples of the best and brightest that the Chemical Corps has to offer in the protection of our Nation.

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Not "Just Another Day"

By Major Alex Fuerst and First Lieutenant Chris Eichman

The poet Maya Angelou once penned, "One isn't necessarily born with courage, but one is born with potential. Without courage, we cannot practice any other virtue with consistency. We can't be kind, true, merciful, generous, or honest."[1] These simple virtues—rather than a desire to receive awards or to be referred to as a "hero"—led to Staff Sergeant Sean Davis's actions one evening when, in the words of William Shakespeare, "some have greatness thrust upon them."[2]

One of those seemingly endless days was 20 October 2011. It was the kind of day that included more tasks than time available to finish them. It was the kind of day that, following final formation, Staff Sergeant Davis (a 14-year chemical, biological, radiological, and nuclear [CBRN] Soldier serving as the operations sergeant, 92d CBRN Company, Fort Stewart, Georgia) just wanted to go home and escape from the complexities of life. It most certainly was not the kind of day that he expected to see a catastrophic event unfold right before his eyes—or the kind of day that he expected to see children die.

Davis remembers driving home through the "tree tunnel"—the name that his kids use to refer to Highway 144 East, which is the road that winds through the Fort Stewart training areas and into the gently rolling countryside surrounding the farming community of Glennville. There wasn't much traffic on the road that day—just a large pickup truck cruising behind him and an occasional oncoming vehicle. The drive home was peaceful—until Staff Sergeant Davis glanced in his rearview mirror and noticed that the sport utility vehicle (SUV) that he had just met had crossed the centerline and slammed head-on into the pickup truck behind him.

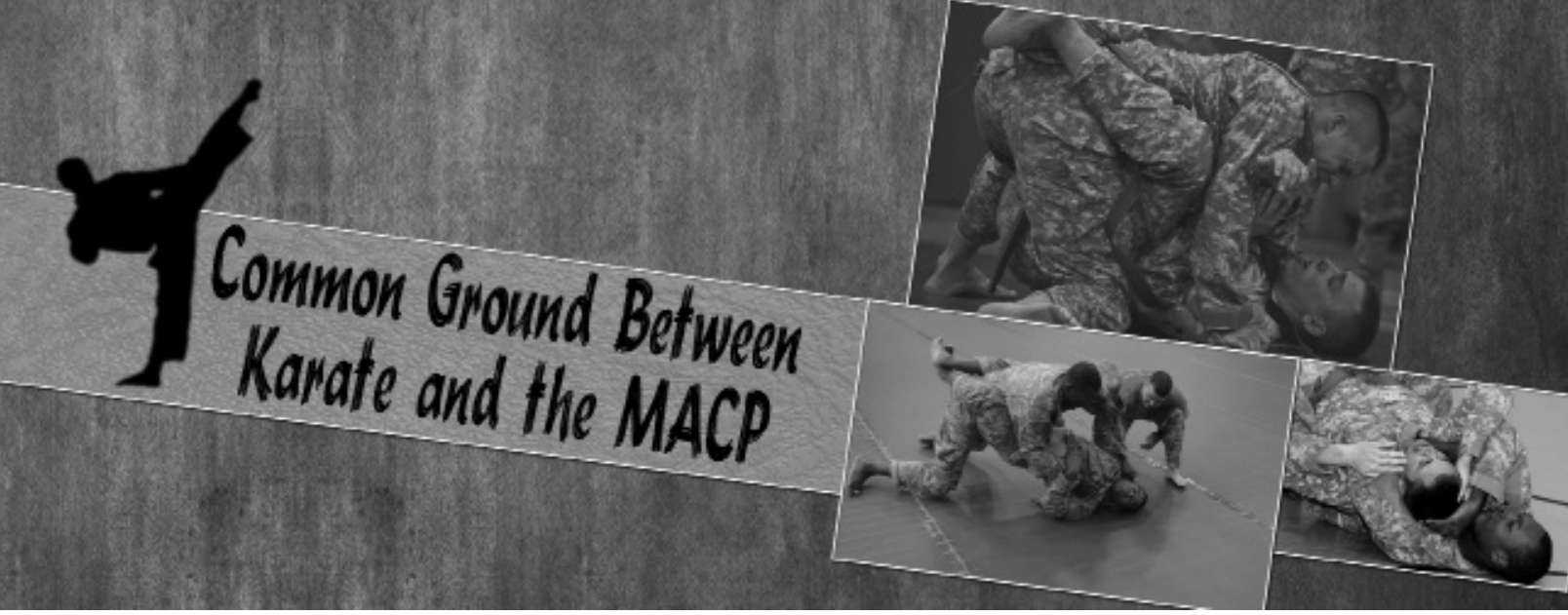
Staff Sergeant Davis did what all Soldiers learn to do through training and repetition—he reacted in an effort to save the lives of others. Staff Sergeant Davis immediately slammed on his brakes and called 911 as he exited his vehicle and ran toward the collision site.

The 911 operator answered the phone, "This is 911. What is your emergency?" Still running toward the scene of the accident, Davis frantically replied, "My name is Staff Sergeant Sean Davis, and the SUV in the oncoming traffic lane that just passed me collided head-on with the pickup traveling behind me. I'm on 144—just east of G&R Farms, near the Glennville Bridge. Send fire, rescue, and emergency medical services. There are numerous injuries to the occupants of both vehicles, and the vehicles are smoking. Please hurry. This is really bad!" Just as Davis reached the crushed, smoking vehicles, the 911 operator indicated, "I'm notifying emergency services now, sir." But Davis barely heard the operator's final statement; his attention was completely focused on the horrific scene in front of him.

The situation was far more severe than anything Davis had encountered during his previous deployment as part of Operation Iraqi Freedom. When the maroon SUV that Davis had met only moments before crossed the centerline and struck the white pickup truck that had been following him, the collision immediately transformed the vehicles into a grotesque, contorted pile of maroon and white metal that hardly resembled the former shapes. "There's no way anyone survived this," Davis thought to himself, as he stood at the wreckage and surveyed the scene. He noticed two men inside the SUV; they were trying to speak, but their words were faint and unintelligible. Then, he turned his focus toward the pickup truck, scanning it for occupants. The mangled mass appeared to have also swallowed an older woman and several small children, but Davis did not detect any movement.

Although he remembers standing there for only a few moments, Davis felt as though an eternity passed as his senses captured every detail. As he moved toward the wreckage, Davis recognized a familiar face running toward him. A fellow Soldier—Specialist Willie Rawls—had been trailing several vehicles behind and had also witnessed the collision. "Come on—let's get the kids first," Davis said; and he and Rawls

(*Continued on page 20*)



By Captain Jason Gramling

As the Army continues to operate in a world that increasingly calls for the use of nonlethal conflict management, it is more and more crucial to provide training in basic hand-to-hand techniques. It is important that these techniques be relatively easy to learn, decisive when employed, and mutually supportive.

At its basis, human hand-to-hand conflict has not changed much over the course of mankind; we have always had two arms, two legs, and one head. There have been some personal armor inventions, but they have been similar to one another in that they have primarily covered the same areas of the body and left the same areas exposed—and for hundreds of years, many fighting systems have exploited the weaknesses in personal armor.

As a long-time practitioner who holds rank in jujutsu (Japanese) and karate (Japanese and Okinawan), I had my own ideas about hand-to-hand techniques; however, I recently completed Level II Modern Army Combatives Program (MACP) training—and one of the instructors made a point that stuck. He said that the techniques used in the MACP were chosen because the ability to demonstrate relative mastery of a specific skill set in the 1–4 weeks available for Level I, II, III, or IV training is critical. Students wouldn't be able to grasp the art of karate in just a month.

That was a good point. I have taught karate to hundreds of students, and it usually takes 3 months of strong effort for them to reach the first colored belt. With the specific sets of techniques used in the MACP, the Army has a system that makes hand-to-hand combat skills easy to learn, measurable, and repeatable. The system is a "quick and dirty" one that allows for consistent results and room for later exploration and refinement by busy students and instructors when time permits.

In April 2012, I traveled to Okinawa, Japan (the birthplace of karate), to train under 9th and 10th degree black belt karate instructors for 12 days. The instructors, who have been training in and teaching karate for 50 to 60 years, still train every day. The group with whom I trained consisted of other karate practitioners from New York, Wyoming, Australia, Denmark, Poland, and Mexico.

Karate is essentially organized around long combinations of punches, kicks, and blocks that are performed while moving through various stances; these long combinations are called *kata* in Japanese (or *forms* in English). My fellow karate practitioners and I spent hours and hours practicing the various grappling movements of the kata. The similarities between these practice sessions and the MACP Level II classes I had taken 2 weeks earlier were amazing. However, the applications of the karate movements were not always readily apparent because those who originally created the movements were often forced to practice them where their future opponents or enemies could observe the practices. It wouldn't have made sense for the practitioners to give away their tactics. Therefore, as students, we took advantage of every opportunity to ask the Japanese instructors about applications of the kata. Unfortunately, because many traditional martial arts instructors are unaware of the connection between the kata and actual fighting, they often cannot explain it. Consequently, criticisms about the relevance of traditional martial arts in hand-to-hand combat have been raised. In reality, though, the kata were the means by which the old masters passed on their lessons learned.

In spite of questions about the relevancy of karate in hand-to-hand combat, there are many similarities between the karate kata and MACP techniques. For example, grappling is a part of every karate kata—just as it is a major component of the MACP. The *drop to single leg takedown* technique of the MACP involves grabbing and trapping the enemy's foot and leg between the thighs; this is similar to the karate *standing double middle block* kata. And when an MACP practitioner performs a *straight arm bar*, he captures the enemy's wrist and upper arm by crossing his arms in front of his chest or grabbing the opponent's wrist and squeezing his thighs together, which is similar to the *standing double middle block* kata, in which the thighs are also squeezed together, the pelvis is brought forward to be used as a fulcrum against the enemy's elbow, and the arms are crossed in front of the chest. Furthermore,

an MACP *single wing choke* or *sleeve choke* is similar to an *elbow strike to an open palm* in a kata and an MACP *collar choke from the rear mount* is similar to a *down block* in a kata. The defensive posture referred to as the *table top* by the bottom member within the MACP "side control" is the same as the karate block known as the *mawashi uke* (or *round block*). Finally, in karate, there are numerous turns in deep stances at 90º, 180º, and 270º angles; these are actually the same as the *hip throw* taught in Level II MACP training.

There are some who take Level I MACP training and decide that they don't want to take any more combatives courses. And there are some who claim that they know what karate is, when in fact, they have actually only watched embarrassing mixed martial arts footage on television. Both of these groups need to be educated. Level I MACP training is intended to lay a foundation, but Level II is vastly different; it is more informative—and more enjoyable. And those who "judge" karate based on televised mixed martial arts competitions need to be aware that there has never been a single "karate chop" thrown in any televised, mixed martial arts event.

Based on my experiences, I offer the following tips:

- The techniques chosen for MACP are logical ones for achieving measurable, repeatable skills in 1-, 2-, and 4-week blocks, whereas karate skills take much longer to develop.
- There are many lines of intersection for karate and MACP.
- Practioners should train often—and train hard.
- MACP training should not be judged by what is taught in Level I. Level II includes much more detailed instruction and explanation and covers new ground and standing techniques.
- Practitioners of karate and MACP should mutually respect one another because both disciplines involve more than is typically realized.

Captain Gramling is the commander of Company D, 2d Battalion, 10th Infantry Regiment, Fort Leonard Wood, Missouri. He is a 5th degree black belt in karate and a 3d degree black belt in jujutsu.

(*"Not Just Another Day" continued from page 18*)

pried open the door to the pickup truck. A small, motionless child was strapped in his car seat—his head slumped to one side at an unnatural angle. He had suffered a broken neck and was dead. His sister and their grandmother were also dead. As the sound of sirens grew louder, Davis and Rawls realized that a young boy in the pickup truck was still alive. "Are you OK?" they asked. "Are you OK?" There was no response. Given an imminent danger of fire from the smoking vehicle, Davis and Rawls scooped up the boy and carried him away from the wreckage. Rawls tended to the child, while Davis returned to the SUV. "I don't remember doing a lot of thinking. I just seemed to react and do what needed to be done." Davis remembered. "But you know, as I ran to the SUV, the images of those kids were ingrained in my mind. It was horrible to see those children."

As Davis approached the SUV, paramedics, police, and the fire department arrived and took charge of the scene. Davis stayed and assisted rescue crews as they cut the two men from the SUV. The driver died while firemen attempted to pry open the vehicle; the passenger died en route to the hospital.

The young boy who Davis and Rawls pulled from the vehicle was transported to a hospital via helicopter, and he was the sole survivor of this horrific accident. The entire incident was a tragic and preventable loss!

In responding to this accident, Staff Sergeant Davis selflessly and courageously reacted to save the lives of others. His heroism epitomizes the values of a Soldier, and he serves as an example for us all. When asked about his own vehicle in relation to the incident, Davis indicated that he didn't really think about the possibility of his vehicle being struck. "I figured it wasn't me, but I was there—so I did whatever anyone else would have done," he said. "Why wonder about what could have happened when it's time to deal with what's happening now?"

Endnotes:

[1]Maya Angelou, *I Know Why the Caged Bird Sings*, Random House, Inc., New York, 1969.

[2]William Shakespeare, *Twelfth Night*, 1601–1602.

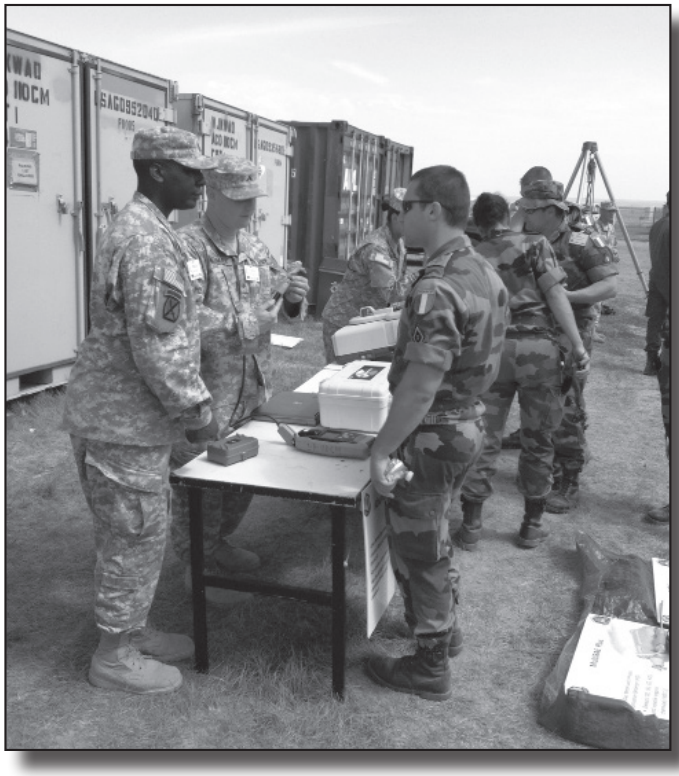
Major Fuerst is the executive officer, 83d CBRN Battalion, Fort Polk, Louisiana. He holds a bachelor's degree from George Mason University, Fairfax County, Virginia; a master's degree in business administration from Webster University; and master's degrees in military arts and science and military strategy from the U.S. Air Force Air University, Maxwell Air Force Base, Alabama.

First Lieutenant Eichman is the assistant operations and training officer (S-3), 83d CBRN Battalion. At the time of the accident, he was serving as the executive officer, 92d Chemical Company. He holds a bachelor's degree in environmental management from Columbia Southern University, Orange Beach, Alabama.

The 110th Chemical Battalion Participates in Exercise Precise Response

By First Lieutenant Kyle E. Lewandowski

A group of 15 U.S. Army Soldiers faced the tall order of serving as the American delegation to an international training exercise that focused on defense against chemical, biological, radiological, nuclear, and high-yield explosives (CBRNE) threats—while scientists and representatives from foreign nations scrutinized the group's every move. The pressure was high, but the Soldiers did not disappoint.



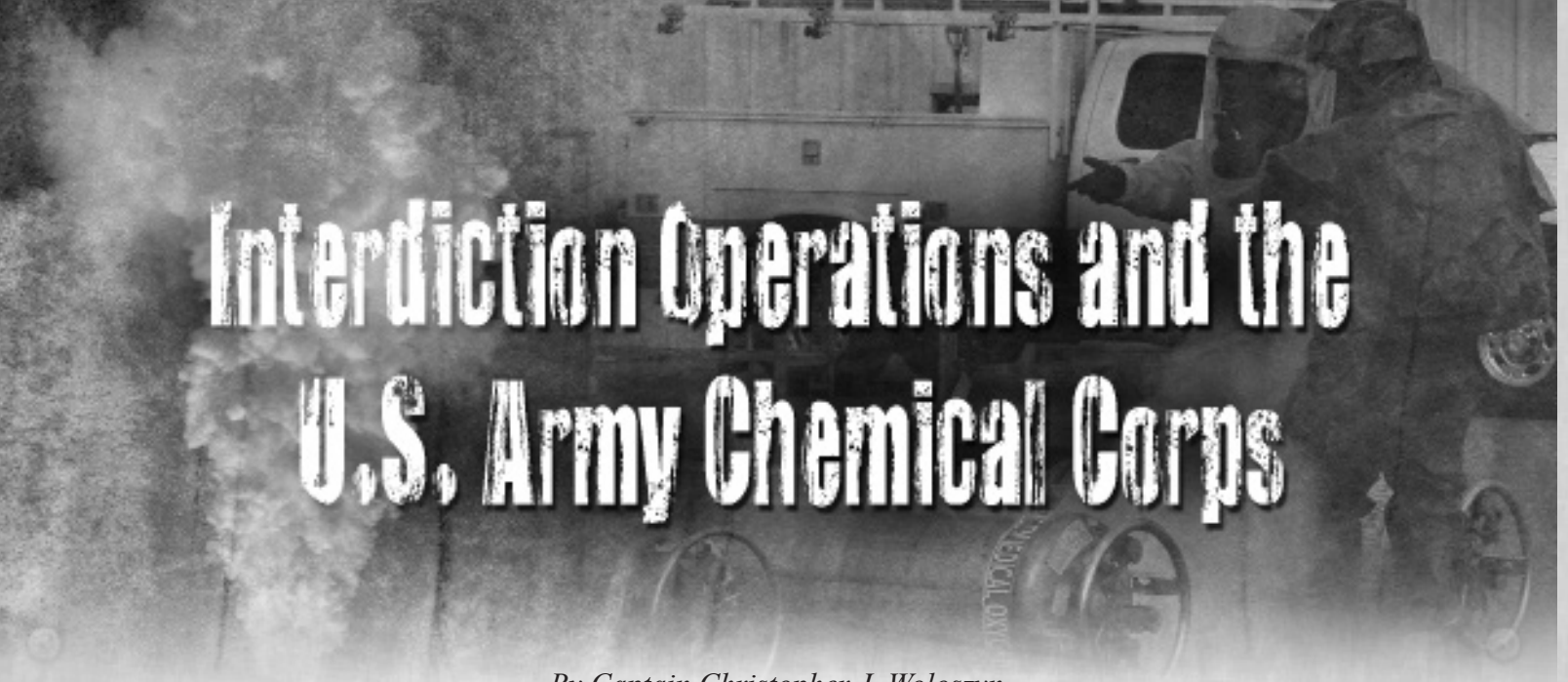
Soldiers from the 110th Chemical Battalion discuss equipment with a French soldier during Exercise Precise Response.

CBRNE Response Teams 1 and 3, Company A, 110th Chemical Battalion (Technical Escort), Joint Base Lewis-McChord, Washington, participated in the North Atlantic Treaty Organization exercise known as Exercise Precise Response, 9–27 July 2012. This annual joint event brings CBRNE specialists from numerous countries together to observe, train, and learn from one another. This year's exercise was hosted by Defence Research and Development Canada–Suffield, Alberta, Canada—a scientific agency experienced in chemical and biological warfare agent defense. Defence Research and Development Canada–Suffield provides world-class training to first responders, the Canadian armed forces, and international militaries. In addition to the United States, other North Atlantic Treaty Organization members and partner nations that attended this year's exercise included Austria, Belgium, Canada, Denmark, Finland, France, Germany, Norway, Sweden, and the United Kingdom. Participants consisted of sampling and decontamination personnel, explosive ordnance disposal technicians, laboratory analysts, and scientists.

The 110th Chemical Battalion sought to meet three principal training objectives throughout Exercise Precise Response:

- Conduct CBRNE and weapons of mass destruction–elimination operations as part of an international task force.
- Gain confidence in the use of detection, identification, and personal protective equipment against live chemical agents.
- Share expertise and strengthen partnerships with North Atlantic Treaty Organization members and partner nations.

(*Continued on page 26*)



Interdiction Operations and the U.S. Army Chemical Corps

By Captain Christopher J. Woloszyn

According to the *National Military Strategy to Combat Weapons of Mass Destruction (NMS-CWMD)*,[1] the Department of Defense (DOD) is responsible for the following mission areas:

- Offensive operations.
- Elimination operations.
- Interdiction operations.
- Active defense.
- Passive defense.
- Weapons of mass destruction (WMD) consequence management.
- Security cooperation and partnership activities.
- Threat reduction cooperation.

The primary combating WMD force provider for most of these mission areas is the U.S. Army. Substantial policy, doctrine, force development, and operating procedures exist for all mission areas except one—interdiction operations. Unlike the situation with most chemical, biological, radiological, and nuclear (CBRN) operations, little policy and few procedures exist to guide the role of the U.S. Army Chemical Corps in these operations. The responsibility for the interdiction operations mission has traditionally been assigned to the U.S. Special Operations Command. At a time when our Nation is downsizing its conventional forces and placing an increased emphasis on joint and special operations forces (SOF) operations, the Chemical Corps has a perfect opportunity to offer its capabilities in addressing this sophisticated issue.

Terrorist groups have placed a high priority on acquiring WMDs, and the DOD must be prepared for this eventuality. CBRN defense (WMD consequence management, passive defense) and WMD elimination have been the mainstay of the Chemical Corps, but it is time that we look "to the left of the boom" for a solution to the WMD problem. This is a priority of national security leaders and the current presidential administration. This article presents a concept that the Chemical Corps can use to meet *NMS-CWMD* guidelines and to contribute to joint interdiction operations.

What Are Interdiction Operations?

Joint Publication (JP) 3-03, *Joint Interdiction*, describes interdiction operations as "actions to divert, disrupt, delay, or destroy an enemy's surface capabilities before they can be used effectively against friendly forces or to otherwise achieve objectives."[2] Interdiction operations have historically been performed by a variety of forces as a means to deny or prevent our enemies from using their assets at a time or place of their choosing, thereby protecting U.S. strategic interests. The U.S. government interdicts shipments of illegal drugs, firearms, and explosives and the movement of potential threats before they can be used against U.S. forces or the domestic population. Interdiction operation mission sets are assigned to a variety of units across the DOD and other government agencies such as the U.S Border Patrol, the U.S. Coast Guard, and other law enforcement agencies. The DOD is responsible for external threats on oceans and in joint operations areas, while the U.S. Department of Homeland Security and state and local law enforcement agencies conduct interdiction activities within the continental United States.

The interdiction of WMD is a unique subset of interdiction operations. According to the *NMS-CWMD*, WMD interdiction operations are "designed to stop the transit of WMD, delivery systems, associated and dual-use technologies, materials, and expertise between states of concern and between state and nonstate actors, whether undertaken by the military or by other agencies of government."[3] These operations are key to preventing adversarial attempts to acquire or proliferate WMD. The interdiction of WMD is a constantly evolving task that is becoming more difficult in our current operating

environment. It requires dedicated intelligence and forces that are prepared to operate at a moment's notice in a variety of environments. U.S. forces may be called upon to prevent the transit of WMD from state to state, state to nonstate, nonstate to state, or nonstate to other nonstate actors.[4] The sheer size of the globe that must be kept under surveillance and the nature of the forces required to interdict potential WMD threats make this a formidable—if not impossible—task.

Why Are WMD Interdiction Operations Important?

The 2010 *National Security Strategy* states that the current administration "has no greater responsibility than the safety and security of the American people. And there is no greater threat to the American people than [WMD] . . ."[5]

Via technology, WMD information can be passed from one individual to another at a frighteningly rapid rate. Furthermore, advances in biotechnology are resulting in changes to the threat itself. The U.S. Department of State has indicated that "terrorist organizations and smuggling networks with links to national governments have posed an increasingly potent proliferation danger in the last few years, boosting the likelihood that extremists could acquire difficult-to-obtain, WMD-related knowledge and components."[6] Therefore, the enemy use of WMD is a real threat and our Nation's top leaders are acting to halt it.

The United States has also recognized the need for more robust tools to stop the proliferation of WMD around the world, specifically identifying interdiction as an area for greater focus.[7] Our Nation has occupied an integral role in creating key international initiatives to stop the movement of WMD. In 2005, the United States assisted in creating and supporting the Global Initiative to Combat Nuclear Terrorism and the Proliferation Security Initiative to help ensure a shared, international effort. The Global Initiative to Combat Nuclear Terrorism is a group of 85 nations that work collectively and cooperatively to detect, prevent, and respond to nuclear terrorism.[8] The Proliferation Security Initiative is a similar cooperative of 90 countries that are collectively committed to facilitating the exchange of information and stopping the movement of WMD and related technologies through their countries. The Proliferation Security Initiative also presents an international framework for signatory nations to legally interdict WMD and their components.[9] As the potential for worldwide WMD proliferation increases, interdiction operations will remain a key aspect in controlling rapidly emerging threats.

In response to emphasis from the U.S. presidential administration, the DOD has also focused on combating WMD. Documents such as the recently published *2012 Army Strategic Planning Guidance* signify that combating WMD is a top Army priority for the 21st century defense of the Nation.[10]

Who Performs WMD Interdiction Operations?

WMD interdiction operations can be conducted by a variety of units, but these missions have traditionally been assigned to SOF units. SOF units can neutralize WMD proliferation and combat WMD operations. And an increased emphasis is being placed on SOF operations, which will likely lead to SOF expansion.[11] At the same time, our Nation is facing budget and resource constraints that will result in a reduction in conventional forces—which, in turn, will impact the Chemical Corps. The area of interdiction operations is one in which the Chemical Corps can provide support and value to the DOD. This belief is echoed in the *2012 Army Strategic Planning Guidance*, which states, "The proliferation of WMD increases the scale of operations required to counter them. The magnitude of the elimination problem exceeds the capacity of [SOF] alone. Conventional forces remain integral to operations to combat WMD and mitigate their effects."[12] The guidance directly addresses the need for SOF and conventional forces to work jointly, calling for the further integration of the forces for "high end" U.S missions and specifically highlighting counterproliferation as an example. Counterterrorism and counterproliferation are becoming Army priorities, and the Chemical Corps must respond by offering its inherent, cost-effective capabilities, which are tailored for this support role. But how can the Chemical Corps become more involved in interdiction operations?

Simply by their nature and by the resources required, interdiction operations will always involve more than one unit and will likely entail more than the DOD. According to the *NMS-CWMD*, there are three strategic enablers that are important in stopping the proliferation of WMD:

- Intelligence.
- Partnership capacity.
- Strategic communications support.

National intelligence will be required from a host of organizations within the U.S. intelligence community, such as the Central Intelligence Agency, the Defense Intelligence Agency, and the National Ground Intelligence Center. In addition, the international cooperation of foreign intelligence organizations will also be necessary. The U.S. government will need for like-minded countries to share information about suspected movements or transits with their U.S. counterparts, which is why international agreements and initiatives are imperative. There are also a large number of other government organizations that contribute to the mission of combating the proliferation of WMD, including the U.S. Coast Guard, the Federal Bureau of Investigation, the U.S. Department of Energy, the U.S. Customs and Border Protection, and the U.S. Department of Homeland Security.[13] Organizations within the DOD, such as the Defense Threat Reduction Agency, contribute knowledge and expertise and play a major integration role in combating WMD. Most importantly, WMD interdiction requires that combatant commanders use all available resources to become prepared to execute lines of operations in their assigned operational areas. Combatant commanders must also conduct shaping operations and provide mission command for units operating in their geographic commands.[14] It is not possible for U.S. and allied SOF, maneuver forces, or CBRN forces to manage all WMD interdiction operations

alone; joint task force headquarters are necessary for the oversight of asset integration across all Services.

Where Do Chemical Units Fit Into Interdiction Operations?

Interdiction operations are comprised of established tasks from Field Manual (FM) 7-15, *The Army Universal Task List*.[15] Many military units are capable of conducting tasks such as performing tactical intelligence preparation of the battlefield; preparing intelligence; and searching for, locating, isolating, and characterizing the objective. However, few units are specifically trained and equipped to handle the unique hazards faced during WMD interdiction operations.

WMD interdiction operations differ from other types of interdictions in that they take place in potentially toxic environments and that advanced technical proficiency is required for the identification and exploitation of the suspected WMD. According to Joint Publication (JP) 3-40, *Combating Weapons of Mass Destruction,* a successful WMD interdiction can essentially be broken down into the following operations (Figure 1):

- **Track.** Tracking involves the use of extensive intelligence to determine the potential movement of WMD or its components or precursors.
- **Intercept.** Interception refers to the deployment of U.S. forces to stop WMD movement on land or sea or in the air.
- **Search.** Searching is the process of seeking the WMD and, if found, identifying, characterizing, attributing, and exploiting it.
- **Disposition.** Disposition involves a determination about what will happen to the intercepted material—whether it will be returned, seized, or destroyed.
- **Transition.** Transition entails the reconsolidation of forces.

The mission area in which the Chemical Corps could best contribute to WMD interdiction operations is the search phase. The primary goal of the search mission is to locate the WMD or its components or precursors. The search phase consists of three steps:[17]

- **Identify and characterize.** The identification and characterization step includes the actual search for, and documentation of, the finding. The unit conducting the search must have sophisticated monitoring equipment. Personal protective equipment may also be required. Detailed logs, sketches, and photographs must be produced.
- **Attribute.** The attribution step describes the chemistry and purity of the substances found. This step requires a great deal of target recognition training. It also demands the ability to determine the specific WMD. The attribution step allows the interdicting force to gather information on the extent of the WMD program and the volume of knowledge proliferated.
- **Exploit.** The final step of the search phase involves exploitation—which may take hours or days, depending on the size of the target and the exploitation process required. Fingerprint and deoxyribonucleic acid (DNA) samples are collected and shipped to various U.S. laboratories, and documents and receipts (such as chains of custody) provide further information for attribution, intelligence operations, or criminal prosecution. A chain of custody is prepared to ensure that the samples are admissible in U.S. court.

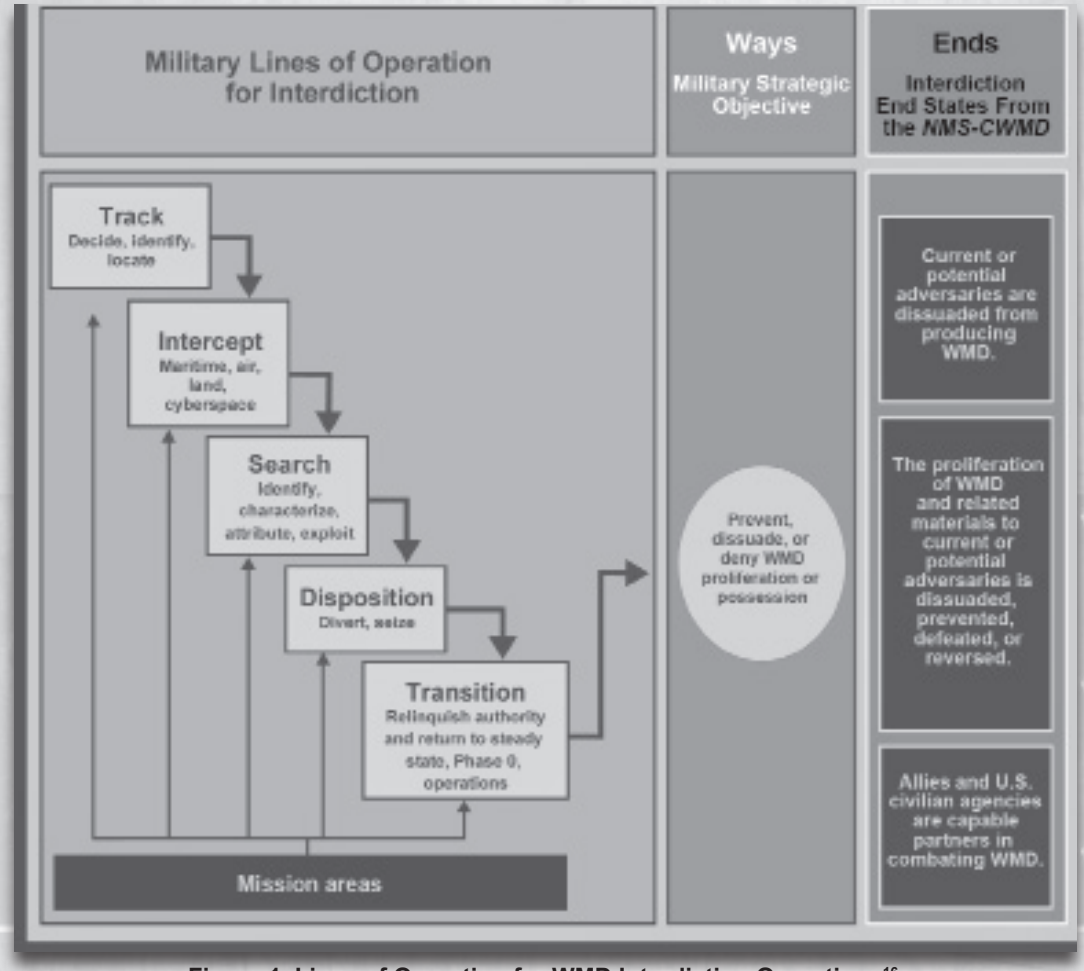


Figure 1. Lines of Operation for WMD Interdiction Operations[16]

Although the search mission may seem simple, a significant amount of

training and the development of specialized tactics, techniques, and procedures are required to carry it out. In addition, it may be necessary for those collecting the information to wear personal protective equipment; this requires further training. With the equipment and the technical knowledge already acquired through their fundamental training, Chemical Corps units are uniquely prepared to operate in hazardous environments. U.S. Army Chemical, Biological, Radiological, and Nuclear (USACBRNS) students receive hazmat training, where they learn about the selection requirements and limitations associated with personal protective equipment as well as the strengths and limitations of their monitoring equipment. Soldiers who attend the Technical Escort Course examine various sample collection techniques and further enhance their understanding of the exploitation process. Therefore, many CBRN Soldiers have at least a minimal understanding of the identification, characterization, attribution, and exploitation steps of the search phase and there are multiple Chemical Corps units that are already prepared to undertake the mission and perform these steps without any significant reorganization or added specialized capabilities. The most prospective fielded organizations are the chemical, biological, radiological, nuclear, and high-yield explosives response teams (CRTs) and the SOF chemical reconnaissance detachments (CRDs). CRTs and CRDs conduct characterization and exploitation operations as part of their primary mission-essential task lists in support of SOF. CRTs are also specifically trained in establishing chains of custody according to federal regulations, and they contain integrated explosive ordnance disposal teams to perform render-safe operations if necessary. Although CRTs are not immediately prepared to conduct WMD interdiction operations, with some additional equipment and training, they could be quickly configured and prepared to execute those operations.

How Can We Prepare and Equip Our CBRN Forces to Support WMD Interdiction Operations?

To support WMD interdiction operations, the Chemical Corps—more specifically, CRTs and CRDs—would need to expand its capabilities to support different types of operating environments. For example, the units must be able to perform operations in permissive and nonpermissive environments—and on land or at sea. And based on the particular scenario, different types of personal protective equipment might be required.

Although significant levels of logistics and transportation support are required for many chemical units, interdiction operations demand the use of equipment that is man-portable or that can be transported by limited air assets. For this reason, small units—which are more likely able to carry their own gear into the area of operations—are optimal for use in interdiction missions. Because CRTs typically carry a significant amount of gear to ensure that they have the ability to respond to any hazard, the use of CRTs for interdiction operations would necessitate a change to current tactics, techniques, and procedures.

Interdiction operations also call for advanced, specialized equipment—much of which is not yet fielded, is still in development, or is not yet technically feasible. This is a unique technological hurdle. Current standoff detection is generally too bulky and ineffective for all but the largest of sources. While the Chemical Corps has effective, portable detectors, none are small enough to be mounted on an unmanned aerial vehicle. In the event that a small amount of the nerve agent sarin or a sealed, 10-pound bag of a biological toxin were hidden on a ship, an extremely time-consuming search (perhaps requiring that the sealed container be opened) would need to be conducted to ensure that the WMD was located. Such activities increase the potential for the spread of contamination. Capable, effective standoff detection is a critical challenge for the acquisition community in searching for WMD in-transit across a large amount of territory.

Finally, WMD interdiction operations would require that SOF/maneuver forces and CBRN forces achieve interoperability and that they share tactics, techniques, and procedures. Although CRDs have inherently strong relationships with SOF, there are limited numbers of CRDs; CRTs could fill this gap. Because WMD interdiction operations leave little room for error, significant training would be required. To execute the mission quickly and efficiently, all units and organizations involved would need to train together before the operation began. Chemical units would need to establish unique tactics, techniques, and procedures for use in operations on ships and other forms of transportation. They would also require the ability to conduct operations rapidly and thoroughly.

Conclusion

The proliferation of WMD is a real, emerging, and evolving threat to U.S. national security; and the interdiction of WMD is an important mission area. The goal of WMD interdiction is to prevent the employment of WMD. Once a target is located, interdiction operations essentially become exploitation missions that are performed on mobile WMD materials in various operating environments. The Chemical Corps is capable of supporting this critical mission without additional force structure, thereby becoming a conventional force multiplier to SOF or any other forces that are tasked with this strategic mission. However, the equipment capability must be improved.

Endnotes:

[1]*National Military Strategy to Combat Weapons of Mass Destruction*, Chairman of the Joint Chiefs of Staff, Washington, D.C., 13 February 2006, <www.defense.gov/pdf/NMS-CWMD2006.pdf>, accessed on 28 August 2012.

[2]JP 3-03, *Joint Interdiction*, 14 October 2011.

[3]*National Military Strategy to Combat Weapons of Mass Destruction*, 13 February 2006.

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

[5]*National Security Strategy*, Office of the President of the United States, May 2012, <http://www.whitehouse.gov/sites/default/files/rss_viewer/national_security_strategy.pdf>, accessed on 29 August 2012.

[6]"Nonstate Actors Pose Growing Proliferation Threat: U.S.," *NationalJournal*, Global Security Newswire, 19 August 2011, <http://www.nti.org/gsn/article/nonstate-actors-pose-growing-proliferation-threat-us/>, accessed on 29 August 2012.

[7]"Proliferation Security Initiative," U.S. Department of State, <http://www.state.gov/t/isn/c10390.htm>, accessed on 29 August 2012.

[8]"The Global Initiative To Combat Nuclear Terrorism," U.S. Department of State, <http://www.state.gov/t/isn/c18406.htm>, accessed on 29 August 2012.

[9]"Proliferation Security Initiative."

[10]*2012 Army Strategic Planning Guidance*, U.S. Department of the Army, 19 April 2012, <http://usarmy.vo.llnwd.net/e2/c/downloads/243816.pdf>, accessed on 29 August 2012.

[11]"Report: Military Realignment To Emphasize Drones and Special Forces," *NationalJournal*, 25 January 2012, <http://www.nationaljournal.com/nationalsecurity/report-military-realignment-to-emphasize-drones-and-special-forces-20120125>, accessed on 29 August 2012.

[12]*2012 Army Strategic Planning Guidance*, 19 April 2012.

[13]JP 3-40, *Combating Weapons of Mass Destruction*, 10 June 2009, <www.fas.org/irp/doddir/dod/jp3_40.pdf>, accessed on 29 August 2012.

[14]Ibid.

[15]FM 7-15, *The Army Universal Task List*, 27 February 2009.

[16]JP 3-40, 10 June 2009.

[17]Ibid.

Acknowledgement: The information presented in this article was supported in part by Class 03/04-12, CBRN Captain's Career Course, Fort Leonard Wood, Missouri.

At the time this article was written, Captain Woloszyn was a student in the CBRN Captain's Career Course. He is now assigned to the Force Protection Cell, Regional Command–South, Afghanistan. He previously served as the leader of a technical escort team and as the executive officer, Company C, 22d Chemical Battalion (Technical Escort), Aberdeen Proving Ground, Maryland. Captain Woloszyn holds a bachelor's degree in mechanical engineering from the U.S. Military Academy at West Point, New York.

(*"The 110th Chemical Battalion Participates . . ." continued from page 21*)

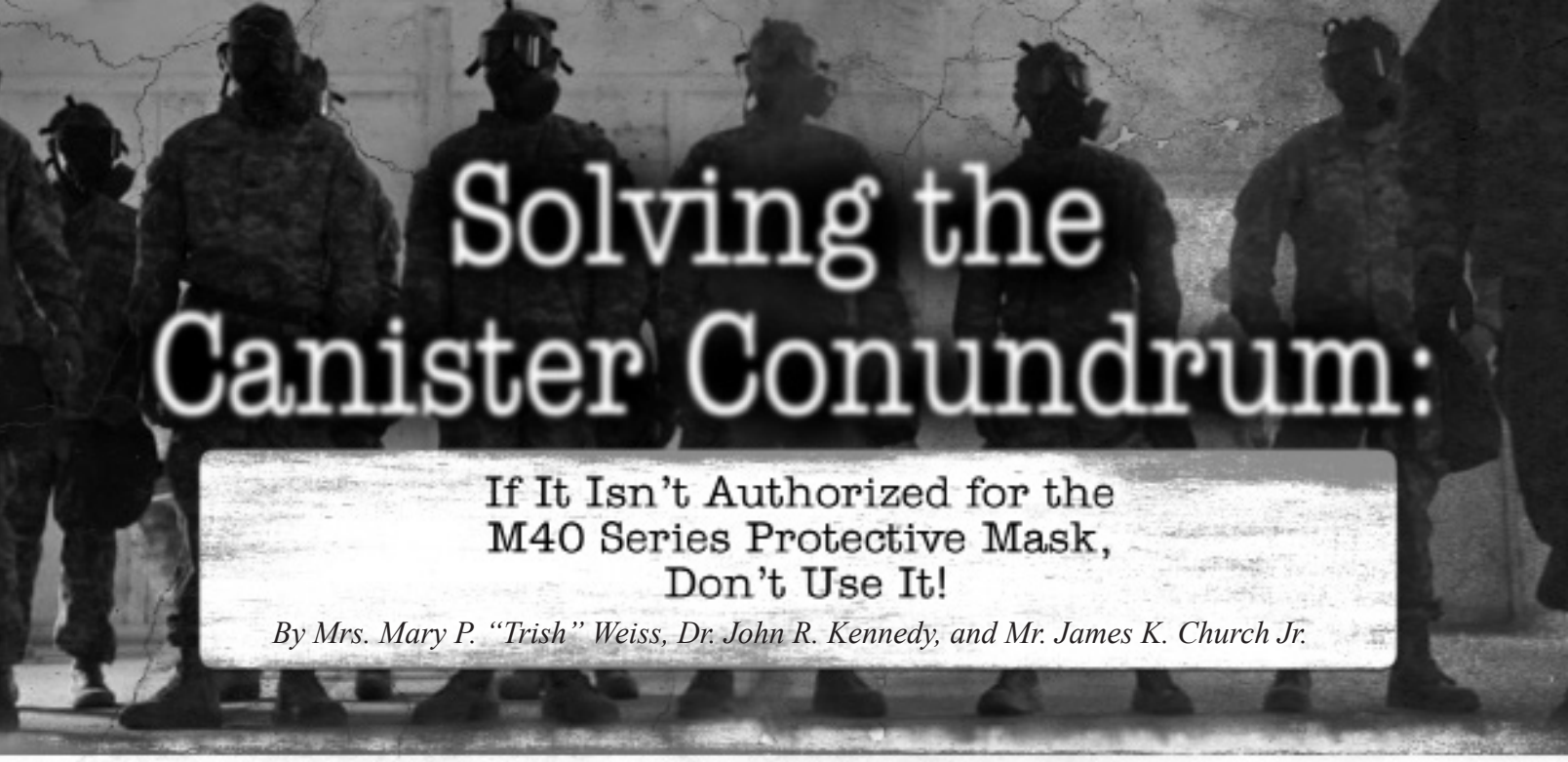
During the exercise, CBRNE response team Soldiers encountered 13 missions involving a range of live chemical agents and biological simulants; explosive ordnance disposal technicians were also tasked with rendering mock explosive devices safe.

Soldiers were required to conduct sensitive-site exploitation in a variety of unique scenarios, including automobile accidents, clandestine laboratories, and a subterranean bunker. To add to the challenge, all training was conducted while wearing personal protective equipment on the sun-heated Canadian prairie, where temperatures reached well over 80ºF. According to one of the participants, "Working with real [biological, radiological, and chemical] agents . . . validated our [tactics, techniques, and procedures] and [standing operating procedures] and gave us confidence in our equipment."

Several of the missions required that personnel from the various nations perform decontamination procedures on one another, thereby building trust among the international participants. Personnel from all countries fully embraced the global spirit of the exercise as they showcased their equipment, discussed best practices, and networked with others.

According to the commander of Company A, who served as the head of the U.S. delegation, "Out of the 7 years of Exercise Precise Response, this was by far the smoothest and most technically proficient group." The 110th Chemical Battalion met its stated training objectives and is now better postured to conduct CBRNE operations in a joint environment. More importantly, the CBRNE response team Soldiers left with heightened confidence in their individual and collective abilities.

First Lieutenant Lewandowski is an assistant operations officer with the 110th Chemical Battalion. He holds a bachelor's degree in business administration from Drake University, Des Moines, Iowa.



Solving the Canister Conundrum:

If It Isn't Authorized for the M40 Series Protective Mask, Don't Use It!

By Mrs. Mary P. "Trish" Weiss, Dr. John R. Kennedy, and Mr. James K. Church Jr.

The M40 series protective mask is a remarkable piece of equipment. It provides face, eye, and respiratory protection in chemical, biological, radiological, and nuclear environments; and it can be worn continuously for 8 to 12 hours.[1] The M40 series replaced the M17 series protective mask as the standard Army field mask in the early 1990s, and it is still produced for field and combat vehicle applications.

The M40A1 mask, which is specifically designed for field application, features a flexible, silicone facepiece with binocular, hard-coated, polycarbonate lenses with protective outserts; air inlet and outlet valves; front and side voicemitters; an internal/external drink tube system that interfaces with standard Army water canteens; and a "second skin" to provide protection against liquid contamination. Designed for combat vehicle application, the M42A2 mask has the same basic features as the M40A1 mask—plus a quick-doff hood, detachable microphone, and hose-and-canister carrier that allows the filter canister to be worn on the belt.

Filtration for the M40 series masks is provided by the C2A1 filter canister, which is a two-stage gas and particulate filter equipped with standard North Atlantic Treaty Organization threads. In the first stage, a pleated, high-efficiency particulate paper filters out airborne particles such as biological agents and dust. In the second stage, a bed of activated carbon impregnated with copper, silver, zinc, molybdenum, and triethylenediamine (commonly referred to as ASZM-TEDA) adsorbs chemical aerosols and gases. The C2A1 canister provides protection against a variety of chemical warfare agents (CWAs) including nerve, choking, blister, and blood agents. After passing through the C2A1 canister, filtered air is drawn through air inlet valves into the mask facepiece and nose cup and exhaled through a covered outlet valve assembly.[2]

The M40 series mask facepiece is manufactured in three sizes to fit the 5th to 95th percentile of Soldiers, and it features an inturned peripheral seal to provide a more secure fit.[3] The facepiece and mask accessories (including the filter canister, outserts, the waterproof bag, and the operator's manual) are contained in a rugged, canvas carry bag.

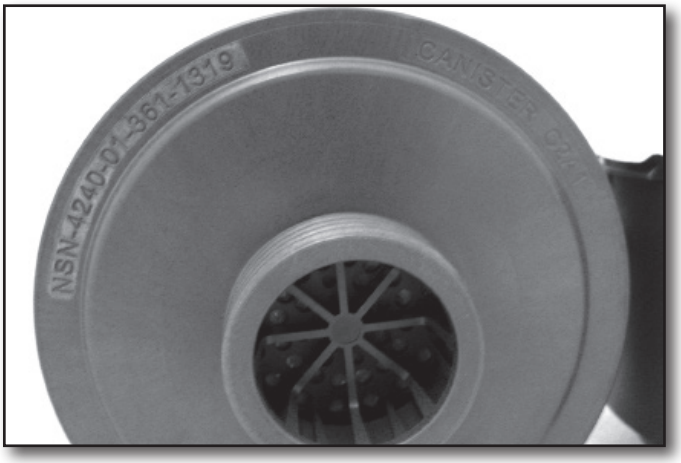
The M40 series masks have been standard issue for more than 20 years, and they have served our warfighters well. But as they reach the end of their effective service life, fielding is underway for the next generation of protective masks—primarily the Joint Service General-Purpose Mask. The Joint Service General-Purpose Mask will offer enhancements in chemical-biological protection (with dual filter elements) and performance (with improved vision, reduced breathing resistance, and increased comfort), which will reduce the physiological and psychological burdens normally associated with wearing protective masks.

The protective mask is designated as a "critical safety item" among the equipment the warfighter wears and carries. In the event of an attack involving a chemical or biological agent, a warfighter's protective mask can mean the difference between life and death. Because day-to-day operations can be hard on equipment, routine inspections and maintenance of the protective mask are essential in ensuring that the mask is ready when needed.

Problem Revealed

When units return from combat deployment, their equipment is assessed and restored to serviceable condition to ensure combat readiness for future missions. Special field support teams conduct reset operations on virtually every piece of unit equipment, including protective masks.

Only two types of filter canisters are currently authorized for military use with the M40 series masks—the aforementioned C2A1 (National Stock Number [NSN] 4240-01-361-1319) and the C2 (NSN 4240-01-119-2315). (Although C2



The NSN for the C2A1 canister is located on the side of the canister that is threaded.

canisters continue to be authorized, they are no longer manufactured. Remaining C2 canisters have expired shelf lives and are no longer serviceable; therefore, they should be replaced as soon as possible.) However, during reset operations conducted within the past 2 years, it was discovered that units returning from Iraq and Afghanistan were turning in M40 series masks that contained unauthorized commercial filter canisters (for example, the 3M™ FR-C2A1 Filter Cartridge[4]).

The use of unauthorized commercial filter canisters with the M40 series masks is a troubling revelation. While the source of supply is unknown, it would not be difficult to purchase unauthorized canisters from sources outside the military supply system via the Internet or other electronic means. Although the unauthorized canisters are very similar in appearance to the authorized ones—and they have compatible North Atlantic Treaty Organization standard 40-millimeter threads—military and commercial canisters are designed and tested to meet different standards of protection against traditional CWAs and toxic industrial chemicals (TICs). These differences in standards are described in terms of the chemical threat, protection requirements, and filter change-out criteria.

Chemical Threat

The protection afforded by the canisters is dependent upon the chemical threat encountered. As a general rule, military protective masks are primarily designed to protect against battlefield concentrations of traditional CWAs and military chemical compounds. CWAs refer to the toxic chemicals—and their precursors—that are prohibited under the Convention on the Prohibition of the Development, Production, Stockpiling, and Use of Chemical Weapons and on their Destruction (commonly referred to as the "Chemical Weapons Convention").[5] They are classified based on their physiological actions. Well-known CWAs include choking, nerve, blood, blister, and incapacitating agents.[6] Although military chemical compounds (which are classified as smoke/obscurants, lacrimators [tearing agents], or respiratory irritants) are considered less toxic than CWAs, unprotected exposure to military chemical compounds can also have adverse effects.

Military chemical compounds include o-chlorobenzylidene malononitrile (commonly known as tear gas) and capsaicin (commonly known as pepper spray).[7] Although decontaminating agents (supertropical bleach, decontamination solution 2) are not classified as military chemical compounds, they are considered military-unique chemicals that can also have adverse effects in cases of unprotected exposure.

In contrast, commercial respirators and canisters are designed to protect against occupational and first responder exposures to TICs. TICs are toxic to humans, animals, and plants and are used in manufacturing processes, agriculture (pesticides), water treatment (chlorine), and other areas. They are characterized by their toxicity, corrosiveness, flammability, explosiveness, reactivity, chemical by-products, and quantity/availability. The list of TICs is extensive and includes some compounds that are also classified as traditional CWAs, such as phosgene.[8]

The chemical threat posed by military and nonmilitary chemicals is a function of the duration of effectiveness, potency, and physiological action. Factors affecting the duration of effectiveness include the method of dissemination (vapor, aerosol, liquid), weather/terrain conditions (temperature, wind, humidity, topography, vegetation), physical properties (vapor pressure, freezing and melting points), and chemical properties (stability, reactivity). Factors affecting the potency and physiological action include the toxicity of the compound, the concentration/dosage, the route of exposure (inhalation, percutaneous), and the duration of exposure.[9]

Protection Requirements

Protection requirements for canisters are generally defined based on the chemical threat, the exposure scenario (such as battlefield versus occupational exposure), and the controlling legal authority for the wearer's safety and health. The Office of the Surgeon General of the U.S. Army has been assigned the overarching responsibility for the safety and health of military personnel in military-unique environments, including the responsibility for certifying personal protective equipment (PPE) requirements.[10] The U.S. Army Chemical, Biological, Radiological, and Nuclear School establishes specific protection requirements for military mask systems (including filtration canisters and elements).

The chemical threat to the M40 series filter canister is defined in terms of the minimum number of chemical attacks that the canister must be capable of withstanding for a specified CWA. A chemical attack is commonly expressed as the product of the agent concentration (C) and the duration (T) of the attack as follows:

Chemical attack = C (milligrams/meter^3) x T (minutes), or CT (milligram-minutes/meter^3)

The cumulative chemical agent threat for a specific CWA, or total CT, is expressed as the product of the CT and the total number of attacks as follows:

Total CT (milligram-minutes/meter^3)= [concentration (milligrams/meter^3) x time (minutes)] x [number of attacks]

The commercial 3M FR-C2A1 Filter Cartridge is very similar in appearance to its military counterpart—the C2A1 filter canister. The shapes and sizes of the canister bodies are identical, as are the hermetically sealed cans used for packaging.

The protection afforded by the filter canister is expressed as the percent penetration of a CWA threat challenge with exposure to the total CT. The percent penetration represents a threshold accumulated dose of a specific CWA that typically produces a physiological effect on the wearer and is unique to that CWA.

In 1999, based on available toxicological and human/animal dose-response data, the U.S. Army Center for Health Promotion and Preventive Medicine established short-term military exposure guidelines for deployed military personnel. These guidelines were developed for use by military commanders as a risk mitigation tool when assessing the potential safety and health risks associated with exposure to CWAs and military chemical compounds. In practice, however, these guidelines would be more applicable in military-unique situations where the threat scenario is better known and controlled (chemical demilitarization operations) versus battlefield chemical attacks.[11] In 2010, the U.S. Army Public Health Command (USAPHC) (formerly known as the U.S. Army Center for Health Promotion and Preventive Medicine) revised the existing risk assessment methodology and expanded the range of existing military exposure guidelines to include TICs.[12]

In contrast, the Occupational Safety and Health Administration has the overarching responsibility for the safety and health of nonmilitary personnel (including first responders and personnel involved in manufacturing) in occupational and workplace exposure scenarios. General requirements for occupational safety and health standards are covered in Part 1910 (*Occupational Safety and Health Standards*), Title 29 (*Labor*), Code of Federal Regulations (CFR).[13] Section 1910.134 (*Respiratory Protection*), Subpart I (*Personal Protective Equipment*), covers standards for PPE—including when and how PPE is used.[14] Briefly, the Occupational Safety and Health Administration requires that employers perform a hazard assessment of the workplace, select appropriate PPE based on anticipated hazards, assess the fitness of employees to wear or use the PPE, and train employees on the proper use and maintenance of the PPE. Further details regarding employer responsibilities are outlined in Section 1910.134.[15]

The National Institute for Occupational Safety and Health (NIOSH) establishes exposure guidelines for nonmilitary personnel in the workplace. NIOSH also certifies the suitability and effectiveness of some PPE for use in nonmilitary work environments—but does not certify or approve PPE for military use. The requirements for testing and NIOSH approval of nonmilitary respiratory protective devices are covered in Part 84 (*Approval of Respiratory Protective Devices*), Subchapter G (*Occupational Safety and Health Research and Related Activities*), Title 42 (*Public Health*), CFR.[16]

The *NIOSH Pocket Guide to Chemical Hazards*[17] provides recommended exposure limits, which reflect a time-weighted average exposure concentration for a 40-hour workweek (or up to a 10-hour workday). It also presents exposure concentrations that are immediately dangerous to life and health; permissible exposure limits; and short-term exposure limits that reflect a 15-minute, time-weighted average exposure that should not be exceeded at any time during a workday. The NIOSH-established TIC exposure guidelines for nonmilitary personnel in the workplace do not necessarily correlate with the military exposure guidelines established by the USAPHC for military personnel in military-unique environments.

Filter Change-Out Criteria

Filter change-out guidelines for military applications—including guidelines for the C2A1 canister—are contained in Field Manual (FM) 3-11.4, *Multiservice Tactics, Techniques,*

The 3M Company is one of several manufacturers of the C2A1 filter canister. An alternative design is manufactured by Immediate Response Technologies. This version of the C2A1 canister features a molded plastic body and is packaged in a hermetically sealed, molded plastic can with sealed film and a locking lid.

and Procedures for Nuclear, Biological, and Chemical (NBC) Protection.[18] Specific change-out criteria are provided for the peacetime, transition-to-war, and wartime use of the protective mask system. In each of these use scenarios, the anticipated threat, climatic conditions, the filter design, and the condition of the filter must be considered. During peacetime, filters that are wet or clogged, have sustained physical damage, or have exceeded their expiration date are routinely changed out. In some peacetime situations, expired filters that are not clogged or damaged can be used for training. During the transition to war, field commanders must consider the unit mission and readiness/deployability alert status, anticipated terrain and weather conditions, the chemical-biological threat assessment for the mission, and the availability of filters and personnel to conduct filter change-outs.

During wartime, filter change-out is based primarily on the types and amounts of chemical agents to which the canister has been exposed and the length of time the filter has been out of its original packaging and exposed to the atmosphere. Wartime change-out intervals (expressed in terms of "war weeks") are also based on climatic conditions. Filter performance tends to be most quickly degraded under hot and humid conditions; therefore, more frequent change-outs are required under these conditions than under other climatic conditions. Units that have been subjected to chemical attacks change out their filters at least every 30 days.

In contrast, nonmilitary occupational or workplace chemical exposure scenarios are generally considered better defined and controlled. Section 1910.134, Subpart I, Part 1910, Title 29, CFR[19] requires employers to ensure that respirators with filter cartridges are equipped with NIOSH-approved, end-of-service-life indicators for specific chemical threats. If no end-of-service-life indicator is appropriate for the conditions encountered in the workplace, the employer is required to implement a filter cartridge change-out schedule to ensure that filters are replaced before the end of their service lives. The change-out schedule is based on objective evidence or on data available for the specific workplace threat.

Canister Conundrum

Differences in military or occupational workplace chemical threats, protection requirements, and filter change-out criteria have created a conundrum regarding military C2A1 canisters versus commercial canisters. Are commercial "look-alike" canisters interchangeable with the C2A1 canister that is authorized for use with the M40 series mask? The simple answer is ***"No!"*** While the two canisters may look alike, appearances can be deceiving. The C2A1 canister was specifically designed and extensively tested for use with the M40 series protective mask, and the C2A1 and C2 canisters are the ***only*** canisters authorized for military use with the M40 series mask.

The commercial FR-C2A1 canister is NIOSH-approved for occupational-exposure scenarios only when used with the FR-M40 mask (which is a close commercial variant of the M40 mask that is also manufactured by 3M). The pairing of the FR-C2A1 canister with the M40 series mask is not authorized for military use or NIOSH-approved for nonmilitary use. The same is true for other commercial canisters that are paired with the M40 series mask. Mixing and matching military and commercial masks and canisters can be risky. Do not be fooled by look-alike commercial canisters; genuine military masks and canisters can only be acquired through authorized military supply channels. The bottom line for filter canisters is: ***If it isn't authorized for the M40 protective series mask, don't use it!***

Endnotes:

[1]"M40/M42-Series Protective Mask," *Army Study Guide*, <http://www.armystudyguide.com/content/Military_Equipment_Information/CBRN_Equipment_Information/m40m42series-field-protec.shtml>, accessed on 11 September 2012.

[2]Joseph T. Maheady et al., (Edgewood Chemical Biological Center Technical Report 930), *M40A1/M42A2 Chemical-Biological Mask Internal Drink Tube Redesign Operations and Support Cost Reduction*, 2012.

[3]Ibid.

[4]"Test Criteria for the 3M™ Cartridge FR-C2A1 Against Various Military and Industrial Chemical Agents," 3M Technical Data Bulletin No. 152, Occupational Health and Environmental Safety Division, 3M, St. Paul, Minnesota, February 2009, <http://multimedia.3m.com/mws/mediawebserver?mwsId=SSSSSu7zK1fslxtU48_vo8t1ev7qe17zHvTSevTSeSSSSSS-->, accessed on 12 September 2012.

[5]Convention on the Prohibition of the Development, Production, Stockpiling, and Use of Chemical Weapons and on Their Destruction (Chemical Weapons Convention), 3 September 1992.

[6]FM 3-11.9, *Potential Military Chemical/Biological Agents and Compounds*, 10 January 2005.

[7]Ibid.

[8]Ibid.

[9]Ibid.

[10]Army Regulation (AR) 385-10, *The Army Safety Program*, 23 August 2007.

[11]USAPHC Technical Guide 230 (Provisional), *Environmental Health Risk Assessment and Chemical Exposure Guidelines for Deployed Military Personnel*, June 2010.

[12]USAPHC Reference Document 230 (Provisional), *Methodology for Determining Chemical Exposure Guidelines for Deployed Military Personnel*, June 2010.

[13]CFR, Title 29 (Labor), Part 1910 (*Occupational Safety and Health Standards*), current as of 13 September 2012.

[14]CFR, Title 29 (Labor), Part 1910 (*Occupational Safety and Health Standards*), Subpart I (*Personal Protective Equipment*), Section 1910.134 (*Respiratory Protection*), current as of 13 September 2012.

[15]Ibid.

[16]CFR, Title 42 (*Public Health*), Subchapter G (*Occupational Safety and Health Research and Related Activities*), Part 84 (*Approval of Respiratory Protective Devices*), current as of 13 September 2012.

[17]*NIOSH Pocket Guide to Chemical Hazards*, Centers for Disease Control and Prevention, 8 February 2012, <http://www.cdc.gov/niosh/npg/npgsyn-a.html>, accessed on 17 September 2012.

[18]FM 3-11.4, *Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical (NBC) Protection*, 2 June 2003.

[19]CFR, Title 29, Part 1910, Subpart I, Section 1910.134.

Mrs. Weiss is a senior mechanical engineer and team leader with the Individual Protection Equipment Branch, Edgewood Chemical Biological Center. She holds a bachelor's degree in mechanical engineering from North Carolina State University, Raleigh, North Carolina, and a master's degree in program management from the Naval Postgraduate School, Monterey, California. Mrs. Weiss is a member of the U.S. Army Acquisition Corps; and she has 28 years of experience in the areas of individual and collective protection equipment, tactical smoke weapons, and chemical demilitarization operations.

Dr. Kennedy, who is a retired U.S. Army Reserve lieutenant colonel, is now a physical scientist with the Edgewood Chemical Biological Center. He holds a bachelor's degree in chemistry from New Mexico State University, Las Cruces, New Mexico; a master's degree in physical chemistry from Texas Tech University, Lubbock, Texas; and a doctor of philosophy degree in physical chemistry from Texas A&M University, College Station, Texas. Dr. Kennedy is a graduate of the U.S. Army Command and General Staff College, Fort Leavenworth, Kansas, and the College of Naval Command and Staff, U.S. Naval War College, Newport, Rhode Island. He is a member of the U.S. Army Acquisition Corps.

Mr. Church is a senior chemical engineer and chief of the Physical Protection Equipment Branch, Edgewood Chemical Biological Center, Aberdeen Proving Ground, Maryland. He holds a bachelor's degree in chemical engineering from Virginia Polytechnic Institute and State University, Blacksburg, Virginia, and a master's degree in management and supervision from Central Michigan University, Mount Pleasant, Michigan. Mr. Church is a member of the U.S. Army Acquisition Corps; and he has 34 years of experience in the areas of developing, testing, and producing individual protection equipment; developing alternative technologies; and ensuring domestic preparedness.

U.S. Army Chemical Corps Celebrates 94th Anniversary During Regimental Week

By Ms. Amy Newcomb

The U.S. Army Chemical Corps Regiment celebrated its 94th anniversary during this year's Regimental Week held at Fort Leonard Wood, Missouri, 17–28 June 2012. The theme for the event was "The CBRN Profession—2020 and Beyond."

Best Joint Chemical, Biological, Radiological, and Nuclear Warrior Competition

Regimental week kicked off with the Best Joint Chemical, Biological, Radiological, and Nuclear (CBRN) Warrior Competition, which was held 17–22 June. Twenty-seven 2-man teams from throughout the Army—and for the first time, its sister Services—competed in events involving Army physical fitness tests, physical endurance combat skills, the Incident Response Training Department, the Chemical Decontamination Training Facility, land navigation, Dragon warrior tasks, reflexive fire, and combatives.

According to Regimental Command Sergeant Major Gabriel Arnold, U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS), the Best Joint CBRN Warrior Competition is vital to the Chemical Corps because "it helps identify who the very best is." Command Sergeant Major Arnold said, "We want our very best leading our formations into the future. Our Regiment will continue to provide combatant commanders with the best-trained and -equipped CBRN personnel and units in order to protect the Nation at home and abroad."

The winners of the competition (Staff Sergeant Maliek Kearney and Staff Sergeant Zachery Jones, 22d Chemical Battalion [Technical Escort], Aberdeen Proving Ground, Maryland) were announced at the Green Dragon Ball on 23 June. The winning team members each received several nice prizes.

Joint, Interagency, Intergovernmental, Multinational, Industry, and Academia CBRN Conference

Following the Best Joint CBRN Warrior Competition, the Joint, Interagency, Intergovernmental, Multinational, Industry, and Academia (JIIM-IA) CBRN Conference was conducted 26–27 June. The theme of this year's conference, which was attended by more than 200 CBRN partners from the JIIM-IA community, focused on the CBRN Soldiers, units, technologies, and capabilities required to enable the Army of 2020.

Keynote speakers for the first day of the conference included Colonel Robert Jones Jr., Deputy Commander and Chief of Staff, Standing Joint Force Headquarters for Elimination; Major General Jonathan Treacy (U.S. Air Force), Commander, Joint Task Force Civil Support, U.S. Northern Command; Major General Charles Gailes Jr. (Army National Guard), Commander, Task Force 51, U.S. Army North and Fifth U.S. Army; and Brigadier General Leslie Smith, Commander, 20th Support Command (Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives).

The second day of the conference consisted primarily of a series of panel discussions, beginning with a panel of JIIM-IA partners led by Colonel Sven Erichsen (Chief of Staff and Director, Chemical and Biological Defense Programs, Office of the Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs), followed by representatives from the U.S. Air Force and the Federal Bureau of Investigation. The second panel consisted of representatives from Army Service Component Commands, including U.S. Army Africa, U.S. Army Pacific, U.S. Army Europe, U.S. Army Central, and U.S. Army South. According to Mr. Russ

Gerhlein, Operations Officer, USACBRNS, "The highlight during the second day was a presentation by Colonel [Vance P.] Visser, commandant [of USACBRNS] and Chief of Chemical,[1] who presented a briefing on the Fiscal Year 2013–2014 Campaign Plan." Colonel Visser's presentation was followed by a third panel discussion, in which USACBRNS and Maneuver Support Center of Excellence personnel discussed CBRN doctrine, organizations, and personnel issues.

Chemical Corps Regimental Association Exhibits

In conjunction with the JIIM-IA CBRN Conference, the Chemical Corps Regimental Association hosted an exhibition, where more than 250 vendors displayed the newest CBRN information, technology, and equipment.

According to Mrs. Arelis Rodriguez, Chemical Corps Regimental Association business manager, the exhibits allowed vendors a chance to introduce new technology that could help improve the Chemical Corps. "What we have," said one vendor, "allows the Soldier, Sailor, Airman, Marine, and Coast Guardsman to accomplish the mission in a chemical and biological environment. What we do is save lives."

Regimental Run

More than 1,000 Soldiers, Marines, Airmen, civilians, and retirees gathered to take part in the Chemical Corps regimental run, which was held on 26 June.

Colonel Visser welcomed 20th Support Command leaders and personnel from the Fort Leonard Wood Marine Corps Detachment; Air Force 364th Detachment 1; 3d Chemical Brigade; 3d Battalion, 10th Infantry Regiment; 2d Battalion, 10th Infantry Regiment; 1st Battalion, 48th Infantry Regiment; 84th Chemical Battalion; 58th Transportation Battalion; and the Fort Leonard Wood Noncommissioned Officer Academy. "It's a fine morning for this esprit de corps run," Colonel Visser said. "We have members of our Regiment on the parade field along with members of other branches and our sister Services."

Before the run began, Colonel Visser reflected on the Best Joint CBRN Warrior Competition. "Your battle buddies stepped up and took charge as leaders of their profession, and we couldn't be more proud of them," he said. "Competition makes our Army great, builds character, and molds young leaders into true professionals—professionals prepared to take our Regiment well into the future." "As we begin our celebration of 94 years of service as a branch," he added, "I am fired up to be with you this morning. I look forward to seeing highly motivated CBRN warriors at the end."

Hall of Fame/Distinguished Member of the Corps Induction

The Chemical Corps paid tribute to six individuals during a time-honored Hall of Fame/Distinguished Member of the Corps induction ceremony on 26 June. (See page 50.)

"For centuries, Soldiers and civilians alike have always found the time to honor those who have performed above and beyond the call of duty," said Colonel Visser. "It is appropriate for us . . . to honor these individuals who have given so much of [them]selves to their Nation, our Army, and our Corps."

Major General Ralph Wooten (Retired) and Colonel Merritt Briggs (Retired) (deceased) were inducted into the Hall of Fame—the highest form of recognition offered by the Regiment.

The Distinguished Member of the Corps designation was awarded to Major General Sampson Bass Jr. (Retired), Brigadier General Stanley Lillie (Retired), Master Sergeant Richard Robertson (Retired), and Sergeant First Class Frank Cupp (Retired) for going "above and beyond" in their personal and professional service to the Corps and by setting a vision of what the Corps is and what it needs to be.

Sunrise Service

An "Honor to Our Fallen" sunrise service was held at Memorial Grove on 27 June in remembrance of 23 Dragon Soldiers who made the ultimate sacrifice.

"Today, we pause for this special time to remember those Dragon Soldiers who have given their lives in service to this country, particularly those killed in Operations Iraqi Freedom and Enduring Freedom. These Soldiers are patriots and heroes in the truest sense of the words," said Colonel Visser. "Their pasts and homes range from all across America. They range from lieutenant to specialist. They came into the U.S. Army from 15 states and one U.S. territory," he added. "While they came from a variety of locations, today they are united as a band of brothers and sisters who believed in a higher cause. And they were willing to—and ultimately did, in fact—give everything they had in that cause of liberty [and] freedom and to help others."

Spouse's Tour

The 3d Chemical Brigade hosted a spouse's CBRN training tour of the Chemical Defense Training Facility and the First Lieutenant Joseph Terry CBRN Responder Training Facility on 27 June.

According to Colonel Jim Bonner, commander of the 3d Chemical Brigade, "It is important [for spouses] to understand what their [CBRN Soldiers do] within the military. It serves to reinforce that bond . . . and [helps the spouses] clearly understand what hard, realistic training their loved ones have conducted that has made them an expert in their field."

Lieutenant Colonel Gregory Borcherding, director of the Incident Response Training Department, 3d Chemical Brigade, USACBRNS, discussed changes that the Chemical Corps has experienced throughout the years. "We are operating in more urbanized terrain . . . and [we are encountering] a lot of chemicals in industry that [were] never used as weapons," he said. He went on to explain that these changes resulted in the need for modifications to CBRN procedures and equipment.

Sibert Award Presentation

Regimental Week concluded with the presentation of the Sibert Award on 28 June. The award, which is named for Major General William Sibert—the "father of the Chemical

Corps"—is presented to the top-performing, company-size CBRN Regular Army, Army National Guard, and U.S. Army Reserve units.

A total of 28 application packets (the most ever submitted for the Sibert Award competition) were received and reviewed by the selection board, and the competition was fierce.

Company B, 22d Chemical Battalion, was honored with the Regular Army Sibert Award. For the second year in a row, the Army National Guard Sibert Award was presented to the 637th Chemical Company, Kettering, Ohio. Also for the second year in a row, the U.S. Army Reserve Sibert Award was presented to the Headquarters and Headquarters Company, 415th Chemical Brigade, Greenville, South Carolina. Each of these units achieved the highest standards in unit training, maintenance, discipline, safety, reenlistments, awards, and overall organizational excellence.

"For these three companies to be selected as our best chemical companies in their respective components is a monumental achievement," said Colonel Visser. He also acknowledged the significant achievement of a back-to-back victory, stating, "It's not an easy feat because it requires consistence, excellence in all areas of an organization over the course of a year, and a lot of hard work."

The guidons of each of the Sibert Award winners will hang inside the entryway hall of the USACBRNS until next year's competition.

Endnote:

[1]Colonel Vance P. (Phil) Visser served as the commandant of the USACBRNS and as the 26th Chief of Chemical from August 2010 to August 2012.

At the time this article was written, Ms. Newcomb was a member of the Fort Leonard Wood Guidon *staff.*

BEST JOINT CBRN WARRIOR COMPETITION

SUNRISE SERVICE

Spouse's Tour

Regimental Run

RADIATION EXPOSURE:
Current and Future Treatments

By Captain Matthew Urban

The March 2011 earthquake and associated tsunami in Japan damaged nuclear reactors in Fukushima and subsequently highlighted the need for better safeguards against radiation exposure. While some of the pharmaceuticals used to treat acute radiation sickness have been available for years, several others are in testing phases. These drugs hold promise not only in treating acute radiation sickness, but also in protecting the human body before it is exposed to radiation.

Effects of Radiation Exposure

Acute radiation sickness is caused by exposure of the human body to high levels of radiation in a short period of time. Mild symptoms of exposure are manifested at an exposure level of about 0.3 grays, while severe symptoms or death occur at about 50 grays.[1]

Symptoms of acute radiation sickness include nausea, vomiting, abdominal pain, diarrhea, loss of appetite, leukocytopenia (a decrease in the white blood cell count, which can lead to infection), anemia, thrombocytopenia (a low platelet count, which can lead to internal and external bleeding and poor healing of wounds), dizziness, fever, headache, hair loss, and cognitive impairment.[2] Skin damage (including redness, itching, blistering, and ulceration) may also occur. Cataracts and cancer are two complications of acute radiation sickness.

Most of the symptoms that occur are due to cellular damage caused by various types of radiation interacting with cellular molecules:

- **Alpha particles.** Alpha particles (helium nuclei) capture electrons from nearby atoms; if the electrons are shared by two atoms forming a molecule, then the molecule is broken.[3] The remnants of the molecule become very chemically reactive radicals that can form dangerous compounds. However, the penetrating ability of alpha radiation is limited; unless inhaled or ingested, alpha particles do not penetrate the human body.
- **Beta particles.** Beta particles (high-energy, high-speed electrons or positrons) can create radicals by pushing electrons from other atomic or molecular orbitals. As beta particles pass through matter, they decelerate and emit X-rays.[4] They may also excite other atoms and emit ultraviolet radiation. The ionizing power and penetrating ability of beta particles are moderate.
- **Gamma rays and X-rays.** Gamma rays and X-rays are high-energy, high-frequency forms of radiation that transfer energy to atoms. The atoms, in turn, transfer the energy to their electrons, which are then emitted by the atoms. These energetic electrons may behave like beta particles.[5] Although the penetrating ability of gamma rays and X-rays is high, these types of radiation are less damaging than alpha and beta particles.
- **Neutrons.** Due to electromagnetic and nuclear forces, neutrons interact with atoms. A high-energy neutron that encounters living material may collide with a proton, dislodging the proton from its atom. This causes the nucleus of the atom to become radioactive and to emit beta particles. In addition, the dislodged proton may ionize other atoms.[6]

When radiation breaks the chemical bonds between the atoms of molecules, radicals are created. The resulting damage to the human body depends on which molecules are broken and which nearby molecules react with the resulting radicals.[7] Cells are killed when ionizing radiation damages deoxyribonucleic acid (DNA) at the molecular level. DNA is hit by ionizing radiation. Atoms are ionized and break off of the main double-helix structure. Some of the ionized atoms bond with other parts of the DNA molecule, and some bond with other nearby atoms. These changes are considered single-strand or double-strand errors. Single-strand errors occur when atoms or molecules are missing or the wrong atoms or molecules are present on one strand of the DNA double helix. Single-strand errors are relatively easy to repair. Double-strand errors may involve complete breaks in the DNA structure. They are more difficult to repair. If there are enough DNA errors of either type, the "cell death mechanism" of the affected cell may be activated, while other nearby cells divide into new cells.

"An alternate strategy for the treatment of radiation sickness involves boosting the production of blood cells to help ward off infection. Radiation exposure can destroy bone marrow, which is responsible for the production of blood cells. Low white blood cell counts impair the body's ability to fight off pathogens, leaving an individual vulnerable to death by infection."

Method of Treatment

Potassium iodide is a well-known—but often misunderstood—radiation treatment drug. In reality, potassium iodide is not used to treat radiation exposure; rather, it is a prophylactic used to prevent thyroid damage due to radioactive iodine-131 (I-131). Iodine accumulates in the thyroid; and if the iodine that accumulates is radioactive, extensive thyroid damage can occur. Depending on the method by which it is absorbed and the length of time it remains in the body, radioactive I-131 is capable of damaging living cells.[8] When taken before exposure to radioactive I-131, potassium iodide saturates the thyroid's capacity for iodine so that additional iodine (such as radioactive I-131) cannot be absorbed into the body and is flushed out. However, potassium iodide does nothing to prevent radiation sickness and does not guard against any other form of radiation exposure.[9]

Prussian blue is a blue, nontoxic dye with the unique ability to bind to radioactive cesium-137 (Cs-137). Therefore, it is used as a treatment for exposure to Cs-137.[10] Prussian blue can be administered when a patient is suspected of having inhaled or ingested Cs-137. It binds to the Cs-137, which is then eliminated through bowel movements. This decreases the period of internal contamination from 110 days to about 30 days, thereby reducing internal radiation damage.[11] Substances of this nature are referred to as *chelating agents*.

Another chelating agent used to treat certain types of internal radiation poisoning is diethylenetriamine pentaacetic acid (DTPA). DTPA can be used for patients who have been exposed to americium, plutonium, or curium.[12] Unfortunately, DTPA is also capable of chelating minerals (such as zinc) that the body needs to produce blood cells.[13] Given that one of the potential effects of radiation poisoning is a decrease in the number of blood cells, the use of DTPA may complicate recovery.

An alternate strategy for the treatment of radiation sickness involves boosting the production of blood cells to help ward off infection. Radiation exposure can destroy bone marrow, which is responsible for the production of blood cells. Low white blood cell counts impair the body's ability to fight off pathogens, leaving an individual vulnerable to death by infection. Human granulocyte colony-stimulating factors (such as Neupogen® and Neulasta®) assist the body in producing more neutrophils (a type of white blood cell) by stimulating the production of white blood cells and aiding in their release into the bloodstream.[14] Individuals exposed to radioactive materials may be treated with human granulocyte colony-stimulating factors; however, this approach treats only one symptom of acute radiation poisoning and does not serve as a generalized prophylaxis.

The last option currently available to medical professionals for the treatment of acute radiation poisoning is supportive care. Supportive care involves treating the symptoms of acute radiation poisoning. Administering antibiotics to stave off infection and providing fluids in cases of severe diarrhea are examples of supportive care. Although supportive care does not prevent or cure radiation sickness, adequate support can improve the survival rate.[15]

Emerging Pharmaceuticals

A new class of pharmaceutical that promises to protect patients from acute radiation exposure has been developed. Two of the drugs within this class—Protectan and Ex-RAD—are currently undergoing testing. Both of these drugs may be administered well before exposure, and both help to mitigate the effects of radiation poisoning.

Human exposure to outside stimuli such as stress, infection, signals from death receptors, or ionizing radiation can result in cell apoptosis—a process of cellular death in which the number of undamaged cells that remain are insufficient to divide and replace the damaged ones. In untreated cases of acute radiation poisoning, large portions of the body are destroyed, leading to potential death. Protectan suppresses the cell death mechanism by repairing radiation-induced damage to gastrointestinal tract cells and the hematopoietic (blood and bone marrow) system. Protectan CBLB502 is a "rationally designed recombinant derivative of the bacterial protein flagellin, which binds and activates the mammalian TLR5 cell surface receptor."[16] CBLB600 Series Protectans are "synthetic derivatives of mycoplasma lipopeptide, which promote activation of the antiapoptotic NF-kappaB pathway associated with acute radiation syndrome."[17] Animal trials of Protectan have yielded promising results, and radical improvements in radiation exposure treatment are expected. However, information about the long-term cancer risks of Protectan are unavailable. The U.S. Food and Drug Administration approval of Protectan is anticipated sometime during 2012.

Ex-RAD, which is a protein kinase inhibitor, makes use of a different healing mechanism.[18] When DNA becomes damaged enough, proteins such as p53, p21, bax, c-ABI, and p73 are activated.[19] These proteins are integral in apoptotic cell death. Ex-RAD reduces the amounts of these proteins, thereby blocking cell death pathways. Studies suggest that this mechanism of inhibiting cell death signals increases the survivability of animals following a massive dose of radiation. Mice that

"Soldiers must continue to practice contamination avoidance and ensure that exposures remain as low as reasonably achievable; however, if these emerging pharmaceuticals prove to be effective, military forces could revise operational exposure guidelines to reflect the abilities of the pharmaceuticals."

received a dose of 7.5 grays of radiation (where the median lethal dose [LD50] is about 5 grays) exhibited an 80 percent survival rate when they were administered Ex-RAD from 24 to 36 hours after exposure—versus a 20 percent survival rate for the control group.[20] Other trials have demonstrated a prophylaxis effect when mice that sustained a dose of 8 grays of total body radiation survived after receiving Ex-RAD 24 hours before irradiation.[21] Human trials have indicated no adverse symptoms when individuals are orally or subcutaneously administered Ex-RAD. However, studies regarding long-term effects of Ex-RAD use have not been completed.[22]

Benefits of Innovative Treatments

According to the U.S. Nuclear Regulatory Commission, workers may receive a maximum dose of 1 gray of radiation to any extremity during a 1-year period as part of a planned, approved, special exposure and a maximum lifetime dose of 2.5 grays to any extremity.[23] Military guidance specifies that Soldiers involved in emergency missions may receive a dose of no more than 1.25 grays.[24]

With options for acute radiation sickness treatment and prevention expected to be available in the near future, domestic first responders and military commanders may be able to tolerate increased amounts of radiation exposure. In domestic emergency situations, it may be necessary to operate in very high-dose environments to limit the scope of disaster. In these cases, Protectan or Ex-RAD could be administered to workers to allow them to perform their duties in environments that, under current regulations, contain unacceptable levels of radiation. In addition, Soldiers may be called upon to perform missions under heavily contaminated conditions such as those encountered on a battlefield where nuclear weapons were used. The administration of drugs such as Protectan and Ex-RAD may allow commanders to increase allowable levels of radiation exposure for Soldiers involved in critical operations. Soldiers must continue to practice contamination avoidance and ensure that exposures remain as low as reasonably achievable; however, if these emerging pharmaceuticals prove to be effective, military forces could revise operational exposure guidelines to reflect the abilities of the pharmaceuticals.

A situation in which the enemy has detonated a radiological dispersal device poses particularly interesting challenges to operational exposure guidance. It could take several days to identify radioactive materials (which may require laboratory confirmation) in an emergency operational environment, and it is difficult to accurately predict the levels of radioactive contamination. Consequently, first responders may be exposed to high levels of various types of radiation. If radioactive I-131 or Cs-137 were used in the dispersal device, potassium iodide or Prussian blue could be used to provide a measure of treatment. However, because Protectan and Ex-RAD do not target specific isotopes, they could provide generalized protection against radiation exposure. Once radiation is identified as a hazard in a radiological dispersal attack, the administration of Protectan or Ex-RAD could be expected to increase survivability rates and possibly decrease the risk of acute radiation sickness symptoms interfering with lifesaving operations.

Several other types of drugs that may provide similar protections against acute radiation sickness are currently under development. If these pharmaceuticals are approved for human use, the number of deaths due to exposure to high-level radiation during emergency situations and wartime may be decreased. Emergency responders and Soldiers may be able to perform tasks in high-level radiation environments with few immediate adverse effects. However, due to the elevated risk of cancer associated with exposure to radiation, workers exposed to high doses of radiation must continue to be monitored throughout their lives.

Endnotes:

[1]"Acute Radiation Syndrome: A Fact Sheet for Physicians," Centers for Disease Control and Prevention, 18 March 2005, <http://www.bt.cdc.gov/radiation/arsphysicianfactsheet.asp>, accessed on 6 September 2012.

[2]Armed Forces Radiobiology Research Institute (AFRRI) Special Publication 10-1, "Medical Management of Radiological Casualties," June 2010, <http://www.usuhs.mil/afrri/outreach/pdf/3edmmrchandbook.pdf>, accessed on 6 September 2012.

[3]"Interaction of Radiation With Matter," *International Web Site: Scientifically Validated Information on Chernobyl Disaster, April 1986*, European Centre of Technological Safety, <http://www.tesec-int.org/TechHaz-site%2008/Radiation-interaction.pdf>, accessed on 6 September 2012.

[4]Ibid.

[5]Ibid.

[6]Ibid.

[7]"How Radiation Affects Cells," Radiation Effects Research Foundation, 2007, <http://www.rerf.or.jp/radefx/basickno_e/radcell.htm>, accessed on 6 September 2012.

[8]"Potassium Iodide (KI)," Centers for Disease Control and Prevention, 13 March 2012, <http://www.bt.cdc.gov/radiation/ki.asp>, accessed on 6 September 2012.

[9]Ibid.

[10]"Prussian Blue," Centers for Disease Control and Prevention, 20 April 2010, <http://www.bt.cdc.gov/radiation/prussianblue.asp>, accessed on 6 September 2012.

(*Continued on page 40*)

Changes in Chemical/CBRN/CBRNE Nomenclature

By Mr. Karl A. Kilthau

The U.S Army Chemical Corps Regiment has experienced significant changes throughout its history, and the past 10 years have been no exception. In 2003, the Regiment's general-purpose forces were redesigned to provide a more flexible organizational mix that was better capable of performing chemical, biological, radiological, and nuclear (CBRN) operations to protect U.S. interests at home and abroad. Functional-based chemical companies that traditionally supported reconnaissance, biological surveillance, smoke, and decontamination operations were modified or eliminated. And new organizations that were capable of conducting CBRN operations across a wider spectrum were created. These new organizations were designed to perform tasks associated with consequence management through major combat operations, thereby ensuring the ability to defend the homeland.

During the same time period, Army vocabulary (lexicon) and doctrine were also modified. The official name of the school was changed from the U.S. Army Chemical School to the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS). Duty titles were similarly changed so that chemical officers became CBRN officers and enlisted chemical personnel became enlisted CBRN personnel. And when the need for technical warrant officers within the Chemical Corps was determined, the duty titles assigned to those warrant officers also contained the CBRN designation.

In July 2010, Field Manual (FM) 3-101, *Chemical Staffs and Units* (which was dated 19 November 1993), was replaced by Army Tactics, Techniques, and Procedures (ATTP) 3-11.36, *Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Aspects of Command and Control*.[1] Appendix I (U.S. Army Chemical, Biological, Radiological, and Nuclear Capabilities and Employment), ATTP 3-11.36, contains a discussion regarding the Army operational concept and incorporates the Army modular force transformation for CBRN and chemical, biological, radiological, nuclear, and high-yield explosives (CBRNE) units and staffs.[2]

Units are assigned table of organization and equipment (TOE) titles ***and*** unit designations. The TOE title is the name of the specific type of organization; the unit designation is used to track lineage and honors and to provide specific information for the modified TOE. Unit designations are determined by the U.S. Army Center of Military History using strict, historically ingrained designation guidelines.[3] Clarity and efficiency in communication require the use of simple, consistent unit designations. A modified TOE unit designation usually consists of a number, a branch or function, and a level of command.[4] The branch function for the Chemical Corps remains *chemical.* (For example, the unit designation for the 11th Chemical Company remains 11th Chemical Company).

Old TOE Title	New TOE Title	Unit Designation
Chemical Brigade	CBRN Brigade	Chemical Brigade (CBRN)
Chemical Battalion	CBRN Battalion	Chemical Battalion (CBRN)
Chemical Battalion (Technical Escort)	CBRNE Battalion (Technical Escort)	Technical Escort Battalion
Chemical Company (Mechanized Smoke)	CBRN Company (Obscuration)	Chemical Company (Obscuration)
Chemical Company (Biological Integrated Detection System [BIDS])	CBRN Company (Biological)	Chemical Company (Biological)
Chemical Company (Heavy Redesign)	CBRN Company (Area Support)	Chemical Company (Area Support)
Chemical Company (Combat Support)	CBRN Company (Maneuver Support)	Chemical Company (Maneuver Support)
Technical Escort Company	CBRNE Company (Technical Escort)	Chemical Company (Technical Escort)
Chemical Service Organization	CBRN Coordination Element	Chemical Detachment

CBRN/CBRNE Units

However, TOE titles can be changed to reflect current lexicon and doctrine. And aside from the designation line located on the TOE and modified TOE, chemical units will make use of doctrinal titles. Throughout the coming years—as chemical lexicon and doctrinal publications are updated so that maneuver support takes the place of combat support and obscuration takes the place of smoke—the titles of chemical units from the smallest (chemical service organization) to the largest (chemical brigade) will also be changed (to CBRN coordination element and CBRN brigade, respectively). Unit designations, on the other hand, are not changed with every lexicon change. During World War II and the Korean War, units were designated according to their functions; however, during the mid-1950s, the Army began redesignating units according to their branch and echelon to avoid the frequent redesignation resulting from continuous changes in function. Regardless of the title change, the designation will now remain the same. For example, the old title of headquarters and headquarters company, chemical brigade, will be replaced with the new title of headquarters and headquarters company, CBRN brigade. However, the designation will remain headquarters and headquarters company, chemical brigade.

The Chemical Corps is currently preparing to receive new, more technically advanced equipment that, when fielded, will expand the capabilities of the Army. As a result, the terms *surveillance, assessment, hazardous response,* and *mass casualty decontamination* will be added to the ever-growing Army lexicon. These new capabilities will need to be balanced within the increasingly smaller Corps; and as they are, we can be sure that CBRN organizations will be redesigned to incorporate the expanded capabilities.

Endnotes:

[1]ATTP 3-11.36, *Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Aspects of Command and Control*, 12 July 2010.

[2]Ibid.

[3]Army Regulation (AR) 220-5, *Designation, Classification, and Change in Status of Units*, 15 April 2003.

[4]AR 220.5, 15 April 2003.

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(*"Radiation Exposure . . ."continued from page 38*)

[11]Ibid.

[12]"Facts About DTPA," Centers for Disease Control and Prevention, 11 October 2006, <http://www.bt.cdc.gov/radiation/dtpa.asp>, accessed on 6 September 2012.

[13]Ibid.

[14]"Facts about Neupogen®," Centers for Disease Control and Prevention, 1 March 2005, <http://www.bt.cdc.gov/radiation/neupogenfacts.asp>, accessed on 6 September 2012.

[15]AFRRI Special Publication 10-1, June 2010.

[16]"Radiation Antidote," *Science Buzz*, Science Museum of Minnesota, 20 April 2008, <http://www.sciencebuzz.org/buzz-tags/protectan>, accessed on 10 September 2012.

[17]Ibid.

[18]"Onconova Therapeutics Presents New Data Demonstrating Radioprotection by Ex-RAD at RRS Annual Meeting," *EurekAlert!* Onconova Therapeutics, 27 September 2012, <http://www.eurekalert.org/pub_releases/2010-09/poc-otp092710.php>, accessed on 10 September 2012.

[19]L. Stergiou and M.O. Hengartner, "Death and More: DNA Damage Response Pathways in the Nematode *C. elegans," Cell Death & Differentiation*, Scientific Reports, Nature Publishing Group, 2004, <http://www.nature.com/cdd/journal/v11/n1/full/4401340a.html>, accessed on 10 September 2012.

[20]Sanchita P. Ghosh, "Development of Ex-RAD® as a Radiation Countermeasure," Armed Forces Radiobiology Research Institute 50th Anniversary Radiation Countermeasures Symposium, Uniformed Services University of the Health Sciences, 15 June 2011, <http://www.usuhs.mil/afrrianniversary/events/rcsymposium/pdf/Ghosh.pdf>, accessed on 10 September 2012.

[21]Ibid.

[22]Ibid.

[23]Regulatory Guide 8.35, "Planned Special Exposure," Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, August 2012, <http://pbadupws.nrc.gov/docs/ML1013/ML101370008.pdf>, accessed on 11 September 2012.

[24]Field Manual (FM) 3-11.4, *Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical (NBC) Protection*, 2 June 2003.

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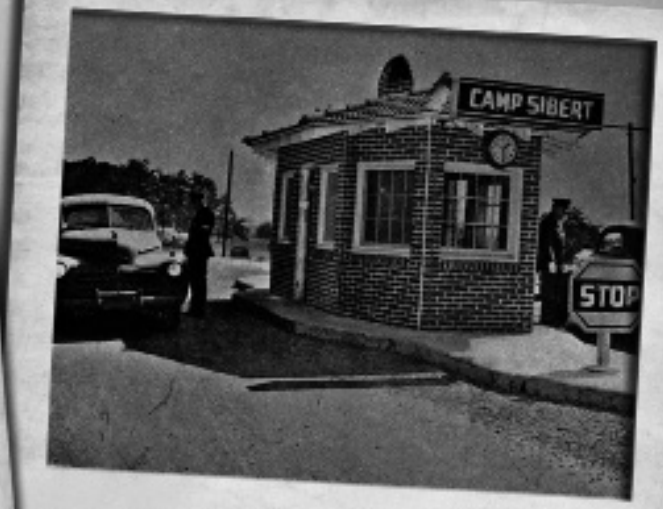
TECHNICAL ESCORT:
COUNTERING WMD FOR 70 YEARS

By Lieutenant Colonel Andrew L. Miltner and Mr. Jeffery K. Smart



Left: Training at Camp Sibert included the handling of all types of chemical warfare materials, including actual chemical warfare agents.

Right: On 20 January 1943, the CWS authorized the establishment of a Guard and Security Section at Camp Sibert.

On 20 January 2013, the U.S. Army Technical Escort Unit (TEU), the legacy organization of the 22d and 110th Chemical Battalions (Technical Escort), will celebrate its 70th anniversary as the longest continually active chemical unit in the U.S. Army and one of the most uniquely capable counter weapons of mass destruction (WMD) forces in the world. Manned by a surprisingly small number of highly trained chemical, biological, radiological, and nuclear (CBRN) and explosive-ordnance disposal professionals, the unit has continuously provided the National Command Authority with the most technically and tactically capable chemical, biological, radiological, nuclear, and high-yield explosives (CBRNE) force in the world. The dedicated men and women who have served as Technical Escort Soldiers throughout the past 7 decades remain vigilant today, responding to emergencies within the continental United States and abroad, in peacetime and in war, and earning their moniker as "America's Guardians."

Need for Toxic-Gas Handlers

The origins of the TEU go back to World War II, when there was an operational requirement for such a unique organization. At the beginning of the war, the United States expected the fighting to include the use of chemical weapons, as in World War I. To prepare for such a conflict, the Chemical Warfare Service (CWS) expanded the production of chemical weapons, stockpiled them at various arsenals and depots around the country, and shipped them to forward positions in various overseas theaters of operations.

Due to their hazardous nature, the movement of chemical weapons required personnel who were trained in the dangers and effects of chemical agents and in what to do in case of an accident or leak. Initially, the Soldiers who were tasked with moving the chemical weapons by truck, rail, or ship were assigned to the arsenal or depot that supplied the weapons. This was the way that chemical weapons movements were conducted during and after World War I. However, this arrangement was administratively and logistically burdensome for Ordnance Department arsenals and depots because they did not employ trained toxic-gas handlers who were knowledgeable about the rules, regulations, and safety issues.[1]

Establishment of a Guard and Security Section at Camp Sibert

To solve this problem, the chief of the CWS and the chief of the Ordnance Department entered into an agreement by which CWS personnel were to take responsibility for escorting chemical weapons to and from ordnance depots and to and from CWS arsenals and depots. To accomplish this mission, the CWS created a special toxic-gas handler unit.

On 20 January 1943, the CWS authorized the Replacement Training Center, Camp Sibert, Alabama, to select and train 20 junior officers and 100 enlisted men for the new mission. The CWS did not specify a name for the

new organization, nor did it create a headquarters. Instead, the headquarters of the Replacement Training Center provided the necessary administration.[2] The officers were drawn from the chemical warfare replacement pool, while the enlisted personnel were attached from the 1st and 2d Regiments of the Replacement Training Center. Officers and enlisted personnel were trained in the security and safety precautions necessary to handle overland and overseas shipments. For escort duty, the 120 personnel were divided into detachments consisting of one officer and five enlisted men.

The new unit, which was eventually named the Guard and Security Section, trained at and operated from Camp Sibert for the remainder of the year. The demand for escort support almost immediately exceeded the initial capabilities of the unit. To meet this great demand, additional personnel were temporarily sent to the unit, but were later removed when they were no longer needed. However, because this was not conducive to training or unit cohesiveness, the authorized enlisted strength of the unit was increased to 300 on 5 October 1943; in December 1943, the authorized officer strength was also increased to 37.[3] Between May 1943 and January 1944, the Guard and Security Section conducted more than 250 missions throughout the world.[4]

Transfer to Edgewood Arsenal

In January 1944, the CWS ordered the Guard and Security Section to move from Camp Sibert to Edgewood Arsenal, Maryland. The move was completed by 1 February 1944, and the Guard and Security Section was administratively assigned to Detachment 1, Headquarters, Edgewood Arsenal. The unit was renamed the Guard and Security Division.

Mission Training

At Edgewood Arsenal, Guard and Security Division personnel were required to complete 3 weeks of training, which included basic training and a refresher course designed to inform personnel about the latest developments. Topics covered in the classes included chemical agents, toxic-gas handling, protection, first aid, infantry drill, and sexual morality (in relation to venereal diseases). Because the unit was considered "special," it was exempt from other detail assignments, such as arsenal operations and post guard.[5]

Mission Equipment

The list of special equipment necessary for each mission included items such as gas masks, protective suits, chemical-agent detectors, first aid kits, decontamination equipment, brooms, rags, soap, wrecking bars, hammers, nails, buckets, flashlights, coffee pots, and .45-caliber pistols with five rounds of ammunition for each man.[6]

As more movements required overseas travel, unit personnel were often called upon to man antiaircraft guns while onboard ships during combat. Many unit personnel earned the right to wear battle stars as a result of their actions. Others helped prevent ship explosions by removing faulty explosives or leaking munitions—often at grave risk to themselves. Several unit members were awarded medals for these actions.[7]

Growth in Mission and Size

The importance of the unit was reflected in a change in status on 31 January 1945. The unit, which was redesignated as the 9710th Technical Service Unit, Guard and Security, became a separate organization authorized to carry out its own functional operations. The first commander—Lieutenant Colonel Garland M. White, an experienced chemical officer—was assigned in February 1945. The unit continued to grow in mission and size throughout 1945. A total of 899 escort missions were conducted between February 1944 and November 1945. By 1 November 1945, the total strength of the unit had grown to 56 officers and 299 enlisted men.[8]

Lieutenant Colonel White was the first commander of the 9710th Technical Service Unit, Guard and Security.

Meritorious Unit Commendation

By the end of World War II, the Guard and Security Division had accomplished 1,151 escort missions and had moved more than 848,000 tons of material. In 1947, the unit (renamed the Technical Escort Detachment that same year) received a Meritorious Unit Commendation, signed by General Dwight D. Eisenhower (Chief of Staff of the Army), for work performed during the war.[9] Yet, the outstanding service and high disciplinary standards demonstrated by the unit during World War II were only the beginning of a long tradition that is currently carried on by the 22d and 110th Chemical Battalions.

Prologue

In the days following the 11 September 2001 terrorist attacks on the United States, 10 Technical Escort Soldiers and civilians from Dugway Proving Ground, Utah, and Edgewood Arsenal (subsequently renamed Aberdeen Proving Ground–South) deployed to Karshi-Khanibad, Uzbekistan, in support of Operation Enduring Freedom. These Soldiers and civilians were attached to Joint Special Operations Task Force Dagger and tasked with locating, confirming, and securing what U.S. officials feared might be a fledgling al-Qaida chemical and biological weapons capability.

Other Technical Escort Soldiers concurrently deployed to Washington, D.C., where they responded to the delivery of anthrax-filled envelopes to six U.S. Senators by spending months collecting samples at Senate office buildings. Their focus had previously been on the management of stockpile and nonstockpile chemical munitions, but that focus changed overnight. The TEU was now at the forefront of the U.S. counter WMD effort—the scope of which was expanding further and faster than anyone could have predicted. Significant organizational changes seemed necessary to keep pace with emerging requirements.

Lessons learned in Afghanistan and suspected WMD threats in the Horn of Africa and Iraq prompted the U.S. Congress to direct the Defense Threat Reduction Agency to develop a concept of operations to support offensive operations and to prevent the manufacturing, weaponization, offensive use, and proliferation of WMD. The Defense Threat Reduction Agency solicited assistance from the TEU (at the time, commanded by Lieutenant Colonel George Lecakes) to train and certify teams in an entirely new skill set intended to mitigate the threat posed by large-scale, state-sponsored WMD programs. These teams, which were dubbed WMD disablement teams, were the predecessors of the CBRNE response teams of today. The WMD disablement teams were trained and certified at Edgewood Arsenal, and they established the original critical tasks that were required to support what are now referred to as WMD elimination operations.

As the War on Terrorism expanded to Iraq and Southeast Asia and the WMD threat loomed heavily on the minds of U.S. leaders, the Department of the Army decided that the role of the U.S. Army TEU must be expanded. Consequently, the TEU was inactivated as a member of the U.S. Army Materiel Command in February 2004 and redesignated as the 22d Chemical Battalion (Technical Escort) under the U.S. Army Forces Command in October of that year. In September 2005, the 110th Chemical Battalion (Technical Escort) was activated at Fort Lewis, Washington, effectively doubling the Army's technical escort capability. In May 2007, the CBRNE Analytical and Remediation Activity was activated at Aberdeen Proving Ground. Manned almost entirely by former TEU members, the civilian scientists and hazmat handlers continued the important work of WMD remediation and recovered chemical weapons materials response, while the 22d and 110th Chemical Battalions focused

Bombs filled with dangerous mustard agent sometimes leaked or even burst, creating a cleanup challenge for the Guard and Security Division.

Bombs were typical of the chemical weapons that the Guard and Security Division moved throughout the country and across the oceans during World War II.

their efforts on supporting regional combatant commanders. The CBRNE Analytical and Remediation Activity and the 22d and 110th Chemical Battalions mark a new era in the history of the technical escort mission. Their influence on the Chemical Corps—and on the Army as a whole—continues to grow as more attention is placed on the global WMD threat.

Commemoration

The TEU, which was established in response to critical counter WMD requirements following World War II, will commemorate its 70th anniversary in 2013. Special events, including a living history leader professional development series, are scheduled throughout 2013. A series of events will also be held in conjunction with the 22d Chemical Battalion change of command, which is to be conducted in June 2013. Former TEU Soldiers are encouraged to submit noteworthy stories about Technical Escort-related missions to Lieutenant Colonel Andrew Miltner at <andrew.l.miltner.mil@mail.mil> or Mr. Jeffery Smart at <jeffery.k.smart.civ@mail.mil> for consideration for inclusion in *The History of the Technical Escort Unit*, which is slated for publication in late 2013.

Endnotes:

[1]John P. Bauer Jr. and Pierre E. Peltier, "The Guard and Security Division, Chemical Warfare Service and the 9710 Technical Service Unit, Chemical Corps, Technical Escort Detachment," Army Chemical Center, 1954.

[2]"Military Personnel to Accompany Shipments of Classified Chemical Warfare Material," memorandum from the Office of the Chief of Chemical Warfare Service to Commanding General, Headquarters, Services of Supply, 20 January 1943.

[3]Bauer and Peltier, 1954.

[4]"Guard and Security," monograph.

[5]"Program Summary," Guard and Security Division, Edgewood Arsenal, Maryland.

[6]"Equipment for Guard and Security Detachment, Edgewood Arsenal, Maryland," memorandum from the Office of the Adjutant General, Headquarters Army Service Forces, to Chief of Chemical Warfare Service and Chief of Engineers, 18 April 1944.

[7]Bauer and Peltier, 1954.

[8]"Guard and Security."

[9]War Department General Orders No. 69, 5 September 1947.

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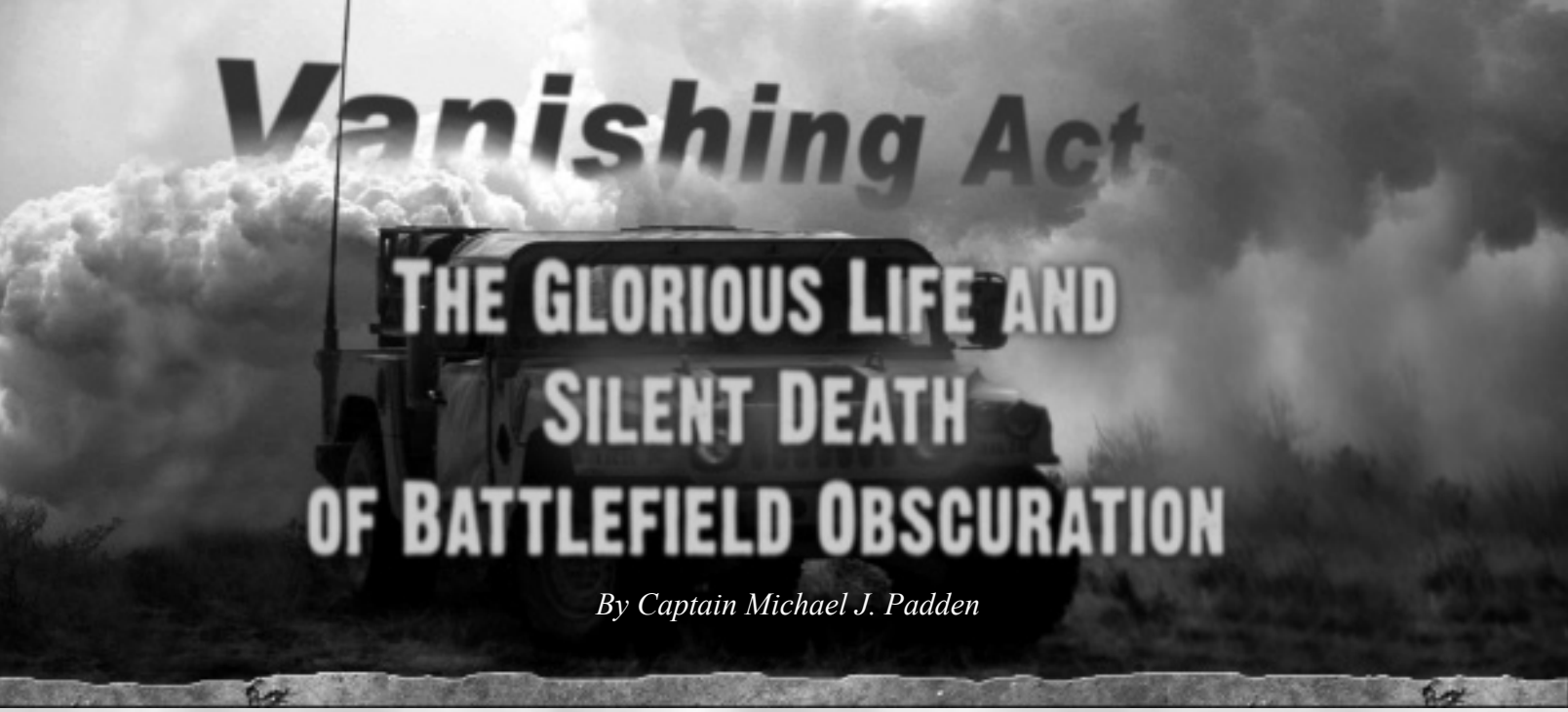


Vanishing Act

The Glorious Life and Silent Death of Battlefield Obscuration

By Captain Michael J. Padden

For almost a century, the U.S. Army Chemical Corps has had oversight of the doctrine and technology used in laying smoke on the battlefield. The effective application of battlefield obscurants has been documented for virtually every conflict from World War I through the War on Terrorism. In recent years, however, the near elimination of this traditionally important enabler has gone largely unnoticed. Additionally, there is little to indicate whether this capability will completely disappear from the battlefield or whether it will be provided by other means. This article describes the storied past, turbulent present, and questionable future of battlefield obscuration.[1]

To fully understand the significance of the situation, it is important to have a good understanding of the lineage of smoke operations. The idea of using obscurants to bewilder enemy forces on the battlefield dates back more than 2,000 years, when Indian and Roman armies created screens by burning brush and straw. The Swedish attempted to employ obscurants around 1700, and the use of obscurants was proposed (but never actually implemented) during the American Civil War. However, it was not until World War I that the U.S. and German militaries first conducted practical and methodical obscurant applications.

In late 1917, the U.S. Army War College published the first recorded guidance on the use of smoke as a battlefield obscurant.[2] The guidance, which was intended for use on the front lines of Europe, contained a discussion on employing contemporary methods of smoke production, such as incorporating red and white phosphorus in artillery shells and making use of the recently invented smoke grenade. It also established six purposes for the use of smoke:

- To protect flanks.
- To blind enemy machine guns in infantry attacks.
- To serve as a feint to draw enemy attention away from an area of operation or to compel the enemy to needlessly expend ammunition.
- To conceal friendly troop and gun emplacements.
- To fool the enemy into believing that they were under chemical attack.[3]

Following the war, two major entities contributed to the development of modern smoke generation in the United States. The Department of the Army—through the National Defense Research Committee and the Chemical Warfare Service—conducted extensive research on the development and improvement of smoke-producing chemicals and munitions that could be generated by pots or grenades or projected in artillery shells or mortars. Ironically, at about the same time, enterprising Prohibition Era "rum runners" developed the tactic of dripping engine oil on the tops of hot engine blocks to create smoke screens and effectively evade pursuing law enforcement officials.[4, 5] (The same general concept was later applied in the mechanical smoke generators of World War II and remained in use by U.S. forces for generations.) During the period of time between the two world wars, three categories of smoke obscuration systems were developed—and are still included in modern-day doctrine:

- Generated (pots, mechanical generators, dispersion tanks attached to aircraft).
- Projected (munitions).
- Self-defense (a combination of generators and munitions).

Shortly after the bombing of Pearl Harbor, Hawaii, the United States first began to employ smoke to protect vital infrastructure such as aircraft plants along the country's west coast and locks along the Panama Canal. Most of the coverage was provided by the M-1 smoke generator, which—although a bulky, stationary, 1½-ton contraption—was the most effective smoke generation technology available during much of the

war. The M-1 was capable of smoking out a target in less than 30 minutes.[6] In comparison, Great Britain's primary involvement in smoke operations consisted of distributing smudge (smoke) pots to volunteers who were stationed near key facilities in the event of an air attack. This approach was logistically difficult, as the initiation and sustainment of effective screens around the facilities required the prestaging of thousands of pots.

It could be argued that the use of battlefield obscurants reached its zenith during World War II, when obscurants not only protected critical domestic and rear area facilities, but also screened infantry and engineer operations along the front lines of the European theater. U.S. forces used at least 2.5 million gallons of fog oil in 107 forward area screening operations, while 25 chemical mortar battalions laid down hundreds of thousands of rounds of smoke artillery. Smoke operations became so important during the Mediterranean campaign of 1944 that there were not enough generator units available to fulfill all theater requests. Smoke was also used in well-known battles that took place in the Republic of Tunisia and in the Italian regions of Sicily, Salerno, and Anzio, where it "saved the day" for the Army VI Corps elements who were fighting along the beachhead.[7]

Not surprisingly, the most significantly planned smoke operation of World War II coincided with the invasion of Normandy, France. For more than 2 years, senior commanders considered a plan to use smoke to conceal ports and landing areas during the cross-channel invasion. The smoke capability was so important that an obscuration plan was included and briefed throughout the entire process. By D-Day on 6 June 1944, as many as 21 chemical companies were employed in support of the invasion—some of which possessed the new and improved M-2 generators, which were more compact and lighter in weight. While there is little doubt about the readiness of units to support the operation, the lack of German aircraft in the area at the time limited the employment of smoke during the storming of Omaha Beach. However, smoke operations played an important role in obscuring the size and composition of the invading force debarkation sites in southern England and artificial ports constructed off the coast of Normandy.

In contrast, due to differences in the geography and the nature of operations, there was less demand for obscuration in the Pacific theater. Although smoke was not generally used in large area screening operations, smoke units were still assigned to the region. The most notable instances of smoke use occurred in conjunction with an airborne assault near Lae, New Guinea, where air screens were created when smoke-producing material was released from 32- and 70-gallon tanks affixed to the bottoms of aircraft.

Numerous technological advances in obscuration were made during World War II. Through several successful engagements, these advances were ultimately proven in combat. In addition to the original mission of protecting rear areas, the frontline use of smoke at Anzio and during other operations helped earn the interest and support necessary to maintain and develop obscuration capabilities for future conflicts.

Like many other Army units, several chemical generation units returned to the United States following World War II and were subsequently demobilized and inactivated or transferred to the U.S. Army Reserve or the Army National Guard.

A few years later, during the Korean War, units such as the 68th Chemical Company were deployed to screen facilities in Seoul, Pusan, and Incheon from North Korean airstrikes. The unit history of the 68th indicates that, in 1953, it was one of the first units to receive the M-3 generator.[8]

There is little documentation regarding the employment of smoke during the Vietnam War; however, it appears that smoke was used primarily with artillery or grenades for marking locations or breaking contact with the enemy. The single documented case of the use of generated smoke during the Vietnam War involved modified UH-1H "smoke ships," which were used by units such as the 145th Combat Aviation Battalion to protect low-flying aircraft from Vietcong fighters.[9]

The decline in the use of smoke on the battlefield following the Korean War reflected a U.S. shift toward unconventional operations. While there are tactical uses for smoke employment under such circumstances, military planners and commanders have historically preferred the use of smoke over flat, open areas in conventional settings—which is why smoke doctrine remained important despite the infrequent use of smoke during the Cold War era. While U.S. forces were bogged down in an untenable war in Southeast Asia, military strategists remained aware of the critical role that smoke would play if Soviet tank divisions someday rolled across the vast openness of the Fulda Gap or the North German Plains.

This philosophy was bolstered during the Arab-Israeli War of 1973, when Egyptian forces unleashed an overwhelming salvo of generated and projected smoke and then crossed over the Sinai and Golan Heights regions of the Middle East and reclaimed land that had been lost during the Six-Day War a few years earlier. In less than 24 hours, the Egyptians moved five divisions (consisting of about 100,000 men, about 1,000 tanks, and more than 13,000 vehicles) across one of the largest tank

ditches in the world. Amazingly, their use of smoke allowed much of the operation to take place across wide-open terrain during the middle of the day. The sheer psychological effects of confusion and isolation on the Israelis were overwhelming, rendering them virtually incapable of providing any sort of resistance to the impending onslaught.

Less than 20 years later, and in fairly close proximity, the onset of the first gulf war brought about the most significant offensive use of smoke by U.S. forces since World War II. In his July 1998 article entitled "Is There a Future for the Smoke Platoon?" Captain William King recounts one instance in which smoke was used during that war:

> *. . . during Operation Desert Storm, the 59th Chemical Company, with only 10 minutes warning, masked the King Fahd International Airport and forced enemy fighter-bombers up to an altitude where our stinger teams could shoot them down. Shortly after, the 68th and 44th Chemical Companies conducted a smoke mission along the Wadi Al Batin to aid in the 1st Cavalry and VII Corps execution of the [Army Central Command] deception plan. The deception task force was able to draw all but one Iraqi division east of the wadi before the ground war was initiated.*[10]

The effectiveness of chemical companies in using smoke on the battlefield reaffirmed the importance of smoke as a combat multiplier in post-Cold War operating environments. Once again, dual-purpose (smoke/decontamination) and mechanized-smoke chemical companies became prized assets of division and corps echelons. Through countless Combined Arms Training Center rotations and military actions in locations such as in Kosovo, these companies and their platoons provided smoke and decontamination support to—and developed close relationships with—the brigades that they directly served. These relationships continued for more than a decade—through the 11 September 2001 attacks and the beginnings of Operation Enduring Freedom and Operation Iraqi Freedom.

While chemical companies were primarily focused on combating chemical and biological threats during this time, units such as the 46th, 68th, and 69th Chemical Companies (Mechanized Smoke) used equipment such as M1059 (Wolfe) smoke generators mounted on the backs of M113 armored personnel carriers to conduct major obscuration operations during the early stages of Operation Iraqi Freedom. While screening elements of the 3d Infantry Division as they crossed the Euphrates River, the 6th platoon, 68th Chemical Company, conducted the longest continuous combat obscuration mission since 1942. However, at that time, no one realized that these missions would likely signal the end of the Chemical Corps role in providing tactical smoke on the battlefield.

The increased threat of international and domestic terrorism, the development of the wars in the Middle East, and the ensuing personnel strains across the Army significantly impacted the Chemical Corps. As the U.S. military became less concerned with traditional, massive, conventional warfare and more concerned with small-scale counterinsurgencies, it appeared that everyone else did as well. The Chemical Corps began placing less emphasis on the long-held mission of shielding the force from enemy fires and reconnaissance, surveillance, and target acquisition elements and more emphasis on detecting and countering chemical, biological, radiological, and nuclear (CBRN) threats in conjunction with military and civilian partners.

This trend is evident in the rapid and dramatic changes made to chemical unit structures throughout the past few years. All active mechanized-smoke chemical companies were inactivated, and all dual-purpose companies were transformed to combat (maneuver) support. The total remaining battlefield obscuration capability for the entire Army consists of two mechanized-smoke chemical companies that are assigned to the Army National Guard. Why was such a drastic change made so quickly? The precise reasoning is not evident, but advances in military technology, the ability to produce smoke using alternate means, safety and environmental concerns, and cost considerations may have contributed to the decision. The reduction may have actually been the result of a combination of these and other factors.

Of the possible reasons for such a quick and drastic change in the use of battlefield obscurants, one of the biggest concerns probably had to do with the tremendous advances in military technology that have taken place during the past 20 years—many of which have degraded the effectiveness of traditional obscurants. For more than 50 years, the thick clouds produced by fog oil were sufficient for countering threats within the visible portion of the electromagnetic spectrum. However,

recent developments in satellite imagery (particularly infrared imagery), combined with the common military application of the Global Positioning System, have challenged the dominance of fog oil on the battlefield. Attempts were made to address this issue during the 1990s, when improvements to the M56 smoke generator (Coyote) allowed for the emission of a cloud of polyacrylonitrile-based graphite particles. However, the limited availability of the M56—coupled with safety, operational, and environmental concerns—severely limited its common application.[11] Around the same time, Army researchers considered the possible use of electrospun nanofibers as an obscuration method; however, no further documentation of its development could be located.

It may also have been that the generator systems used by chemical units were no longer practical—as evidenced by their lack of employment during the last 5 years of war. In fact, there is no documentation of the use of generated smoke over the highly elevated and heavily restricted terrain of Afghanistan in almost 10 years of operations there. Combatant commanders in operating environments laden with improvised explosive devices that are capable of destroying heavily armored vehicles do not assume the risk inherent in allowing an M56 mounted on a soft-skinned M1113 Humvee to roll off the forward-operating base.

One of the most popular reasons offered for the sudden change in the use of battlefield obscurants is that projected smoke can adequately address the obscuration needs of the modern fighting force. Smoke that is laid down by fires could potentially be placed more quickly and accurately and could potentially be used to reach locations (bodies of water, restricted terrain, areas behind enemy formations) that would be inaccessible to vehicle-mounted generation units while also potentially eliminating the risk to vehicle smoke crews. In addition, the requisitioning and stockpiling of extra rounds of hexachloroethane (HC), white phosphorus, and other smoke-producing munitions would logistically be much easier and cheaper than maintaining a fleet of generators and transporting them to areas where they are needed.

However, there are significant drawbacks to this position, with the foremost involving doctrine. From the beginning, one principal objective of the use of smoke was to screen friendly operations and protect critical facilities. The screening of facilities is the one capability that can only practically be provided by generated smoke. Relying on smoke pots for the generation of smoke would likely prove logistically impractical, as evidenced by the experiences of Great Britain during World War II. And projecting smoke on or near friendly environments or heavily populated targets is not recommended due to safety and health hazards associated with the materials used in the munitions.

The issue of the possible health and environmental effects of smoke clouds raises another issue that has recently caused some commanders to be weary of the use of smoke in general. Such concerns range from burns, to the increased risk of pneumonia, to carcinogenic properties. As a result, local and Army-wide restrictions have been placed on the use of smoke. And while the validity of these concerns is debatable, the great emphasis that has recently been placed on occupational health—even on the battlefield—may have contributed to the reduced popularity of smoke in modern tactical operations.

All of these issues ultimately seem to represent an overall shift in the mind-set from older to younger military generations. A significant portion of the Army population knows only about fighting in the counterinsurgency environment that developed following the 11 September 2001 terrorist attacks; many of those who entered service when the Army was training to fight in a conventional war against Russia (when smoke played a major role in battle) have already left the Service or are about to retire, taking their vast knowledge and experience with them.

Although the elimination of Chemical Corps smoke assets is a relatively recent development, support for the smoke capability has been cut off for quite some time. The extensive smoke training that was once a part of the initial training for all CBRN personnel was reduced from several weeks of instruction (including field exercises) to a day's worth of electronic slides in the classroom, before eventually being eliminated from the programs of instruction altogether. As a result, the newest generation of Dragon Soldiers and leaders is not trained in the use of smoke, nor do these Soldiers understand how the employment of battlefield obscuration can influence military operations. In addition, there is no special training available for the small force of individuals who may be called upon to apply these skills or oversee the possible future reintegration of smoke obscuration, should the demand arise.

Of utmost concern is that—although the Chemical Corps appears to have focused its abilities on countering CBRN threats—the Corps continues to produce battlefield obscuration doctrine that relies on assets and capabilities that no longer exist at the required levels. The Chemical Corps has clearly been forced to make some difficult decisions; but in light of the issues at hand, two important questions must be raised. First, are maneuver commanders and planners outside the Chemical Corps aware of this situation? And then—perhaps the more difficult question—Do they still consider smoke to be a valuable enabler?

If there has, in fact, been some consensus that smoke capabilities are no longer necessary, we must recognize and respect the need to balance the calculated risk accepted by the Army as a whole against our branch responsibility of providing warfighters with what they need most. However, if there is a recognized need for smoke capability, we must do a much better job of addressing it—either by fighting to reinstitute the appropriate assets or by transferring the responsibility to another protection function element that is better postured to provide it.

Although this line of reasoning is simple, there is one caveat: Retaining a capability that is not understood can prove to be more disastrous than not possessing the capability at all. This concern applies to smoke that is improperly placed by untrained individuals, as illustrated by what happened when the 36th Infantry Division attempted to cross the banks of the Rapido River near Sant' Angelo, Italy, on 22 January 1944. Of the many things that went wrong that day, one that stood out was a failed attempt to use smoke while conducting bridging operations. In a desperate effort to screen engineers from an overwhelming force of Nazi elements holding elevated terrain, untrained Soldiers began randomly deploying smoke pots all along the river's edge. The smoke, which was laid on too thickly, blew back onto friendly forces, causing them to become sick, blind, and disoriented. Without the protection of adequate cover, the troops were forced to endure extended periods of tremendous fire; and casualties needlessly began to build. Furthermore, some of the Soldiers wandered off into a minefield and were killed by explosions. The division, which had an exemplary fighting record, suffered a terrible defeat, ultimately sustaining 1,681 casualties and failing to cross the river.[12]

Regardless of what the future holds for the use of smoke on the battlefield, the lesson our forefathers learned was a hard and bloody one. We must honor their memory by ensuring that events like this are never repeated.

Endnotes:

[1]Field Manual (FM) 3-50, *Smoke Operations*, 4 December 1990.

[2]*Notes on the Use of Smoke*, U.S. Army War College, Washington, D.C., 1917.

[3]Ibid.

[4]*Rumrunners, Moonshiners, and Bootleggers,* The History Channel (History Alive), A&E Television Networks, New York, 2007.

[5]"Federal Officer Stearns in Chase Where Alleged Bootlegger Uses Smoke," *Nashua Telegraph*, New Hampshire, 19 July 1930.

[6]Gene Weinreis, "Smoke Generators—Through the Years," *Army Chemical Review*, January 1991.

[7]"Denying Enemy Obscuration," *The Chemical Warfare Service in World War II: A Report of Accomplishment*, U.S. Army Chemical Warfare Service, Reinhold Publishing, New York, 1948.

[8]William H. Boudreau, "68th Chemical Company: Historical Missions," 1996, <http://www.first-team.us/journals/div_arty/68_ndx01.html>, accessed on 21 September 2012.

[9]"Smoke Ships," *118th Assault Helicopter Company (AHC)*, <http://www.118ahc.org/118thAHC.htm>, accessed on 21 September 2012.

[10]William King IV, "Is There a Future for the Smoke Platoon?" *Army Chemical Review*, July 1998.

[11]Frank D. Chapman, "Smoke Units Viable to IBCT and Objective Force—Informational Dominance Denial Through Use of Advance Obscurants," *Army Chemical Review*, August 2001.

[12]Martin Blumenson, *Bloody River: The Real Tragedy of the Rapido*, Houghton Mifflin Company, Boston, Massachusetts, 1970.

References:

William R. Bowlin, "Smoke—Historically Proven Combat Multiplier," *The Army Chemical Journal*, Vol. 2, No. 2, Summer 1986.

Benjamin W. Covington III, "Smoke . . . Part Science, Part Art, and . . .," *The Army Chemical Journal*, Vol. 2, No. 4, Winter 1986.

Gerald O. (Neal) Dorroh Jr., "Breaking the Paradigm: Restructuring the U.S. Army Chemical Corps for the 21st Century," *Army Chemical Review*, February 2001.

Andrew Herbst, "Operations Other than War—Smoke Integration," *Army Chemical Review*, January 1995.

Jorge Rios, "CBRN Brief," (poster session presented to Class 03-11, CBRN Captain's Career Course, Fort Leonard Wood, Missouri), August 2011.

Richard L. Slick, "Unit History in Korean War," *United States Army Chemical Mortar Battalions: Distinguished Service in World War II and the Korean War*, 1986, <http://www.4point2.org/hist-2kslick.htm>, accessed on 21 September 2012.

At the time this article was written, Captain Padden was a student in the CBRN Captain's Career Course, Fort Leonard Wood, Missouri. He is currently assigned to the 110th Chemical Battalion (Technical Escort), Joint Base Lewis-McChord, Washington.

2012 Honorees of the U.S. Army Chemical Corps

Compiled by Ms. Christy Lindberg

Hall of Fame Inductees

The U.S. Army Chemical Corps Hall of Fame award is the highest form of recognition offered by the Regiment. This coveted award honors those who have made landmark contributions to the overall history and traditions of the Chemical Corps or continue to work in ways that benefit the Corps. These individuals have distinguished themselves through advances in science and technology, a lifetime of service and devotion to the Corps, or gallantry in battle. The ranks of the Hall of Fame are inundated with scientists who tirelessly worked to protect the force through innovations and with Soldiers who exemplified the tenets of courage and honor. The following individuals were inducted into the Hall of Fame on 26 June 2012.

Major General Ralph G. Wooten (Retired)

Ralph G. Wooten was born in LaGrange, North Carolina. Upon his 1968 graduation from Officer Candidate School, Fort Benning, Georgia, he was commissioned as a second lieutenant. He was then deployed to Vietnam, where he served as a platoon leader and as the adjutant of 1st Battalion, 2d Brigade, 1st Infantry Division.

Returning from Vietnam, Wooten was assigned to the 82d Airborne Division (1972–1977), where he served as division chemical officer and logistics staff officer for the divisional artillery brigade, as commander of the 14th Chemical Detachment, and as commander of B Company, 782d Maintenance Battalion. Other key assignments for Major General Wooten include branch chief and deputy director of the Nuclear, Biological, and Chemical Training Department, U.S. Army Chemical School; materiel readiness officer and commander of the Materiel Management Center, 3d Armored Division; deputy director of the Research, Development, and Engineering Support Directorate; chief of staff of the Chemical Research, Development, and Engineering Support Directorate; and chief of staff of the Chemical Research, Development, and Engineering Center, Aberdeen Proving Ground, Maryland; logistics planning officer of the Deputy Chief of Staff for Logistics (G-4), III Corps, Fort Hood, Texas; commander of the U.S. Army Environmental Center, Aberdeen Proving Ground; joint program manager for Biological Defense, Falls Church, Virginia; and deputy commanding general of the U.S. Army Chemical and Military Police Centers and Fort McClellan, Alabama. Wooten served as the 21st Chief of Chemical and the commandant of the U.S. Army Chemical School from 1994 to 1999; he advanced to the commanding general of Fort McClellan in 1996.

As commandant of the Chemical School, Wooten's 21st century vision of "Protecting the Force" outlined a broad strategy to provide trained chemical, biological, radiological, and nuclear (CBRN) battle staff leaders and multipurpose chemical forces that were fully capable of supporting global joint operations. His "Chemical Vision 2010" had a profound and lasting impact on the acquisition strategy, force structure, technology, training, and doctrine of the Chemical Corps. His ideas on force protection, mounted reconnaissance, and smoke capabilities transformed the way CBRN units and staffs support and protect Army and joint forces. In addition to his visions and ideas, Wooten demonstrated extraordinary leadership during the closure of Fort McClellan and the successful relocation of the U.S. Army Chemical and Military Police Schools to Fort Leonard Wood, Missouri. He has been a mentor and role model for thousands, and his legacy continues to inspire and motivate a generation of Soldiers and civilians.

Major General Wooten's military decorations include the Combat Infantryman Badge, the Legion of Merit, and the Bronze Star Medal with two oak-leaf clusters.

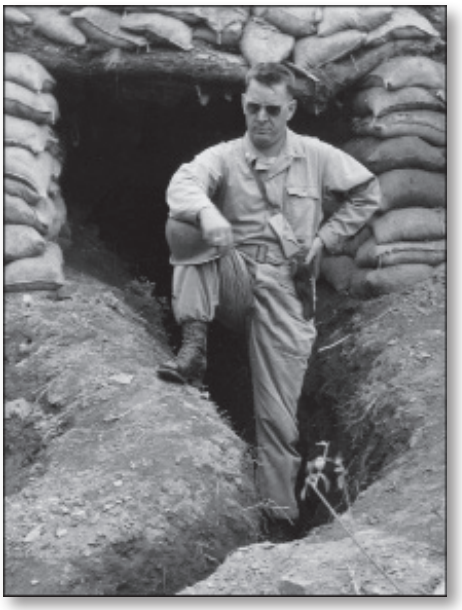
Major General Wooten holds a bachelor's degree in biology from North Carolina Central University and a master's degree in logistics management from Central Michigan University. He is also a graduate of the Chemical Officer Advanced Course, the U.S. Army Command and General Staff College, and the Industrial College of the Armed Forces.

Major General Wooten (Retired) is a renowned subject matter expert in environmental compliance; pollution prevention; environmental remediation; CBRN defense operations; and weapons of mass destruction contingency planning, emergency management operations, and strategic planning. He now serves as the executive vice president of Davis-Paige Management Systems.

Colonel Merritt W. Briggs (Retired)

Merritt W. Briggs was born in Jamestown, New York, and received a bachelor's degree in biology from Oberlin College, Ohio. He was inducted into the Army at Buffalo, New York, in 1942 and was stationed at Fort Jackson, South Carolina. In 1944, he was commissioned at the Army Chemical Center, Edgewood, Maryland. During his military career, Briggs served in three major conflicts: World War II, the Korean War, and the Vietnam War.

As commander of the 2d Chemical Mortar Battalion, Briggs was presented with a Silver Star for actions that enabled one of his companies to return to combat and helped bring the Chinese Communist breakthrough on the central front in the Kapyong-Chunchon area to a standstill. Colonel Briggs organized and led a task force consisting of a platoon of tanks and personnel through enemy lines to the overrun mortar positions of two of his companies, where he found much of the equipment still intact. He returned and organized a combat engineer unit—which, under his direction and covered by the tank unit, recovered all of the equipment except a 1-ton vehicle and trailer and two mortars.



Major General Claude Ferenbaugh, commander of the 7th Infantry Division, wrote a letter of appreciation to Briggs, stating, "Your support is particularly commendable in view of the hazardous and roadless terrain over which we are obliged to displace. All movements were accomplished with alacrity and were obviously well planned. The thorough indoctrination of your officers was apparent in the attack on Hill 851, during which action the mortar support was superb. Full utilization was made of forward observers with devastating results. The flexibility of your command in functioning under either infantry or artillery control evidences the thorough training and technical skill of all personnel."

Briggs received the distinguished award of Honorary Officer of the Most Excellent Order of the British Empire (Military Division). According to the citation, "Lieutenant Colonel Briggs was the officer commanding the 2d Heavy Chemical Mortar Battalion, [U.S.] Army. Throughout the campaigns, Lieutenant Colonel Briggs' splendid and most cordial spirit of cooperation with the Commonwealth Division was very noticeable. It was due to this general planning and logistical support that his mortars were always at hand when needed."

Colonel Briggs' other military awards include the American Campaign Medal, the European-African-Middle Eastern Campaign Medal, the Asiatic Pacific Campaign Medal, the World War II Victory Medal, the Army of Occupation Medal (Japan clasp), and the Korean Service Medal.

After more than 26 years of military service, Colonel Briggs retired. He passed away in 1988.

Distinguished Members of the Chemical Corps Inductees

Four names were added to the list of outstanding individuals serving the U.S. Army Chemical Corps. The award of the Distinguished Member of the Chemical Corps title signifies that these individuals have not only contributed a lifetime of service in the Corps, but also support the Chief of Chemical in implementing his vision of what the Corps is and where it is going in the future. The following individuals were inducted into the 2012 Distinguished Members of the Chemical Corps on 26 June 2012.

Major General Sampson H. Bass Jr. (Retired)

Sampson H. Bass Jr. was born in Washington, D.C. He began his career as a chemical operations officer with the U.S. Military Assistance Command, Vietnam. He went on to earn degrees from the U.S. Army Command and General Staff College and the U.S. Army War College.

After completing his studies at the War College, Bass became the director of the Weapons Development and Engineering Laboratories, Edgewood Arsenal, Maryland, and then the commander of Pine Bluff Arsenal, Arkansas. He is considered the "grandfather of the Chemical Demilitarization Program," which began with Task Force Eagle in 1969. In the early 1970s, he

served as the program manager for chemical demilitarization and installation restoration with the U.S. Army Chemical Stockpile Disposal Program. During that time, the Army researched and developed the more environmentally sound chemical weapons disposal methods of high-temperature incineration and chemical neutralization. Through more than 45 years of dedicated service, Bass worked on the research and development of new toxic gases in pilot plant operations; development and industrial mobilization plans; staff supervision; and execution for the determination of the construction, conversion, expansion, and layaway of chemical and biological plants and processes. In addition to these contributions, Bass served as the manager for the M17 gas mask and as the principal for the Big Five Program at Fort Detrick, Maryland.

As a result of the foundation laid by Bass, the U.S. Army Chemical Materials Agency was able to successfully accomplish its mission of destroying nearly 90 percent of the Nation's chemical agent stockpile and all chemical-agent munitions and items declared when the Convention on the Prohibition of the Development, Production, Stockpiling, and Use of Chemical Weapons and on Their Destruction (commonly known as the Chemical Weapons Convention) went into force.

Major General Bass earned the Distinguished Service Medal, the Legion of Merit with two oak-leaf clusters, the Air Medal, and the Army Commendation Medal with four oak-leaf clusters.

Brigadier General Stanley H. Lillie (Retired)

Stanley H. Lillie was born in Nashville, Tennessee. After receiving a bachelor's degree in biology from Middle Tennessee State University, he began his military career with the Chemical Corps. Lillie demonstrated remarkable leadership and vision throughout his 30-year career.

As commander of the 83d Ordnance Battalion and Akizuki Army Ammunition Depot, Camp Kure, Japan, Lillie worked with several levels of Japanese military and government officials on a building project that saved millions of dollars for the U.S. Army. When he served as commander of the U.S. Army Environmental Center, Aberdeen Proving Ground, his public outreach program fostered public appreciation of the military; furthermore, his actions led to the purchase of land at Fort Bragg, North Carolina, that facilitated training and created a habitat for the red-cockaded woodpecker, leading to its removal from the Endangered Species List. Another of Lillie's key positions was as the chief of the Biological and Chemical Defense Division, Office of the Deputy Chief of Staff for Operations and Plans (G-8), Washington, D.C. In addition to securing vital equipment for deploying units, he worked with the Joint Program Executive Office for Chemical and Biological Defense to rebuild the M-12 decontamination apparatus. He also served as the 23d Chief of Chemical and as the commandant of the U.S. Army Chemical School, Fort Leonard Wood. In this capacity, Lillie guided the development of concepts and requirements for dismounted CBRN reconnaissance and sensitive-site exploitation, determined emergency response and weapons of mass destruction–civil support team capabilities, and improved the technical capabilities of general-purpose chemical units. He also spearheaded efforts to reacquire proponency for technical escort training and secured funding for the First Lieutenant Joseph Terry CBRN Responder Training Facility.

Brigadier General Lillie's awards include the Military Distinguished Service Medal, the Defense Superior Service Medal, the Legion of Merit with three oak-leaf clusters, and the Meritorious Service Medal (4th award).

Master Sergeant Richard C. Robertson (Retired)

Richard C. Robertson hails from Tennessee. He entered the Army in 1988.

Robertson's first assignment was as the nuclear, biological, and chemical noncommissioned officer, 1st Battalion, 41st Infantry Regiment, 2d Armored Division, Germany; from there, he served his first combat tour in Operations Desert Shield/Desert Storm. He was also assigned as the nuclear, biological, and chemical noncommissioned officer of 1st Battalion, 17th Field Artillery Regiment; 3d Battalion, 21st Infantry Division (Light); and 71st Chemical Company. In addition, Robertson served as an assistant squad leader and squad leader, 31st Chemical Company and 1st Squadron, 10th Cavalry Regiment, 4th Infantry Division. He then served as a recruiter and, later, an instructor/writer with Headquarters and Headquarters Company, 84th Chemical Battalion. Because of his nuclear, biological, and chemical subject matter expertise, Robertson was assigned to the 1st Special Forces Operational Detachment–Delta. During his first two tours with that unit, he served in a direct support role

for combat operations, which led to deployments to Saudi Arabia (for Operations Desert Shield/Desert Storm) and Iraq (for Operation Iraqi Freedom). During his third tour with the 1st Special Forces Operational Detachment–Delta, he was severely wounded in the western deserts of Iraq. The combat injuries he sustained prompted Master Sergeant Robertson to retire after having served for more than 20 years.

Master Sergeant Robertson's military awards and decorations include the Bronze Star Medal; the Purple Heart; the Defense Meritorious Service Medal, the Meritorious Service Medal, the Army Commendation Medal with three oak-leaf clusters, the Army Achievement Medal with seven oak-leaf clusters, the Good Conduct Medal (6th award), the National Defense Service Medal with one bronze service star, and the Southwest Asia Service Medal with two bronze service stars.

Today, Master Sergeant Robertson (Retired) actively participates in the Care Coalition, U.S. Special Operations Command, MacDill Air Force Base, Florida, where he serves as a peer mentor for fellow severely injured/wounded special operations warriors. In addition, he provides valuable input to the Special Operations Warrior Foundation; for example, he advises wounded warriors on how to best overcome issues they face when embarking upon a new career after suffering traumatic combat injuries.

Sergeant First Class Frank Cupp (Retired)

In 1943, at the age of 17, Frank Cupp joined the Army and was assigned to the 88th Chemical Mortar Battalion, which was sent to the Pacific theater of operations.

While training for landings on Guadalcanal and Angaur Island, Cupp achieved the rank of corporal and became the leader of a squad that was operating 4.2-inch mortars. Although he sustained injuries from a grenade blast, he continued on to the Philippines to fight on the islands of Leyte and Mindanao. He left the Army for a brief time, but reenlisted in 1946.

During his second enlistment, Cupp was assigned to Edgewood Arsenal, where he first traveled with educational displays that promoted the Chemical Warfare Service during World War II and was later assigned to the 9710 Technical Service Unit—a unit responsible for the disposal of chemical agents brought back from various overseas installations. Cupp escorted train shipments of toxic, chemical agent-filled shells, bombs, land mines, rockets, and 1-ton containers to Huntsville Arsenal, Alabama; Pine Bluff Arsenal, Arkansas; Rocky Mountain Arsenal, Colorado; and Oak Ridge Nuclear Facility, Tennessee, where he destroyed the dangerous chemicals. He served in the 9710 Technical Service Unit until 1952, when—at the grade of sergeant first class—he was discharged from the Army for a second time.

Sergeant First Class Cupp's awards include the Asiatic-Pacific Campaign Ribbon with bronze arrowhead device, the Philippine Liberation Medal, and the Good Conduct Medal.

After leaving the Army, Sergeant First Class Cupp (Retired) accepted a civilian position as an inspector with the Materials Inspections Division at the Edgewood Area of Aberdeen Proving Ground. He later continued this line of work in the private sector. Today, Sergeant First Class Cupp (Retired) continues to work with several depots and munitions sites, aiding in the cleanup of hazards that may possibly remain buried. He has also worked closely with the U.S. Army Research, Development, and Engineering Command to write the history of what is now known as the 22d Chemical Battalion (Technical Escort).

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

DOCTRINE UPDATE

U.S. Army Maneuver Support Center of Excellence
Capabilities Development Integration Directorate
Concepts, Organization, and Doctrine Development Division

Publication Number	Title	Date	Description
		Current Publications	
FM 3-11 MCWP 3-37.1 NWP 3-11 AFTTP(I) 3-2.42	Multiservice Doctrine for Chemical, Biological, Radiological, and Nuclear Operations	1 Jul 11	This is the overarching chemical, biological, radiological, and nuclear (CBRN) doctrine manual. This revision represents a critical doctrinal shift from nuclear, biological, and chemical (reactive mode covering weapons of mass destruction [WMD] only) to CBRN operations (proactive mode covering the full range of CBRN threats and hazards). It implements the three strategic pillars of the *National Strategy to Combat Weapons of Mass Destruction*—nonproliferation, counterproliferation, and consequence management. **Status**: Current.
ATTP 3-11.23	Multiservice Tactics, Techniques, and Procedures for Weapons of Mass Destruction Elimination Operations	10 Dec 10	A multiservice tactics, techniques, and procedures (MTTP) manual that provides the tactical doctrine and associated tactics, techniques, and procedures (TTP) that each Service provides in support of the joint weapons of mass destruction–elimination (WMD-E) mission area in an effort to operate systematically to locate, secure, disable, and/or destroy a state or nonstate actor's WMD programs and related capabilities. **Status**: Current. Will be redesignated as Army Techniques Publication (ATP) 3-11.23.
ATTP 3-11.36 MCRP 3-37B NTTP 3-11.34 AFTTP 3-2.70	Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Aspects of Command and Control	12 Jul 10 C1 28 Feb 11	An MTTP manual that provides commanders, staffs, key agencies, and Service members with a key reference for understanding, characterizing, and managing CBRN threats and hazards in a particular operational environment. **Status:** Current. Will be redesignated as ATP 3-11.36.
FM 3-11.3 MCRP 3-37.2A NTTP 3-11.25 AFTTP(I) 3-2.56	Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Contamination Avoidance	2 Feb 06 C1 20 Apr 09	An MTTP manual for CBRN contamination avoidance. It provides commanders, staffs, key agencies, and Service members with a key reference for planning and conducting CBRN avoidance and contains the tools that CBRN defense personnel need to implement active and passive CBRN avoidance measures. It also supports decisionmaking. **Status**: Under revision fiscal year (FY) 2013. Will be redesignated as ATP 3-11.32, Volumes I and II.
FM 3-11.4 MCWP 3-37.2 NTTP 3-11.27 AFTTP(I) 3-2.46	Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical (NBC) Protection	2 Jun 03 C1 31 Dec 09	An MTTP manual that establishes principles for CBRN protection and addresses individual and collective protection considerations for the protection of the force and civilian personnel. **Status**: Under revision FY 13. Will be consolidated with ATP 3-11.32.
FM 3-11.5 MCWP 3-37.3 NTTP 3-1.26 AFTTP(I) 3-2.60	Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Decontamination	4 Apr 06	An MTTP manual that defines the roles of military units and staffs involved in the preparation, planning, and execution of decontamination operations. It addresses the requirement for different decontamination techniques. The manual focuses on the need for all U.S. forces to be prepared to fight and win in a CBRN-contaminated environment. It also addresses homeland security support required from the Department of Defense (DOD). **Status**: Under revision FY 13. Will be consolidated with ATP 3-11.32.
FM 3-11.9 MCRP 3-37.1B NTRP 3-11.32 AFTTP(I) 3-2.55	Potential Military Chemical/ Biological Agents and Compounds	10 Jan 05	A manual that provides commanders and staffs with general information and technical data concerning chemical and biological agents and other compounds of military interest, such as toxic industrial chemicals. **Status**: Under revision FY 13. Will be redesignated as Technical Manual (TM) 3-11.91.
FM 3-11.11 MCRP 3-3.7.2	Flame, Riot Control Agent, and Herbicide Operations	19 Aug 96 C1 10 Mar 03	A manual that describes the TTP for employing flame weapons, riot control agents, and herbicides during peacetime and combat. The distribution of this manual is restricted due to the sensitive nature of the information contained in it. **Status**: Current. Will be superseded with the publishing of TM 3-11.91.
FM 3-11.19 MCWP 3-37.4 NTTP 3-11.29 AFTTP(I) 3-2.44	Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Reconnaissance	30 Jul 04 C1 31 Dec 08	This publication was approved by all four Services. Due to the increased workload and priorities for Doctrine 2015, the commandant of the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS) has approved and signed an implementation memorandum so that the MTTPs may be immediately incorporated into institutional training and used by the U.S. Army—even though they are not yet authenticated or published by the Army Publishing Directorate (APD). This publication can be accessed and downloaded in electronic format from the CBRN Knowledge Network (CKN) at <http://www.us.army.mil/suite/portal/do?p=409522>. The other three Services are seeking the same rapid implementation from their leaders. **Status**: Under revision FY 13. Will be combined with and supersede Field Manual (FM) 3-11.86. Will be redesignated as ATP 3-11.37.

DOCTRINE UPDATE

U.S. Army Maneuver Support Center of Excellence
Capabilities Development Integration Directorate
Concepts, Organization, and Doctrine Development Division

Publication Number	Title	Date	Description
Current Publications (Continued)			
FM 3-11.20	Technical Escort Battalion Operations	29 Aug 07	An Army-only manual that provides the TTP for the employment of technical escort battalions. The distribution of this manual is restricted due to the sensitive nature of the information contained in it. **Status**: Under revision FY 13. Will be redesignated as ATP 3-11.24.
FM 3-11.21 MCRP 3-37.2C NTTP 3-11.24 AFTTP(I) 3-2.37	Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Consequence Management Operations	1 Apr 08	An MTTP designed for CBRN responders who plan and conduct domestic, foreign, or DOD-led consequence management operations. DOD personnel who respond to a CBRN incident may be responsible for CBRN consequence management planning and may be required to execute plans during full spectrum operations. **Status**: Current. Will be redesignated as ATP 3-11.41.
FM 3-11.22 AFTTP 3-2.81	Weapons of Mass Destruction–Civil Support Team Operations	10 Dec 07 C1 31 Mar 09	A dual-service (Army and Air Force) manual that provides suggested doctrinal TTP for use by WMD–civil support teams. The revision updates the manual to incorporate the expanded mission of WMD–civil support teams, including responses to toxic industrial material releases and natural or man-made disasters that could result in the loss of life or destruction of property in the United States. It also addresses expanded response areas in which the teams are required to conduct their missions, including maritime and urban areas and confined spaces. **Status**: Under revision FY 13. Will be redesignated as ATP 3-11.46.
FM 3-11.34 MCWP 3-37.5 NTTP 3-11.23 AFTTP(I) 3-2.33	Multiservice Tactics, Techniques, and Procedures for Installation CBRN Defense	6 Nov 07	An MTTP that focuses on installation emergency management rather than CBRN installation defense. It will address all hazards—not just CBRN hazards. The revision is the result of newly published DOD policy and instruction and a front-end analysis of the DOD CBRN Defense Program led by the J-8/Joint Requirements Office. The new name will be *Multiservice Tactics, Techniques, and Procedures for Installation Emergency Management.* **Status**: Under revision FY 13. Will be redesignated as ATP 3-11.42.
FM 3-11.50	Battlefield Obscuration	31 Dec 08	An Army-only manual that provides TTP to plan obscuration operations and employ obscurants during or in support of full spectrum military operations at the tactical through operational levels of war. **Status**: Current. Will be redesignated as ATP 3-11.50.
FM 3-11.86 MCWP 3.37.1C NTTP 3-11.31 AFTTP(I) 3-2.52	Multiservice Tactics, Techniques, and Procedures for Biological Surveillance	4 Oct 04	This publication was approved by all four Services. Due to the increased workload and priorities for Doctrine 2015, the commandant of USACBRNS has approved and signed an implementation memorandum so that the MTTPs may be immediately incorporated into institutional training and used by the U.S. Army—even though they are not yet authenticated or published by APD. The publication can be accessed and downloaded in electronic format from the CKN at <http://www.us.army.mil/suite/portal.do?p=409522>. The other three Services are seeking the same rapid implementation from their leaders. **Status**: Under revision FY 13. Will be consolidated with ATP 3-11.37.
FMI 3-90.10	Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives Operational Headquarters	24 Jan 08	An Army-only manual that provides the basic doctrine for the employment of a chemical, biological, radiological, nuclear, and high-yield explosives operational headquarters to conduct tactical-level, WMD-E operations or transition to a joint task force-capable headquarters for WMD-E operations to support campaigns and civil authorities. **Status**: Revision on hold due to strategic decisions. This is a Maneuver Support Center of Excellence manual, which will be redesignated as ATP 3-90.10.
***Note:* Current CBRN publications can be accessed and downloaded in electronic format from the General Dennis J. Reimer Training and Doctrine Digital Library at <http://www.adtdl.army.mil/>, CKN at <http://www.us.army.mil/suite/portal.do?p=409522>, or Maneuver Support Knowledge Network (MSKN) at <http://www.us.army.mil/suite/page/275589>.**			
Emerging Publications			
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	TBD	A dual-service ATP that provides the tactical doctrine and associated TTP for conducting CERFP and HRF operations. This manual contains TTP associated with consequence management operations that involve State Active Duty, Title 32, and Title 10 response. A recommendation has been made to the U.S. Army Training and Doctrine Command to encompass CERFP and HRF missions in this manual. **Status:** Under development 4th quarter, FY 13.
***Note:* CBRN draft publications can be accessed and downloaded in electronic format from CKN at <https://www.us.army.mil/suite/portal.do?$p=409522> or MSKN at <https://www.us.army.mil/suite/page/275589>.**			

Professional Military Education

Qualification training courses are listed and described in Table 1.

Table 1. Qualification training courses

Enlisted/Noncommissioned Officer (NCO) Qualification Training Courses	
74D10 Chemical, Biological, Radiological, and Nuclear (CBRN) Specialist Course (School Code 031)	
Phase I (Course 031-74D10 [R] [dL])	Students who have a reservation for Phase II are automatically enrolled in Phase I. They receive e-mail instructions from the Army Distributed Learning Program via Army Knowledge Online (AKO). Students must complete Phase I before reporting for Phase II training. An Army Correspondence Course Program (ACCP) certificate of completion (e-mailed) or other documentation must be presented as proof of Phase I completion during Phase II in-processing. Soldiers who experience problems with Phase I should telephone the ACCP at (800) 275-2872 (Option 3) or (757) 878-3322/3335. If no ACCP representative is available, they should contact Master Sergeant Gary Leamons, 3d Brigade (Chemical), at (860) 570-7114 or <gary.leamons@usar.army.mil>.
Phases II and III (Course 031-74D10 [R1])	These phases consist of resident training conducted at Fort Leonard Wood, Missouri. Soldiers must have an e-mail printout indicating that they have completed Phase I. Soldiers who fail to provide the printout are returned to their units. Phase II is waived for civil support team members who have already completed the Civil Support Skills Course (CSSC).
CBRN Transition Course (School Code R031)	
This is a three-phase resident course. Soldiers attending the CBRN Transition Course (031-74D2/3/4) must be graduates of a military occupational specialty (MOS) Advanced Leader Course (ALC) or Basic Noncommissioned Officer Course (BNCOC). Soldiers who have not attended ALC or BNCOC must attend the CBRN Specialist Course (031-74D10) to become 74D10 MOS-qualified. Soldiers must complete the online Hazmat Awareness Training (<https://afcesa.csd.disa.mil/kc/login/login.asp>) prior to attending the CBRN Transition Course; certificates must be presented during in-processing.	
ALC—Common Core (CC) Distributed Learning (dL) (School Code G400, Course 600-C45)	
This is a 90-day, 60.4-hour, highly facilitated, Web-based, non-MOS-specific course that has replaced only the CC portion of the previous BNCOC. Unit trainers enroll Soldiers through the Army Training Requirements System (ATTRS). Students receive e-mail registration instructions. Soldiers who fail to register within 15 days before the start date are automatically cancelled and considered "No Shows." The next Soldier on the waiting list is granted a confirmed reservation. Soldiers who are classified as "No Shows" or who have been cancelled may be required to wait 24 months to be rescheduled for any phase of ALC. Soldiers must complete the ALC-CC and the three-phase CBRN ALC technical course to be considered an ALC graduate. Soldiers who previously completed BNCOC-CC will receive constructive credit for ALC-CC.	
74D30 CBRN ALC (School Code R031, Course 031-74D30-C45)	
CBRN ALC is a three-phase resident course. Phase I is waived for Soldiers who possess a certificate indicating that they have completed Department of Defense (DOD)-certified hazmat training at the technical level.	
74D40 Senior Leader Course (SLC) (School Code R031, Course 031-74D30-C46)	
This is a three-phase resident course conducted at Fort Leonard Wood.	
Officer Qualification Training Courses	
CBRN Captain's Career Course (C3) (School Code 031)	
Phase I (Course 4-3-C23 [dL])	This branch-specific dL phase (formerly Phase II) consists of 108 hours of dL instruction, which must be completed within 60 days before attending Phase II. Unit trainers enroll Soldiers through ATTRS. Students receive e-mail instructions from the Army Distributed Learning Program. Hazmat awareness training can be accessed at <https://afcesa.csd.disa.mil/kc/login/login.asp> and completed by students prior to attending Phase II. Students who encounter problems should contact the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS), CBRN C3 Course Manager, Major John Feero at (573) 563-7397 or <john.ferro@us.army.mil>. The successful completion of Phase I (and the CBRN Defense Course [branch transfers]) is a prerequisite for Phase II attendance.
Phase II (Course 4-3-C23)	This branch-specific resident phase (formerly Phase III) consists of 2 weeks of training conducted at the USACBRNS. The focus is on radiological operations, live-agent training, hazmat awareness and operations level training and certification, and the basics of the Joint Warning and Reporting Network used within the Maneuver Control System. The successful completion of Phase II is a prerequisite for enrollment in Phase III.
Phase III (Course 4-3-C23 [dL])	This CC phase (formerly Phase IV) consists of 59.2 hours of dL instruction. Unit trainers enroll Soldiers through ATTRS. Students receive e-mail instructions from the Army Distributed Learning Program. Students must complete Phase III within 60 days of attending Phase IV. Those who encounter problems should contact Major Feero at (573) 563-7397 or <john.feero@us.army.mil>. The successful completion of Phase III is a prerequisite for Phase IV attendance.
Phase IV (Course 4-3-C23)	This resident phase (formerly Phase V) consists of 2 weeks of training conducted at the USACBRNS. The focus is on a computer-aided exercise that includes additional Joint Warning and Reporting Network and Maneuver Control System training, culminating in a military decisionmaking process exercise using state-of-the-art battle simulation equipment.

Joint SLC (Course 4K-74A/494-F18)
This is a 4-day course in which senior leaders are presented with critical CBRN subject matter such as operational- and strategic-level aspects of CBRN defense. Participants also receive toxic-agent training at the Chemical Defense Training Facility. In addition, the Joint SLC forum offers a unique opportunity for senior military leaders, civilian government agency leaders, and leaders representing allied and coalition partners to exchange ideas.
CBRN Precommand Course (Course 4K0F4)
This is a 5-day course that prepares Regular Army and Reserve Component (RC) officers who have been selected for command of a CBRN battalion or brigade or a CBRN position in a division. Each student receives instruction in the application of Field Manual (FM) 7-0, *Training Units and Developing Leaders for Full Spectrum Operations,* concepts to the battalion training management process.
Note: Additional information is available at <https://www.atrrs.army.mil/>.

The courses shown in Table 2 are required by CBRN consequence management response force; chemical, biological, radiological, nuclear, and high-yield explosives (CBRNE) enhanced response force package; and civil support team units and for MOS qualification.

Table 2. Functional training courses

Mass Casualty Decontamination Course (School Code 031, Course 4K-F25/494-F-30)
This 9-day course is appropriate for CBRNE enhanced response force package and domestic-response casualty decontamination team members. Students who successfully complete the course receive certification at the hazmat awareness and operations levels.
CBRN Responder Course (School Code 031, Course 4K-F24/494-F29)
This 10-day course is appropriate for CBRN consequence management response force members. Students who successfully complete the course receive certification at the hazmat awareness, operations, and technician levels.
Civil Support Skills Course (CSSC) (School Code 031, Course 4K-F20/494-28)
This 8-week course is appropriate for Army National Guard civil support team members. Students receive advanced training in hazmat technician and incident command and CBRN survey, point reconnaissance, sampling operations, personal protective equipment selection and certification, and decontamination and receive specialized training on a variety of military and commercial CBRN detection equipment.
Note: All students who successfully complete hazmat training are awarded certificates issued by the International Fire Service Accreditation Congress and DOD. Additional copies of certificates can be obtained at <http://www.dodffcert.com>.

Soldiers who arrive for any resident courses without having first completed all appropriate dL requirements will be returned to their units without action.

USACBRNS RC Personnel

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

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

The 3d Brigade (Chemical), 102d Division (Maneuver Support), is currently seeking instructors for various locations. Applicants should be an E-6 or E-7, should be qualified (or able to be trained) as Army basic instructors, and should have completed the appropriate NCO Education System coursework. Interested Soldiers should contact Master Sergeant Leamons at (860) 570-7114 or <gary.leamons@usar.army.mil>.

Contact Information

Colonel Nathan J. Storck (DAC-AR), (573) 563-8050 or <nathan.j.storck.mil@mail.mil>.

Master Sergeant LaHarold M. Woodhouse (Senior Enlisted Advisor–AR), (573) 563-4026 or <laharold.m.woodhouse.mil@mail.mil>.

Master Sergeant Richard K. Kennon (Training Development NCO–AR), (573) 563-7757 or <richard.k.kennon.mil@mail.mil>.

Major Javid D. Heravi (DAC-NG), (573) 563-7676 or <javid.d.heravi.mil@mail.mil>.

Sergeant First Class Joseph C. Bahr (Army National Guard Proponency NCO), (573) 563-7667 or <joseph.c.bahr.mil@mail.mil>.

Reference:

FM 7-0, *Training Units and Developing Leaders for Full Spectrum Operations*, 23 February 2011.

Chemical Corps

PIN: 103148-000