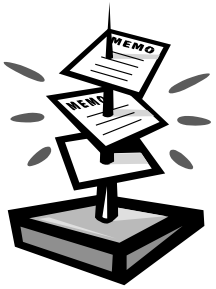
ARMY CHEMICAL REVIEW

Chemical Corps Homeland Security

PB 3-00-2

July 2000

Editor's Notes



This issue features the three winners of the last Chemical Corps writing contest. The topics, instructions, and deadline for our next writing contest are listed on page 19. I encourage as many of you as possible to select a topic and submit an entry. Who knows? You could be one of our next winners.

We encourage any feedback you may have on articles in this publication. I will see that your input gets to the appropriate authorities.

For those of you who wish to submit articles for publication, here are a few tips to guide you in your writing:

- Articles may range from 2,000 to 4,000 words. You may send a paper copy along with a disc in Microsoft® Word or by e-mail to the address below.
- Any article containing information or quotations not referenced in the story should carry appropriate endnotes.
- Appropriate photographs and art are appreciated. Hard-copy photographs are preferred and will be returned upon request. Digital photos are acceptable if saved at a dpi/ppi of 200 or more and at 100 percent of actual size. TIFF and JPEG file formats are preferred. If photographs are taken by individuals or support organizations or are the personal property of someone, provide the name of individual/organization so proper credit can be given. Also provide a brief description of what the photograph entails and, when appropriate, names of individuals in the photograph and what they are doing.

FM 3-5, *NBC Decontamination*, is at the Army Training Support Center awaiting printing and distribution. POC is LTC Flanagan, Chief of Doctrine.

Thanks to all of you who responded to my request for updating the mail list. I appreciate all your calls, e-mails, and letters. I also encourage you to continue sending articles that are of interest to your chemical comrades. This is your publication and a way to share your experiences with others.

Thank you,

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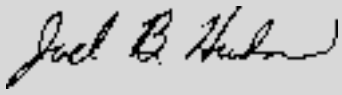

JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
0012404

CML
ARMY CHEMICAL REVIEW

PB 3-00-2 **July 2000**

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COL(P) Patricia L. Nilo
Chief of Chemical

What a tremendous amount of change and OPTEMPO we are experiencing in our Army today! Transformation has touched nearly every one of us. However, even if you are not decisively engaged in this major initiative, you are likely consumed with an ambitious training or deployment OPTEMPO. Here at the Chemical School, transformation and OPTEMPO are our daily bread as we strive to support the warfighters in the field. With summer already here and the Worldwide Chemical Conference behind us, the staff of the Chemical School is dividing its time between those issues and the preparation of the Chemical Corps Functional Area Assessment (FAA), scheduled for late this summer.

Years ago, during the Cold War, our units rarely experienced a change of scenery. And, "change of mission" was even more rare. Now, in this era of geopolitical uncertainty and WMD proliferation, nearly every component of our Army is actively participating in worldwide contingency mission rotations. To adapt and execute missions successfully under these conditions, our Cold War threat-based Army needs the change we are undergoing today.

The conversion of the 3d Brigade, 2d Infantry Division, at Fort Lewis from a heavy armored brigade to a lighter, more deployable force is the most visible aspect of Army transformation. It represents the Army's commitment to deliver a sustainable and lethal brigade to the warfight in 96 hours. An NBC reconnaissance platoon, initially equipped with the Fox NBCRS, is part of the embedded NBC defense capability for this force. This platoon received its initial training here at the Chemical School from May through July and reports to Fort Lewis in the next few weeks.

This platoon will be among the first units to receive the Chemical Corps newest NBC reconnaissance platform. Work has already begun on key time-phased improvements for our new NBCRS. These include integrated nuclear, biological, and chemical-agent identification; reach-back via secure SATCOM; and command and control of autonomous sensors on unmanned aerial vehicles, unmanned ground vehicles, and unattended ground sensors. Faced with continued WMD proliferation, the growth of our Corps, and the continued scientific advances in Chemical Corps warfighting technology foreshadow a very bright future with increasing opportunity for all of us.

This summer, at Fort Leonard Wood, we gave you a glimpse into that future during the XVII Annual Worldwide Chemical Conference held the week of 19 through 23 June. The theme of this year's conference was "*NBC Defense—Forging the Future*." As always, this has been the preeminent chemical and biological conference in the United States. The nearly 100 exhibitors in attendance, who highlighted the newest chemical and biological defensive technologies, reinforced to all of us the level of sophistication and commitment we need to have for an effective NBC defense. The time we spent in the breakout sessions of the Warfighter Conference was indeed well spent and produced solid recommendations to several issues from the tactical to strategic levels.

We will capture those recommendations for the Chemical Corps FAA. Ultimately, the FAA will affirm that the Chemical Corps is on a path to support the Army and that the Army can fully support our vision as it extends through the POM years. Since February, we have been working hard on the ideas and issues you submitted in response to January's FAA survey, and your feedback at the Worldwide Chemical Conference will prove to be vital. We are currently scheduled to present the FAA to the VCSA this September.

As a Corps, we have a lot to look forward to in the coming months and years. The vast majority of you will be part of our active force well into the future. As professionals, I urge each of you to participate in and contribute to both Army and Chemical Corps transformation initiatives. While the unpredictability of the WMD threat assures the need for NBC defense, our ability to remain relevant in that domain depends on your input and ideas that allow us to innovate effective methods to meet the challenges of the future. Let's forge the future of the Chemical Corps together!

Dragon Soldiers!

Regimental Command Sergeant Major

CSM James E. Van Patten III

Since our last publication, your Chemical School and the Chemical Corps Regiment really have been busy, just as you have been busy in the most important job in the Chemical Corps, the one you hold now. Every position in the Corps is vital to the mission we have of nuclear, biological, and chemical defense and the use of smoke. At the Maneuver Support Center (MANSCEN) and the Home of Chemical, we are continuing to train Dragon soldiers to provide the force necessary to execute our mission.

We have now graduated soldiers from every chemical-related course taught at Fort Leonard Wood. Recently the MANSCEN NCO Academy had its first graduation of the Chemical Advanced NCO Course 1-00 and its first Basic NCO Course 1-00. We also brought 19 more NCOs into the Corps through our Basic NCO Reclassification Course R1-00. These first classes helped us sort through the problems associated with establishing in a new location with competing demands on resources.

The BNCOC reclassification course is one way to help us gain NCOs for our shortages of sergeants. The other way is to ensure that we are properly coaching, teaching, training, and mentoring our specialists/E4s to become sergeants. We are short almost 500 SGT SL 20s across the Corps. We have just over 1,300 specialists in the inventory. Of these, almost 450 are in the primary zone, around 515 are in the secondary zone, and about 115 are on the SGT promotion list. We need the help of local commands to develop our specialists and recognize their potential to become SGTs, which will help us build and grow the force we need. All Chemical Corps leaders must be actively involved in this process for the benefit of the soldiers and the Corps.

By now you should be aware that we conducted our XVII Annual Worldwide Chemical Conference (WWCC) and Regimental Week, 19 through 23 June 2000, at Fort Leonard Wood. This was the first time, like so many other things, that we conducted this event here. We had several dedications, tours, briefings, work sessions, and special events, along with our Warfighter Symposium and Chemical Corps Regiment events. We had an outstanding conference that was well attended and beneficial to all who came. I give a special thanks to all who attended the conference and to the professionals who planned and executed our capstone event. You can find information about the WWCC on the Chemical School's home page at www.wood.army.mil.

We are approaching the time of year when our U.S. Army Reserve and National Guard units will start their annual training. Remember, the largest part of the Chemical Corps is in the Reserve Component and, whenever there is an opportunity to assist, then don't hesitate.

I would also like to mention that our seven chemical battalions of The Army School System (TASS) mostly do the training of Chemical Reserve Component soldiers. This year, our TASS battalions will train 212 soldiers as 54B10s, 272 new chemical NCOs in the 54B20/30 transition course, 34 soldiers in BNCOC, and 76 soldiers in ANCOC. TRADOC has directed that we convert the programs of instructions taught by the Active and Reserve Components into a single Total Army Training System (TATS). This project is ongoing and will result in significant changes and standardization of courses, including 54B10 reclassification, 54B BNCOC, 54B ANCOC, the Chemical Captains' Career Course, and the NBC Defense Course.

The Chemical Corps is one of the fastest-growing branches in our Army with many units coming online. The 455th Chemical Brigade at Fort Dix, New Jersey, activated on 4 June 2000. Recently, it was announced that 17 more weapons of mass destruction civil-support teams (formerly RAID) will be activated this year. We will have another biological-integrated-detection-system (BIDS) company activated next year and an active chemical brigade in 2007.

We also have elements that will be standing up in the Initial Brigade Combat Team (IBCT) with the transition of the Army that is taking place. We are currently working new recon platoons that will be part of the IBCTs, and this is happening quicker then anything the Army has ever done. The conversion of the existing brigades at Fort Lewis, Washington, to IBCTs has already begun with the first one coming online

this summer. So, the Chemical Corps has many new opportunities coming up to continue supporting our Army and nation.

The 3d Chemical Brigade at the MANSCEN has really made a difference in initial entry training and technical training of young chemical officers, junior enlisted, NCOs, and Transportation Corps enlisted soldiers. The directorates that work for and with the Chemical School are working hard on the many projects that support the future of the Corps and our Army. The Directorate of Doctrine, Training, Leader Development, Organization, Materiel, and Soldiers-Integration (DTLOMS-I) works most issues for the Chemical School. We have, under the MANSCEN, additional elements that work Chemical Corps-related functions along with DTLOMS-I. The Directorate of Combat Developments (DCD) works future organizations and equipment, and the Directorate of Training Development (DOTD) works our training products.

An example of some of the things that we have worked hard on is the transformation of the Army including the IBCTs. Another is the revision of the radiation-safety courses by DOTD, which just went through a critical-task selection board and will result in adjusting the courses to meet the current and future needs of the Army. Only two radiation courses will be offered, and they will be called the Basic and Advanced Radiation Safety Officer courses.

You probably have already felt the impact of the Chief of Staff of the Army's guidance to man the divisions at 100 percent. If you are in a division, then it should be getting better. If you are not in a division and are in a table of distribution and allowances (TDA) or echelons above division (EAD), then you can see that replacement soldiers are not coming as fast. There is some pain associated with this, but I can assure you that our Quartermaster/Chemical Branch is doing the best it can to get a fair share of soldiers to all the commands.

The future of the Chemical Corps is looking really good. Everyone wants to make sure that our capabilities are available for nearly every operation or contingency. We will continue to be a vital part of our Army for combat, peacemaking, peacekeeping, and homeland security. You play an important role in what you do day-to-day. Remember that what you do, although often unrecognized, is essential to our ability to accomplish the mission. Thank you for maintaining and building on the reputation of the Chemical Corps.

Finally, an additional piece of great news for the Chemical Corps is that **COL Patricia L. Nilo**, our Chief of Chemical and Commandant of the U.S. Army Chemical School, was selected for **promotion to Brigadier General.** Congratulations to COL(P) Nilo and all those who have helped to make her successful. I know that COL(P) Nilo will continue to support Dragon soldiers for years to come.

"ELEMENTIS REGAMUS PROELIUM"

Leading the Way!

The recent relocation of the U.S. Army Chemical School to Fort Leonard Wood, Missouri, has brought about many changes and new adventures. The 4/95th Chemical Battalion set a milestone when it conducted this year's annual training. The 4/95th, commanded by Lieutenant Colonel William Porter, was the first Reserve Component TASS Chemical Unit to conduct its annual training rotation at Fort Leonard Wood. The unit successfully performed its flame-field-expedient training on Range 27.

On 11 May 00, 135 students graduated and became 54Bs and 11 students received certificates for the NBC Defense Officer/NCO Course completion. Future plans call for all seven Reserve Component TASS chemical battalions to rotate through Fort Leonard Wood for their two-week annual-training period.

"Deadlier than a bullet: unclean, often unseen, sinister in its stealth. Goes for your head—the brain cells themselves, as well as a psychological number it lays on you—and your body. That's NBC warfare. Therefore, it's no fun to train for it: You have to face up to the realistic training soldiers need to survive on the battlefield. That means units, as well as personnel, must train under combat NBC conditions just as expected as rain or snow."[1]

LT COL Edward A Bradill
U.S. Army

The Chemical Corps Annual Writing Contest

NBC Defense Training: *Meeting the Challenge!*

By CWO3 Jeffrey W. Curry

"It didn't happen in the Gulf War, and Iraq had all types of chemical and biological (CB) weapons." This is the typical response I receive from Marine Corps commanders and leaders when attempting to coordinate nuclear, biological, and chemical (NBC) training. What if these weapons had been used against us? Would we have been prepared? Answer the questions yourself, but I think the answer is no!

We must recognize that NBC warfare is a battlefield condition. It is not a *check in the block* for an annual-inspection checklist! Let's face it: NBC-defense training is usually on the bottom of every commander's priority list. Why? With more and more countries procuring NBC capabilities, the proliferation of such weapons, and the escalating terrorist threat, the likelihood of encountering these weapons on the battlefield is at an all-time high. The NBC community, leaders, and commanders must band together and meet this daunting challenge head-on. If we remove the barriers that inhibit our ability to train our troops, institute innovative training techniques that spark interest in our personnel, and effectively solicit command support for NBC training, we better prepare our troops to *win battles* in the future. The first thing we can do is to rid ourselves of some old training practices that negate and undermine the benefits of NBC training.

BARRIERS

Old training practices impede our ability to train our personnel effectively. What I am specifically targeting are the CS chamber *pain-threshold* exercises and the mission-oriented protective posture (MOPP) 4 *sweat exercises*. Most service members' first experience with NBC-defense training begins with the M40 field protective-mask-confidence exercise. The perception our troops depart with, from this one experience alone, determines how they will respond to future training. When performed improperly, many such practices ingrain fear and resentment in our junior leaders, making it difficult for the NBC community to train its personnel once they become staff NCOs and commanders. These negative customs have a cumulative effect and significantly contribute to the fear that permeates all aspects of NBC training and readiness.

FEAR

NBC and fear are almost synonymous! Many leaders fear NBC because it provokes change, intrudes on the established methods of doing business, and interjects several complications into conventional training. Fear arises from the fact that we know our personnel are not proficient in performing their mission in a contaminated

environment. Our troops feel it! In MOPP4, it is hard to see, hear, touch, smell, communicate, and perceive what is going on around them. This fear erodes their confidence and ability to function in MOPP4—fear of exposure to CB agents, fear of dying, and fear of the unknown. Regardless of its source, fear will create American casualties on a contaminated battlefield. Ignorance fuels this fear. Effective training is the only way to combat this fear. I have researched and tested several training methods as a Marine battalion and regimental NBC defense officer. Here are a few innovative techniques that worked for me:

Crawl

Establish a tiered training program that builds on previous successes. Use the crawl, walk, and run methodology when beginning an NBC regimen. Crawl—an example is to have the unit (one platoon at a time) observe a task being performed (such as a detailed troop decontamination [DTD]). Set it up so all the unit has to do is watch. Put on a show. The NBC instructor dresses an assistant in MOPP4, then processes him through the DTD from beginning to end. For optimal learning, set the DTD up like a classroom with the stations close together so the students can see the big picture. It limits confusion and aids in retention. This type of initial training reduces fear by teaching basic concepts and procedures. Personnel usually leave this class with confidence, feeling they could process through the DTD without any problems.

Walk

Continue with the above example. The next step is to have that squad or platoon process through the DTD with the rest of the company as an audience. You can even pick a squad from each platoon and have a competition with the staff NCOs and officers as judges. The winning squad could get the rest of the day off as an incentive. Combining training and competition boosts morale and unit cohesion. A softball tournament with the troops wearing field-protective masks[2] or M16A2 service rifle disassembly/assembly relay races while wearing protective gloves are other ways to incorporate competition into NBC training. This training builds confidence in their abilities to use the equipment by attaching it to tasks they readily perform.

Run

Integrate NBC mission-performance standards into unit field-training exercises, joint-training exercises, and NBC field evaluations. This makes the training more challenging and realistic[3] and maximizes its effectiveness. "Train as you fight"[4] epitomizes this philosophy. Work NBC scenarios into training missions at every opportunity. For example, outfit a company in MOPP2 before it occupies defensive positions. Once the attack begins, sound the NBC alarm. Observe the unit as it transitions from MOPP2 to MOPP4. Another example is while a company is conducting movement to contact patrols, have the NBC survey team members put on their masks and gloves and take biological samples. Evaluate, discuss, and correct deficiencies. Integrative training, coupled with evaluation, enhances skill development and builds team confidence. By consistently integrating NBC training into the unit's schedule, it becomes a staple in regular training. Repetition sustains and perfects learned skills—proficiency through consistency. Unfortunately, there is never enough time to accomplish every training objective. Focus on quality when working on a restricted time schedule.

If the group receiving instruction isn't learning, then everyone is wasting their time! Let's take this a step further. Tailor each class to the specific audience, maximizing the audience's potential to learn as much information as possible. One method of accomplishing this is by employing the whole-brain approach.[5]

The left side of our brain controls the mathematical process, sequences, and logical thought, while the right side controls imagination, music appreciation, and conceptual thought.[6] By incorporating teaching techniques that combine aspects from both hemispheres of the brain, personnel are more apt to retain and recall the presented information. Some simple and effective training techniques I found that work well with troops are—

Motivation and Participation

As with all these techniques, your motivation and energy are vital ingredients in maximizing your student's learning potential. Get excited, animated, and bizarre! Interject exaggeration, humor, and action in your classes.[7] For an example, refer back to the DTD scenario to illustrate this concept, specifically, station 1 of the DTD. The key point at this juncture is to get the students to remember what is in each of the three sequentially placed containers used to decontaminate equipment. With a broomstick in hand, tap a container as an orchestra conductor would; then coerce the class to repeat (sing) after you: "hot, soapy water (repeat), decon solution (repeat), and rinse water (repeat)." If they aren't loud enough, have them do it again, and again if necessary. Everyone remains alert while having fun participating and learning. This technique really works!

People have come to me years later just to say, "I still remember what's in those three buckets." People are also more apt to retain information that provokes an emotional response.[8] Another example is to separate the students into pairs and place a splotch of ketchup (or anything) on one of the student's hand. Then, have his training partner

remove the simulated contamination with an M291 decon kit. Ensure that he removes all of the liquid. Rubbing black charcoal onto someone's skin appears foolish, but it stimulates the brain to remember the procedure.

Imagination

Use your imagination! Develop and redevelop training methods that stimulate and enhance your audience's ability to learn. Come up with techniques that work for you. Not everyone may feel comfortable using these techniques. There are other things you can do to promote NBC training. One of the most difficult, yet important, areas of training is getting your command to place emphasis on NBC training.

Command Support

One way to solicit command involvement is to become an avid NBC salesperson. Advertise competence and exhibit those qualities that you feel best exemplify the ideal NBC expert. Remain NBC-oriented regardless of how may additional and collateral duties you hold. Keep a positive attitude. You possess an important role in your unit. Not many officers can perform and function as an NBC officer!

Standards

Train to published standards and follow established doctrine.[9] With the fielding of new NBC equipment and updated field manuals, standing operating procedures (SOPs) become outdated. Revise unit NBC SOPs, and ensure that everyone from small-unit leaders up understands the new and current NBC requirements. Incorporate the training for these requirements into the unit's annual-training plan. Many commanders are not aware of such requirements and eagerly complete the tasks once they are aware that they are mandatory.

Involvement

Spread the gospel! Offer/solicit ideas on how to integrate NBC training into your unit's schedule. Attend training and staff meetings, and ask the executive officer or S3 to state the commander's intent on scheduled NBC-training events. Once the senior leadership is involved, officers and section leaders are more likely to accomplish NBC-training objectives. Invite the commanding officer, executive officer, and S3 to participate in NBC training. At the very least, ask them to make appearances during these phases of training. Through the principle of "leadership by example," unit personnel will observe their commanders actively supporting NBC training and understand its importance.

We can move NBC training near the top of our commander's priority list by arousing troop interest, integrating it into tactical field exercises, and inviting staff participation in NBC training. We must do whatever it takes to prepare our troops for combat in contaminated environments. By removing the barriers that inhibit our ability to train the troops, instituting innovative training techniques, and soliciting command support for NBC training, we better equip our troops to succeed "in every climb and place."

CWO3 Jeffrey W. Curry is currently the NBC Defense Officer and Regimental Training Officer for the 10th Marine Regiment, Camp Lejeune, North Carolina. His previous assignments include NBC Defense Officer for 2d Battalion, 2d Marines and 2d Marine Regiment, and HQ Company Commander and Regimental Training Officer for the 2d Marine Regiment, Camp Lejeune, North Carolina. He was promoted to Warrant Officer in February 1993. CWO3 Curry is a graduate of the Technical Escort, Radiation Safety Officer, Radiological Emergency Team Operations, and Chemical Officer Advance Courses and the Amphibious Warfare School Nonresident Program. He holds a bachelor of science degree from Campbell University's School of Education, Buies Creek, North Carolina.

Endnotes

[1] CG, Marine Corps Combat Development Command, "MAGTF Nuclear, Chemical, and Defensive Biological Operations (OH 11)," (Quantico, VA, 1991), 8-1.

[2] Major Charles E. Heller, USAR, "LEAVENWORTH PAPERS – Number 10; Chemical Warfare in World War I: The American Experience, 1917-1918," (Washington, D.C.: Combat Studies Institute, 1984), 57.

[3] Department of the Army, "Training the Force: Soldiers, Units & Leaders (FM 25-100)," (Washington, D.C., 1988) 1-4.

[4] Dept of the Army, "Training the Force: Soldiers, Units & Leaders (FM 25-100)," Washington, D.C., 1988) 1-3.

[5] Stanley D. Frank, Ed. D., "Remembering Everything You Read," (New York,: Random House, 1990), 166 & 167.

[6] Colin Rose, "Accelerated Learning," (New York: Dell Publishing, 1987), 11.

[7] Fred B. Chernow, "The Sharper Mind," (Paramus, NJ: Prentice Hall, 1997), 24.

[8] Joan Minninger, Ph. D., "Total Recall: How to Boost Memory Power," (New York: Pocket Books, 1986), 154.

[9] Department of the Army, "Training the Force: Soldiers, Units & Leaders (FM 25-100)," (Washington, D.C., 1988) 1-4.

The Chemical Corps Annual Writing Contest **2nd Place**

The Chemical Corps *and* Domestic Decontamination Operations

By Captain Wendy Martin

In a speech to the Defense Science Board, Secretary of Defense William S. Cohen said, "As the new millennium approaches, the United States faces a heightened prospect that regional aggressors, third-rate armies, terrorist cells, and even religious cults will wield disproportionate power by using—even threatening to use—nuclear, biological, or chemical (NBC) weapons against our troops in the field and our people at home."[1] The likelihood of a terrorist using a weapon of mass destruction (WMD)—specifically chemical, biological, or nuclear—in the United States is growing.

With the possibility of an imminent attack, the United States must prepare to manage the consequences of such an event, and we—Chemical Corps soldiers, experts in the NBC-warfare arena—must be prepared to assist with the consequence management. This article discusses the WMD threat, current response teams, agent-detection methods, decontamination procedures, personal experiences with domestic preparedness for WMD attacks, and the effects of domestic-response missions on chemical units.

The 1995 nerve-agent subway attack in Tokyo set a precedent for future attacks. Experts on terrorist activities (Emergency Response and Research Institute) claim that an attack on the United States is imminent, and the Senate Subcommittee says, "It is not a matter of IF, but rather WHEN, such an event will occur."[2] A WMD attack has occurred on American soil; however, the power of the explosion set off in the World Trade Center in 1993 vaporized the cyanide that was packed in the explosive device, thus preventing the spread of a poison gas. The Federal Bureau of lnvestigation is currently tracking several groups that it suspects will use some type of WMD in the future.[3] Chemical units have already been called on to support large events (such as the Atlanta Olympics and the National Boy Scout Jamboree) in the occurrence of a WMD terrorist attack.

The Threat

The NBC threat to the civilian population is much different than the battlefield threat facing today's military. There are five basic types of WMD: nuclear devices, radiological-dispersion devices (RDDs), biological agents, industrial agents, and chemical agents. Agents, quantity, delivery systems, motives, and targets are all different from military uses of NBC warfare.

Nuclear devices pose the least threat to the civilian community because of the high cost, technology, and availability of materials. On the other hand, RDDs have a higher probability of use by a terrorist as a WMD.

RDDs have a greater possibility of use in a WMD attack than nuclear devices. An RDD is defined as "any device, including weapon or equipment, other than a nuclear explosive device, specifically designed to employ radioactive material by disseminating it to cause destruction, damage, or injury by means of the radiation produced by the decay of such material."[4] Although political consequences of an RDD attack outweigh the physical threat, we must still consider RDDs as potential vehicles for WMD attacks.

Biological agents are also a possibility for use in a WMD. These agents are not always stable and require more effort to weaponize, but the materials are inexpensive

... it is unacceptable to have innocent civilians die at the hands of a terrorist during peace. Civilian victims of a WMD terrorist attack will be in a state of panic—they will be unprotected and may try to flee the scene.

and accessible. Longer incubation times of biological agents cause the symptoms to be delayed where "a spread of deadly pathogens could take place without any immediate recognition on the part of the emergency or medical community," thus creating several crises at many medical facilities that last days to weeks.[5]

The supply of *chemical agents* available to terrorists is endless. Many terrorists are college-educated extremists, and the Internet offers videos, books, and supplies for building chemical weapons. Industrial chemicals are also readily available.[6] The vast types of agents are a greater risk to civilians than the battlefield threat agents; however, the amount of agent likely to be used is much less—"a quantity that easily can be produced and carried to a dispersal site by one man."[7] It will be very difficult for terrorists to produce hundreds of casualties.

Military versus Civilian

Chemical soldiers train to decontaminate fellow soldiers who have been contaminated by some military means. FM 3-5, *NBC Decontamination*, carefully outlines the decontamination procedures that all soldiers are trained on. These soldiers—victims of the attack—are protected with suits and masks and trained how to respond to WMD attack. The military takes risks by sending soldiers to war, but leaders accept that some soldiers will die in war. Trained and equipped soldiers are less likely to panic than the untrained, unprotected individual.

Conversely, it is unacceptable to have innocent civilians die at the hands of a terrorist during peace. Civilian victims of a WMD terrorist attack will be in a state of panic—they will be unprotected and may try to flee the scene. Psychological effects of a chemical attack will cause many to seek care in hospitals if they are not consolidated and controlled, thus spreading the contamination. There may be a few people in the attack area, or there may be hundreds; however, most will require some type of treatment. More WMD casualties are likely on a downtown street or in a football stadium than on a battlefield. Many of those casualties will be emergency-response teams, because of their limited protection and detection methods, thus reducing the number of emergency responders to assist with the consequence management.

Response Teams

The Army's Technical Escort Unit, consisting of chemical and biological response teams specializing in technical expertise, serves as the cornerstone for other response forces.[8] The Marine Corps has the nation's only Chemical-Biological Incident Response Force (CBIRF). CBIRF is the vision of Marine Corps Commandant, General Charles C. Krulak, in response to the 1995 Tokyo sarin-gas subway attack; its mission is to "turn contaminated victims into treatable patients."[9] CBIRF consists of marines trained to assist with WMD consequence management through reconnaissance, detection, decontamination, medical, security, and service-support elements.

In October 1999, the federal government announced the locations of ten National Guard rapid-assessment and initial-detection teams for consequence management under the direction of the Federal Emergency Management Agency. This is part of the Domestic Preparedness program to train first responders under the Department of Transportation, established by Congress and the Department of Defense, to assist local, state, and federal emergency-response teams.

The teams focus on enhancing the ability to respond to WMD terrorist attacks.[10] Team members will be trained and provided the equipment necessary to respond to WMD attacks. Upon request from the local government, the teams will deploy to assist the emergency responders.

The government is preparing for WMD attacks by developing these specialized teams and creating training centers for emergency responders. These teams, although trained and equipped, will have limitations; thus, the Chemical Corps must be prepared to respond.

Agent Detection

Military units have equipment to detect various types of military chemical agents. Nerve agents can be detected with the M8A1 alarm, the chemical-agent monitor, and other means. The Chemical Corps weakness is trying to detect the industria1 agents that are more likely to be used by a terrorist than a national enemy.

Most emergency responders have few resources to detect the presence of a chemical agent. They rely on symptoms; placards; and some detector papers, tubes, and instruments for detection and identification of hazardous materials. The inability to detect and identify chemical agents quickly increases the numbers of casualties and the number of emergency responders who also become casualties.[11]

Decontamination Procedures

FM 3-5 addresses the steps for decontamination of troops and their equipment. Are these decontamination methods adequate for decontamination of hundreds of unprotected civilians? For military decontamination operations, the decontaminants are stored on the battlefield, water is available either naturally or in tankers, extra mission-oriented protective-posture gear is stored in logistics bases, military hospitals maintain nerve-agent antidote kits, command and control and radio frequencies are established, and the chemical company or platoon is already on the battlefield.[12]

In a terrorist attack, these necessary supplies are not prestocked for emergencies. Communities are just beginning to accept the probability of a chemical attack.[13] State and local emergency-response teams have minimal amounts of protective equipment available and few trained workers. Also, a nerve-agent antidote is not a normal hospital treatment; thus, it is not kept on hand at most hospitals.[14]

Chemical units must consider these limitations when called for on large-scale, civilian-decontamination operations. Civilians are not trained in military decontamination procedures; they will panic and may look to federal responders (such as police, firemen, and soldiers) for guidance and care.

On the battlefield, chemical soldiers prepare to decontaminate platoons, companies, and occasionally a brigade support area or larger element. The process is time and resource-intensive. In a domestic decontamination operation involving hundreds of people, the chemical platoon will not have the resources necessary to establish a complex decontamination line. We must consider the effectiveness of simply collecting personal belongings, spraying a water-bleach mixture on the victims as they walk a designated path or decontamination line, and checking for remaining contamination.

As the platoon leader of the dual-purpose platoon that provided support to the National Boy Scout Jamboree in August 1997, the chemical platoon learned a unique method for crowd decontamination. The stations consisted of the personal-item collection point, an intensive water and bleach or detergent spray down, a rinse station, and a chemical-agent-monitoring station (see figure).

The first step was command and control. Someone had to take control of the situation and direct contaminated personnel to the decontamination site. After control was established, the decontamination could proceed. The platoon leaders met with the local police and other emergency responders and determined that the local authorities would establish overall control of the situation and secure the area. To assist with command and control, we used hand-held radios provided by the local police department to maintain communication with the emergency responders.

Our first operational concern was the water source. Fire hydrants lined every street; however, the chemical platoon hoses did not fit fire hydrants. The unit had two options—purchase special attachments or let the city provide them. We borrowed attachments from the fire department, and we purchased a large quantity of household bleach from a bulk supplier to solve the water and decontaminant logistical problem.

We decided to operate one gender-irrelevant decontamination line; however, we were prepared to construct two gender-specific lines. The gender-specific configuration consisted of two columns of PVC pipe frames lined with dark, plastic shower curtains. Before the event, we coordinated with a military hospital for several hundred disposable hospital gowns and foam shoes, which we planned to issue at the final monitoring station. We tried to minimize the environmental damage caused by runoff by purchasing plastic wading pools for casualties to stand in while we sprayed them with the decontaminant. The wastewater would be dealt with in the site cleanup phase of the operation.

After developing a method to quickly accomplish the mission, we developed a method to decontaminate litter patients. Litter patients require special treatment. They must be triaged; they may require immediate first aid, such as administration of an antidote; and they require soldiers or other emergency personnel to carry them through the decontamination line.

Through the Army supply system, we ordered several sets of litter stands and placed them inside the wading pools. The source of the nonabsorbent litters was a problem. We borrowed some litters from various medical units; however, this was the most difficult item to obtain. Medics from our home station taught all soldiers proper movement and handling of casualties to eliminate further injuries. Instead of spraying these casualties, soldiers used a 0.5 percent solution of bleach and water and decontaminated the casualties with sponges. The end of the decontamination was marked as an ambulance collection point, where uncontaminated casualties were transferred to local authorities for medical attention.

This lengthy process requires nearly all the soldiers from the platoon. Consequently, it is important for the platoon leaders to monitor the soldiers' physical status and implement an alternating shift. The chemical soldiers cannot successfully accomplish the mission if they become casualties.

After all the casualties are decontaminated, the chemical platoon's job is still not complete. Even though the emergency responders know the decontamination techniques, they also must be decontaminated. After the civilians are decontaminated, and the initial shock of the crisis has subsided, it may be necessary to establish a standard detailed troop-decontamination line to accommodate the protected emergency workers. Chemical soldiers must be

trained to deal with civilians and must be prepared to decontaminate the emergency-response teams.[15]

Chemical Platoon Readiness

Emergency-response agencies—local, state, and federal, to include military troops—must work together to form an integrated response force to assist with consequence management of WMD attacks. Chemical leaders must not forget their primary mission—to prepare for combat. They always must consider the effects of concentrating on domestic preparedness versus preparing troops for combat. Leaders must balance training schedules appropriately.

Conclusion

A WMD attack on the civilian population may, in some ways, be similar to a chemical attack on a battlefield. Many of the responses and treatments are similar; however, chemical units must look at this problem from a new perspective—an urban environment and contaminated civilians. We must prepare for this new mission without sacrificing current mission readiness, training, and deployability. State and local governments are looking to members of the Army's Chemical Corps for training, guidance, and assistance with this consequence management of this relatively new threat to the American people.

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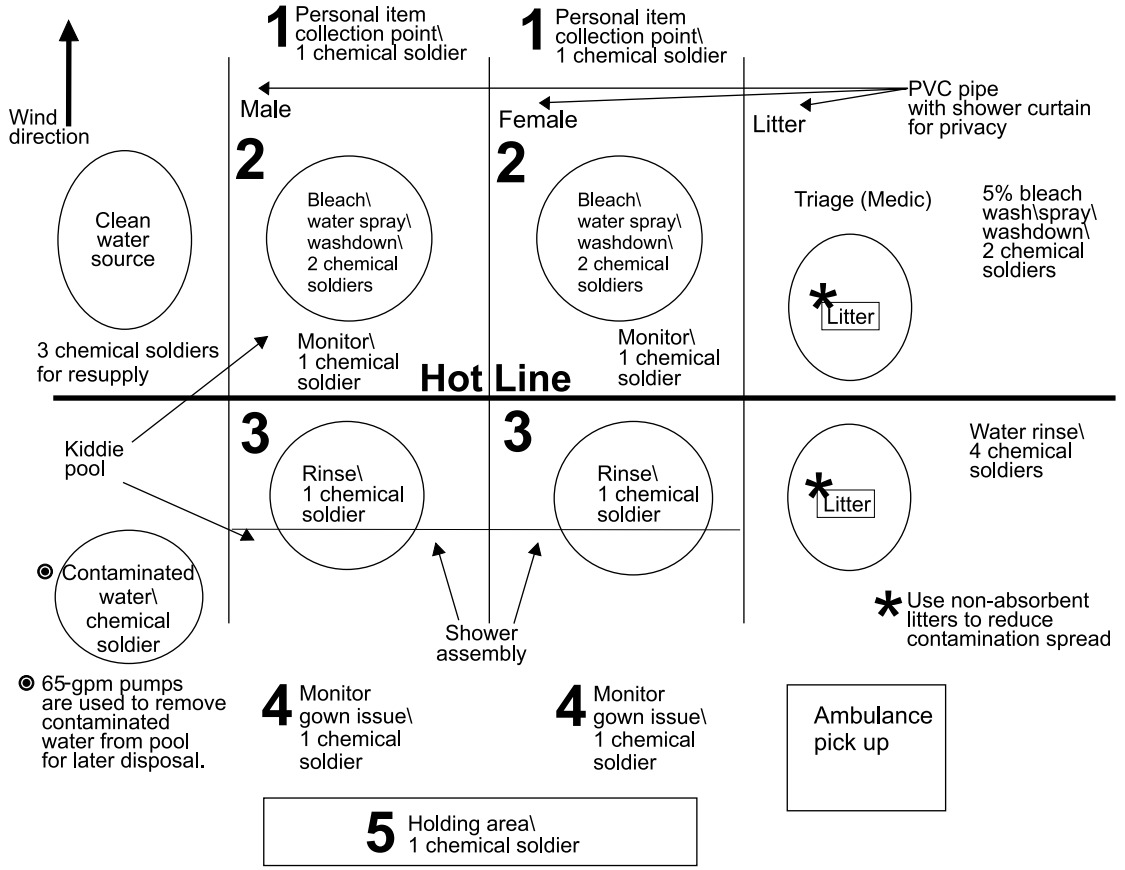
Boy Scout Jamboree Decontamination Program

Casualties enter at Station 1 and exit at Station 5. Each station is labeled by action and number of chemical soldiers required. The platoon leader monitors the hot side, and the platoon sergeant monitors the clean side.



Endnotes

[1] James L. Ford, "Assessing the Transnational Threat," Strategic Forum of the National Defense University Institute for National Strategic Studies, p.1. http://www.massdecon.com/news_current.htm.

[2] Clark Staten, "Emergency Response to Chemical/Biological Terrorist Incidents," Emergency Response and Research Institute, Chicago, Illinois, August 7, 1997, p.1. http://www.emergency.com/cbwlesn1.html.

[3] Chris Seiple, "Consequence Management: Domestic Response to Weapons of Mass Destruction," *Parameters. US Army War College Quarterly*, Carlisle, Pennsylvania, Autumn, 1997, p.1.

[4] Ford, p.1.

[5] Staten, "Emergency Response…", p.7.

[6] David E. Kaplan, "Terrorism's Next Wave: Nerve Gas and Germs are the New Weapons of Choice," *U.S. News and World Report*, November 17, 1997, p.2. http://www.usnews.com/usnews/issue/971117/17weap.htm.

[7] Gary Eifried, "Chemical and Biological Terrorism: Not Just Another Battlefield, 6th International Symposium on Protection Against Chemical and Biological Warfare Agents," Stockholm, Sweden, May 10, 1998, p.2. http://www.eaicorp.com/pubs/stockholmpaper.html.

[8] Soldiers Biological Chemical Command, "Domestic Preparedness Fact Sheets Program Overview" Aberdeen Proving Ground and Edgewood Arsenal, Maryland, p.2. http://www.sbccom.apgea.army.mil/ops/dp/dp_overview.html.

[9] Seiple, p.4.

[10] Office of the Assistant Secretary of Defense (Public Affairs), "Weapons of Mass Destruction Response Team Locations Announced," News Release Number 512-98, Washington, D.C., October 1, 1998, p.1. http://www.cbiac.apgea.army.mil/WMDNR.htm.

[11] Eifried, p.5.

[12] Headquarters, Department of the Army, "Field Manual 3-5: NBC Decontamination," Department of the Army, Washington, D.C., November 17, 1993, pp. 1-5.

[13] Clark Staten, "Chemical Attack—Are We Prepared?" EmergencyNet News Service and Emergency Response and Research Institute, Chicago, Illinois, 1995. p.1. http://www.emergency.com/chemattk.htm.

[14] Ibid.

[15] Eifried, p.4.

Other Sources

Department of Defense Report to Congress, "Volume I. Domestic Preparedness Program in the Defense Against Weapons of Mass Destruction," Washington, D.C., June 16, 1998. http://www.defenselink.mil/pubs/domestic/toc.html.

ICA Division, OPCW. "Protection Against Chemical Weapons: An Introduction." A FOA Briefing Book on Chemical Weapons, April 29, 1997. http://www.opcw.nl/chemhaz/protect.htm.

Steve Macko, "Senate Hearings Say Local Fire and Emergency Services Not Prepared...," EmergencyNet News Service, Vol.2-090, March 30, 1996. http//www.emergency.com/chembio2.htm.

Congratulations!

The 4th Chemical Company, 2d Infantry Division, Camp Casey, Korea, had three Audie Murphy inductees. The three Silent Death Warfighters NCOs inducted were—

SSG Ryszard Sahli
SSG Roberto La Fontant
SSG Patrick Jolivette

SGT Mahogany Brown of the 4th Chemical Company won the Brigade NCO of the Quarter and was the division's runnerup.

The Noncommissioned Officer Academy at the Maneuver Support Center, Fort Leonard Wood, Missouri, had an Audie Murphy inductee—SFC Miguel Flores-Acevedo.

Nullifying the Effectiveness of Weapons of Mass Destruction (NBC)—

with Integrated Land-, Air-, and Space-Based Sensors and Analysis

By Major William E. King, IV

"Weapons of mass destruction, nuclear, biological, and chemical, along with their associated delivery systems, pose a major threat to our security and that of our allies and other friendly nations. Thus, a key part of our National Security Strategy is to seek to stem the proliferation of such weapons and to develop an effective capability to deal with these threats."[1]

The National Security Strategy, 1998

Despite the best combined efforts of the world's five major powers (United States, China, Great Britain, Russia, and France), Third World countries, rogue radical groups, and potential terrorist organizations continue their alarming proliferation of weapons-of-mass-destruction (WMD) technologies. According to Secretary of State Madeleine Albright, the proliferation of WMD is "the most overriding security interest of our time."[2] Supporting her statement, in recent testimony before the Senate Intelligence Committee, the directors of the Central Intelligence Agency and the Defense Intelligence Agency agreed that the proliferation of WMD is the biggest threat to national security. LTG Patrick M. Hughes, Director of the Defense Intelligence Agency, explained "because chemical and biological weapons are generally easier to develop, hide, and employ than nuclear weapons," they will be "more widely proliferated and have a higher probability of being used over the next two decades."[3]

This article presents a concept for a near-future application of an integrated land-, air-, and space-based system of sensors, detectors, and analysis to provide critical immediate warning, reporting, and situational updates of nuclear, biological, and chemical (NBC) attacks. It shows how much more efficient and effective this concept could be compared to the United States' current system of independent detectors and sensors operating separately at the various levels of command and control. Ultimately, this article describes a concept that has a greater potential to achieve the United States' objective of convincing potential enemies that NBC weapons will be ineffective. Its underlying assumption is that when the United States and its coalition partners develop the capability to deny or limit the effects of an enemy NBC attack and can promise a devastatingly disproportional retaliation, then enemy WMD will be ineffective and the threat of its use will proportionately decline.

The five major world powers created and spearheaded international agreements with the intent of controlling the spread of WMD including the material, equipment, and technologies used in making them. Although the Nuclear Nonproliferation Treaty, SALT treaties, Chemical Weapons Convention, and the Biological and Toxin Weapons Convention encapsulate the best intentions of their creators, enforcing them has proven difficult, if not impossible. The Senate Governmental Affairs Committee concedes that export control agreements "can only slow the spread of WMD technology."[4]

Nations and private companies have violated the treaties with the knowledge that they cannot be enforced. Exporters, motivated by extremely high profits with very little associated risk, endeavor to evade economic sanctions. However, covert smuggling often is not necessary. That is especially true of the materials, equipment, and

Protecting the force against WMD must begin long before any deployment. It must occur all of the time—during peace, conflict, and war. Training, logistics readiness, and intelligence are critical components. Units must train to protect themselves and to operate under NBC conditions. Just getting the troops into MOPP gear is not enough.

technologies that are widely available commercially. Many of the technologies associated with the development of NBC weapons, especially chemical and biological, are classified as dual-use compounds because they also have legitimate civil applications. These technologies, relatively easy to obtain and convert into weapons, are very attractive to terrorist groups who want the power of WMD without the expense. According to Ashton Carter, former Assistant Secretary of Defense for International Security Policy, "export controls alone cannot prevent proliferation," because determined leaders like Saddam Hussein can "home grow their WMD or get them from other countries." [5]

As the proliferation and availability of WMD continue to expand, so do the threats and the expectation of their use. Aggressive Third World countries and rogue radical groups cannot compete directly with the superpowers. The resources required for supporting a large military force, or even conducting research and development for innovative weapons systems, are beyond their capabilities. Thus, as they compete for strategic positioning, power, and international recognition, they use the most destructive devices already within their grasp. Even the weakest terrorist group believes that large numbers of casualties and the ensuing panic inflicted by their insidious assaults will promote their political objectives.

The United States cannot stand by idly while such danger grows. The only way this emerging threat can be contained is by a clear and forceful U.S. policy that will lead the international community in a concerted effort to prevent; deter; and, if necessary, respond to acquisition, threats, and prospective use of WMD.[6]

> *"America's military superiority cannot shield us completely from this (nuclear, biological, and chemical) threat. Indeed, a paradox of the new strategic environment is that American military superiority actually increases the threat of nuclear, biological, and chemical attack against us by creating incentives for adversaries to challenge us asymmetrically."*[7]
>
> William Cohen, U.S. Secretary of Defense

America's unrivaled military superiority means that potential enemies—whether nations, terrorist groups, or individuals—who chose to attack us more likely will resort to terror instead of conventional military assault. Moreover, easier access to NBC weapons technology means that the destructive power available to terrorists is greater than ever. Thus, adversaries may be tempted to use unconventional tools, such as WMD, to target our cities and disrupt the operations of our government.[8]

If it is not feasible for hostile states to counter the United States in conventional combat, it is even more daunting for smaller groups such as terrorists. Fortunately, few terrorist groups have shown interest in inflicting true mass destruction. Bombing or hostage seizures have generally threatened no more than a few hundred lives. Let us hope that this limitation has been because of a powerful underlying ethical reason, rather than a simple lack of capability, and that the few exceptions do not become more typical.[9]

There is no sure reason to rely on such restraint. Indeed, some have tried to use WMD, only to see their attacks fizzle. Eventually such groups will prove less incompetent. If terrorists decide that they want to stun American policy makers by inflicting enormous damage, WMD become more attractive while at the same time more accessible.[10]

The use of these weapons could also be a threat for blackmail and extortion purposes. Even if the weapons are not used, the threat to use them could cause panic and terror in the United States or elsewhere. An accident involving a proliferant's weapons could have significant international repercussions and may be the most likely scenario for an actual incident.[11]

Based on the continuing spread of WMD, no region or level of involvement is exempt from the potential use of such weapons. Delivery systems range from intercontinental and ballistic missiles through standard battlefield weapons such as artillery and bombs, to terrorist or special operations forces selective employment methods such as rented trucks or boats to small packages. This is particularly significant when the use of NBC weapons during initial period of early-entry operations could have devastating effects. It is reasonable to assume that our potential enemies learned lessons from our recent operations in the Gulf War.

Protecting the force against WMD must begin long before any deployment. It must occur all of the time—during peace, conflict, and war. Training, logistics readiness, and

intelligence are critical components. Units must train to protect themselves and to operate under NBC conditions. Just getting the troops into MOPP gear is not enough. The protective equipment, NBC-reconnaissance systems, detectors and alarms, decontamination capability, and other critical items must be available and ready to use. Tactics, techniques, and procedures must be thoroughly understood and practiced. Understanding the enemy's threat, capabilities, and intentions is a continuous task. We cannot afford any surprises.[12]

Not to be overlooked is a more subtle, indirect threat: the possibility that some seemingly inoffensive Third World state would provide chemical, biological, or radiological weapons (one of the forms of nuclear weapons) to terrorists. It could covertly contribute to the struggle without fear of direct retaliation from the United States. There is a strong possibility that several Third World nations may be politically motivated to aid and abet the struggle against the stronger nations. The problem is still growing.

Renegade proliferation of WMD promotes regional instability with potentially global consequences and, as a result, challenges the interests of the United States. In response, the United States Counterproliferation Initiative (CPI) focuses on prevention of the proliferation of WMD, deterrence of their use, and defense measures (active and passive) countering their use. This program's primary objective is to prevent NBC-weapons proliferation. Secondly, if the enemy has an offensive NBC capability, then the goal is to deter its use. Thirdly, if deterrence fails and an attack ensues, the mission evolves to defend against the NBC attack with minimal casualties and degradation. While these three arms of the CPI currently exist in separate operational bodies, they have yet to be linked in a way that combines and, consequently, strengthens their efforts. They lack, but sorely need, a system that allows all three elements of this initiative to operate simultaneously and synergistically to nullify the effects of a WMD threat.

While the U.S. Army recognizes that a potential enemy might employ NBC weapons at any time,[13] planning remains focused on the obvious military threat. The Army usually plans for an NBC attack during a desperate moment in the height of battle, but NBC weapons would actually be most effective during entry or deployment operations.[14] These early, preparatory stages of a tactical operation are the most vulnerable. An enemy's goal would be to quickly inflict a large number of U.S. casualties and either slow U.S. military forces deployment or swing public opinion against further involvement.

We must abandon the Cold War thought that NBC weapons are a last desperate resort after a period of conventional conflict. In recent conflicts, 80 percent of internationally verified cases of chemical warfare occurred early in the conflict, even though other effective military options were still available. Chemical weapons were used to seize the psychological offensive—to terrorize, intimidate, and ultimately achieve victory over the adversary.

However, if these attacks were anticipated at least an hour before, they could have significantly reduced or completely avoided their catastrophic outcomes. But, tragically, no one anticipated these heinous attacks, and the passive defense measures were not in place, thus no warning, no time, no defense, no escape, no survival.

We must abandon the Cold War thought that NBC weapons are a last desperate resort after a period of conventional conflict. In recent conflicts, 80 percent of internationally verified cases of chemical warfare occurred early in the conflict, even though other effective military options were still available.

NBC defense training at all levels is essential for providing a force capable of projection to regional conflicts. While units may not expect to deploy to a theater where there is an NBC threat, it can occur. We can assume that an NBC-capable enemy will not allow us to mass our combat power and conduct a lengthy preparation period that includes extensive NBC defense training.[15]

During force-projection operations, commanders must look at the impact of WMD by stage of the operation. Intelligence concerning the enemy's capability to employ NBC weapons is critical. Types of weapons, delivery means, production and storage facilities, and employment doctrine are examples of the intelligence required long before deployment begins. The ability of the enemy to use WMD will affect the planning process used to determine a unit's mission, course of action, and force structure.[16]

Existing capabilities and new integrated programs in development, especially in the areas of sensor and information technologies and threat assessment, should play a leading role in technical intelligence relating to proliferation.[17] The security of the U.S. armed forces' future requires a system that integrates a full array of land-, air-, and space-based sensors that can detect and identify biological and chemical agents. These sensors must be able to detect production, storage, movement, and environmental releases. This automated, real-time, joint hazard-collection system must also be capable of maintaining situational awareness, analyzing input data from the various sensors, leveraging digitized satellite communications,

providing immediate warning and reporting to those affected military and civilian populations, and updating the situational-awareness database for all other forces and population centers. This system must operate from both land-based sites as well as space-based platforms—a necessary redundancy if it is to provide sufficient coverage to operate the triad of prevention, deterrence, and defense.

This concept is not totally unique. A similar missile defense system is already developed as an integrated array of sensors transmitting to a central point of analysis, warning, and reporting and is referred to as the Theater Ballistic Missile Defense (TBMD) concept. TBMD is built upon three pillars: attack operations, active defense, and passive defense.

- The attack-operations pillar focuses on the U.S. armed forces' ability to prevent the launch of theater missiles by attacking all elements of the enemy's overall ballistic missile system.
- The active-defense pillar focuses on the U.S. armed forces' ability to intercept and destroy theater missiles in flight.
- The passive-defense pillar includes all those individual and collective measures taken to reduce the probability and effects of theater-missile attack by reducing the vulnerability of critical forces and infrastructure and improving the potential to survive and resume operations after an attack.[18]

This article proposes a comparable system for a global WMD defense. Obviously, the U.S. Army has already erected similar pillars for NBC-attack operations as well as active defense. The third pillar, WMD passive defense, also is beginning to rise above its original cornerstone of individual soldier protection. We need to examine the networking of these three pillars and find a way to closely integrate and therefore unify and strengthen them. But before they can be linked, the most essential pillar, passive defense, must be more thoroughly developed.

Passive defense is the essential individual and collective protection measures taken for friendly forces, population centers, and other critical assets. Not only must passive defense be conducted during all operational phases from predeployment through postconflict operations, but it also must be ongoing during peacetime. It is the critical foundation that alerts standby assets to implement the attack and active defense pillars.

Currently, attack warnings are both general (missile launch is imminent or has occurred) and specific (specific units or areas of the battlefield or theater are in danger of attack by a missile system). Early warning is limited to a certain geographical area or to specific units. Lacking immediate warning capability, large numbers of forces often are forced into full protection as a precautionary measure. All units threatened by the hazard are warned to take immediate protective measures. This stresses soldiers. The logistical burdens (unnecessary use of protective equipment) and both physiological and psychological effects (physical degradation and heat stress) are significant.[19]

As mentioned earlier, the foundation for passive defense should be the integration of land, air, and space sensors to provide an immediate, near-real-time warning and reporting response. These sensors must be networked, real-time, all-source, detector, and sensor arrays. Integration of these elements will allow the detectors and sensors to achieve agreement and counterbalance weaknesses or technical limitations in any single detector or sensor. It also will filter out or minimize false alarms, while maximizing responsiveness to residual and downwind warning of NBC effects. This capability could realize incredible effects on soldier and unit morale.

Detection through the use of an array of sensors and detectors is just one part of passive defense. Immediate warning and reporting to joint forces and population centers affected is another critical part. Currently, an integrated space-based NBC-analysis system does not exist. The existing ground-based analysis systems that may give the U.S. armed forces limited NBC analysis are the joint, tactical, air-ground station (JTAGS) and attack and launch early reporting to theater (ALERT).

However, as a result of recent ongoing Force XXI initiatives, advances have been made in the development and testing of a ground-based NBC Battle Management System. This new United States Marine Corps system, currently called Joint Warning and Reporting (JWARN), integrates digitized terrain data, meteorological and micrometeorological data, and information from intelligence systems. With data produced by unit detectors and sensors, the JWARN system can determine where the hazard is, where it has been, and where it is going. This integrated array of sensors and analysis may someday be transposed onto an array of satellites in a constellation to provide global coverage as well as an in-theater redundant ground capability.

The technology exists to identify launched ballistic missiles, to predict impact points, and to warn units within affected areas. If NBC applications are integrated into this nexus, this becomes the foundation for the U.S. armed forces' WMD passive defense. Future operations battle command will leverage this and other new technologies integrated with NBC monitoring to achieve a near-real-time, common, relevant picture of the battlefield with NBC hazards and missile-attack warnings scaled to levels of interest and tailored to special needs. This common, relevant picture will greatly enhance force dominance through situational awareness and rapid, clear,

nonhierarchical communication of hazards and warnings. Operations tempo (OPTEMPO) will be greatly improved with situational awareness, selective response, and standardized unit reactions to maximize available time to react before exposure to a WMD hazard.

The United States must actively monitor its adversaries and provide a vigilant watch over changing threat conditions. We must also support threat-reduction programs and seek to eliminate stockpiles of NBC weapons from the world's arsenal. When asked to deploy, we must, in conjunction with joint and coalition partners, aggressively attack the adversary's ability to employ NBC weapons on the battlefield. When required, as part of a joint and combined team, we must fight and win under NBC conditions.[20]

Counterproliferation actions, coupled with the overall increase in OPTEMPO capabilities, will deter future actual and potential proliferants from using NBC weapons because of their "lack of value" or nullification. The United States and its allies will deny or limit NBC weapons' political and military use by their NBC defense readiness.

MAJ King is currently assigned as the G3 Plans Officer, Eighth U.S. Army in Yongsan, Korea. Upon departure from Korea in June, he will be assigned as Chief of Warfighter Division in Directorate of Training Development, Fort Leonard Wood, Missouri. His previous assignments include Battalion Chemical Officer, 1st Bn, 3d FA, 2AD; Smoke Platoon Leader and Company Executive Officer, 46th Chemical Company (SG)(M); Battalion S1, 2d Chemical Battalion; Aide-de-Camp, DCG, III Corps; Division Chemical Training Officer, DISCOM Chemical Officer, Company Commander, 91st Chemical Company, 24th ID, and Battalion S3, 703d MSB, 3d ID. MAJ King is a graduate of the Chemical Officers Basic and Advanced Courses, CAS[3], U.S. Army Command and General Staff College, U.S. Army School of Advanced Military Studies, and Airborne and Air Assault Schools. He holds a bachelor of science degree in chemistry from the University of Richmond, Richmond, Virginia, and master's degrees in military arts and science from the Command and General Staff College in General Military Studies and Military Space Applications and from the School of Advanced Military Studies in Theater Operations and Planning.

Endnotes

[1] A National Security Strategy for a New Century, The White House, October 1998, pp.11-12.

[2] Senate Committee on Governmental Affairs, "Proliferation Primer: A Majority Report of the Subcommittee on International Security, Proliferation, and Federal Services," Washington, DC, Government Printing Office, January 1998, p.70.

[3] Quoted by Walter Pincus, "CIA Chief Calls Spread of Weapons Technology Top Threat to National Security," Washington Post, 29 January 1998, p.A7.

[4] Senate Committee on Governmental Affairs, p. 69.

[5] Senate Committee on Governmental Affairs, Summary and p. 69.

[6] Pete V. Domenici, "Countering Weapons of Mass Destruction." The WashingtonQuarterly, Center for Strategic and International Studies, Winter 1995, pp. 145-152.

[7] US Army Chemical School, TRADOC Pam 525-20, US Army OperationsConcept for Nuclear, Biological, and Chemical (NBC) Defense (Draft), Washington, DC, Department of the Army, 31 March 1998, p.1.

[8] Fact Sheet, "Combating Terrorism: Presidential Decision Directive 62," May 22, 1998, p.1.

[9] Richard K. Betts, " The New Threat of Mass Destruction." Foreign Affairs, January-February 1998. p. 3.

[10] Betts, p.3.

[11] Domenici, pp.145-146.

[12] Robert D. Orton and Robert C. Neumann, "The Impacts of Weapons of Mass Destruction on Battlefield Operations," Military Review, December 1993, p.70.

[13] Richard A. Jackson and Ralph G. Wooten, "Protecting the Force: 21st Century Chemical Corps," Military Review, September-October 1996, 75. Now, more than 20 nations are known to possess WMD. WMD proliferation is occurring exactly where the U.S. does not want it to occur—in regional flash points throughout the world.

[14] Booz Allen and Hamilton, "Assessment of the Impact of Chemical and Biological Weapons on Joint Operations in 2010 (The CB 2010 Study)," U.S. Department of Defense Study, McLean, VA: Booz Allen and Hamiltion, Inc, November 1997, pp.1-3.

[15] Robert D. Orton and Robert C. Neumann, "The Impacts of Weapons of Mass Destruction on Battlefield Operations," Military Review, December 1993, p.70.

[16] Robert D. Orton and Robert C. Neumann, "The Impacts of Weapons of Mass Destruction on Battlefield Operations," Military Review, December 1993, p.70.

[17] Pete V. Domenici, "Countering Weapons of Mass Destruction." The Washington Quarterly, Center for Strategic and International Studies, Winter 1995, p. 150.

[18] US Army Chemical School, "Theater Missile Defense (TMD) Passive Defense Strategy," Washington, DC, Department of the Army, May 1997, pp.2-5.

[19] U.S. Army Chemical School, "Summary Evaluation Report for Combined Arms in a Nuclear/Chemical Environment Force Development Test and Experimentation -Close Combat Light," Washington, DC, Department of the Army, May 1993, pp.2-4.

[20] Richard A. Jackson and Ralph G. Wooten. "Protecting the Force: The TwentyFirst Century Chemical Corps." Military Review, September-October 1996, p.76.

Other sources:

Dr. (PhD) Robert T. Kroutil. Program SAFEGUARD: Brief Overview Summary of the Concept of Operations. Edgewood Research, Development, and Engineering Center, Aberdeen Proving Grounds, MD, June 1996.

US Army Air Defense School, FM 100-12 (Final Draft), Army Theater Missile Defense. Washington, DC: Department of the Army, 2 April 1998.

US Army TRADOC, TRADOC Pam 525-5, Force XXI Operations. Washington, DC: Department of the Army, 1 September 1997.

US Department of Defense, Proliferation: Threat and Response. Washington: April 1997.

Reports raised worries about defective gear

CDTF Takes Extra Care Inspecting Chemical Suits

By Specialist Peter Fitzgerald,
GUIDON Staff
Reprint from The GUIDON

The chemical suits are put through an autoclave unit to ensure proper hygiene.

Responding to a recent report of defective chemical suits, officials at the Chemical Defense Training Facility (CDTF) at Fort Leonard Wood, Missouri, have taken measures to ensure that there is no cause for alarm. "None of those suits are currently in use at the facility," said Jack Freeman, CDTF protective-clothing and equipment supervisor.

A Pentagon inspector general's report in February revealed that some manufacturer defects in the battle-dress overgarments, or BDOs, were discovered in certain production lots. Pentagon officials, however, were quick to point out that service members were never in danger of being issued defective suits.

"They are maintained and checked to make sure that at no time do we ever put any of our armed forces in jeopardy in that serious environment," said Lieutenant General Thomas Glisson, Defense Logistics Agency director, in a 28 February news briefing.

Because the training at the CDTF is conducted in an environment where real toxic agents are used on a daily basis, immediate measures were taken here to ensure safety. "As soon as we received word on the defective suits, we checked our inventory. We pulled every BDO we had," said Freeman.

During their investigation, CDTF workers discovered that some of the BDOs in their inventory did come from the defective lot. However, no actual defects—tears, holes, or irregular stitching—were found on any of the suits. "We inspected them and didn't find anything wrong with them. Still, we're keeping them separated from our active inventory," said Freeman.

Despite their concern, officials at the CDTF said they did not expect to find any defects, given the thorough inspection process the training gear goes through. "There's an immediate sense of need here to keep a high level of safety," said John Morrissey, CDTF deputy director. "We know we're putting students in a toxic environment on a daily basis. That's why we have very thorough safety measures and procedures."

Along with the features that are built into the design of facility, safety is also ensured by the rigorous procedures workers follow to inspect the gear that is used. Once the BDOs are worn in training, they are stored overnight in stainless steel bins. The next morning the uniforms are hung on racks to release any vapors that might still be on them. Sampling ports constantly monitor the BDOs to detect toxic levels. Any BDO that comes in direct contact with an agent is destroyed.

Once deemed safe, the BDOs are cleaned in an autoclave unit. They are then run through a computer-barcode system that tracks their usage. BDOs are certified safe for four uses, then destroyed. After the garments are tracked on the computer, they are put through a thorough visual inspection. Zippers, drawstrings, and snaps are checked to make sure they are in working order. "We look for cuts, tears, holes, or loose seams—any sign of deterioration," said Freeman. "No repair work is done on the BDOs. If any defects are discovered, the garment is destroyed," said Freeman.

A worker rarely finds a defect. Freeman said that out of 1,000 suits, perhaps one may have a defect. Most problems occur when a student ties a drawstring into a knot that must be cut, requiring the garment to be destroyed. "Generally speaking, they are well-manufactured. It's very rare that we find a defect with the suits themselves," said Freeman. "About 85 percent of them see their way through the use cycle."

After the visual inspection, the suits are placed back into the active inventory to be used again. Given the training environment, the facility, employees, and equipment go through yearly inspection and testing to further ensure that safety standards are maintained.

Ann Biley, a quality assurance specialist with the Defensive Chemical Test Equipment Division at Pine Bluff Arsenal, Arkansas, during a recent visit to the CDTF, said the facility is up to standards. "We look at everything—the inspectors, the procedures, and equipment. From what I've seen, everything's in compliance," she said.

For Freeman, ensuring safety is a personal matter, having served 24 years in the Chemical Corps and four years as a CDTF instructor. Freeman said he had to rely on his equipment every day in the training environment; therefore, he understands the concern for safety. "It's imperative that soldiers have confidence in their equipment, especially if it's equipment that's going to save their lives," he said. "That's why we take very seriously the work we do here. We take our time to do it right because we know there are students counting on us."

At the time this article was written, SPC Peter Fitzgerald was assigned to the Headquarters Company, Maneuver Support Center, Fort Leonard Wood, Missouri, working in the Public Affairs Office as a staff writer for the post newspaper, the GUIDON. He enlisted in the Army in March of 1999 as an E4 and completed basic training in May 1999 and AIT in September 1999. In October 1999, SPC Fitzgerald reported to Fort Leonard Wood for his first assignment.

Chemical Corps Annual Writing Contest

The **Chemical Corps Annual Writing Contest** is an official function of the Chief of Chemical. The competition is open to military personnel in all branches and services, including allied nations, and to civilian personnel of any nationality.

Each article should be submitted as a double-spaced manuscript in paper copy accompanied with a disc in Microsoft® Word format. The article should be between 500 and 2,500 words in length and supported by appropriate footnotes, bibliography, and graphics/photos. Hard-copy photos are preferred; however, if digital photos are submitted, they should be saved at a dpi/ppi of 200 or more and at 100 percent of actual size. In addition to the manuscript, submissions should include a cover sheet with the author's name, title, organization, complete address, e-mail address, and a short biography.

To ensure anonymity in the selection process, the author's name should not appear in the manuscript itself. The panel will rank submissions on a 100-point scale with up to 40 points assigned for writing clarity, 30 points for relevance to chemical soldiers of the twenty-first century, 20 points for general accuracy, and 10 points for originality.

First-, second-, and third-place winners will receive cash awards of $500, $300, and $150 respectively from the Chemical Corps Regimental Association. Certificates of Achievement will be given to all three winners plus those who receive "Honorable Mention." All winning essays will be published in the July 2001 issue of the Army Chemical Review. The deadline for the contest is 30 September 2000. Send your entry to:

Command Historian
U.S. Army Chemical School
320 Engineer Loop, Suite 44
Fort Leonard Wood, MO 65473-5267
Or e-mail: wrightb@wood.army.mil

This year the Chief of Chemical has approved two themes to choose from for the 2000 Writing Contest. They are: "**Chemical Corps operations in complex terrain and urban environment**" and "**Expanded WMD/NBC threat in contingency operations**."

Weapons of Mass Destruction Force-Protection Training

By Mike Sheheane

As a result of several events in the early part of the 1990s, the protection of U.S. forces and facilities from terrorist attack assumed a prominent role in the operational plans of the major Army commands and, subsequently, the training programs of each service. In 1995, Presidential Decision Directive (PDD) 39, *U.S. Policy on Counterterrorism*, directed that U.S. forces give the highest priority to developing effective capabilities to detect, prevent, defeat, and manage the consequences of nuclear, biological, or chemical (NBC) materials or weapons used by terrorist. The Department of Defense (DoD) has provided guidance and standards through the 2000 series of directives. These documents describe specific training requirements for military, DoD civilians, and family members as well as commanders at specific echelons. A series of force-protection assessments in the late 1990s found that the Army, as well as the other services, was not adequately prepared to respond to incidents where weapons of mass destruction (WMD) might be used.

In the last few years, PDD 39 has been followed by PDD 62, *Protection Against Unconventional Threats to the Homeland and Americans Overseas*, and PDD 63, *Critical Infrastructure Protection.* As normally happens when presidential interest, concerns, and oversight are initiated, considerable efforts are expended by various organizations and agencies to rectify training shortfalls as well as operational deficiencies.

The current training requirements for DoD personnel are prescribed in DoD Instruction 2000.16*, DoD Combating Terrorism Program Standards*. Four specific levels of training are defined. Army Regulation 525-13, *Antiterrorism/Force Protection* (*AT/FP): Security of Personnel, Information, and Critical Resources from Asymmetrical Attack*, prescribes the same standards for Army personnel. Level I training must be conducted for military, DoD civilians, and family members prior to deployment. Level II training is a resident course of instruction to prepare officers and NCOs to serve as an advisor to the unit commander for force-protection matters. This Level II course is also a prerequisite for Level I instructors. For Army personnel, this course is taught by the U.S. Army Military Police School (USAMPS) at Fort Leonard Wood, Missouri. Level III training is part of the 05/06-level Precommand Course (PCC). Level IV is the senior commander-/executive-level seminar.

As the joint DoD NBC Training Center and the designated proponent for the Army's WMD AT/FP doctrine, training, leadership, organizations, materiel, and soldiers (DTLOMS), the USACMLS has the subject-matter expertise and experience to manage the design, development, implementation, and sustainment of joint- service training programs to eliminate the WMD shortfalls that were identified during the various assessments.

In May 1998, the USACMLS initiated efforts to assess the adequacy of WMD specific training in the Level I and Level II AT/FP training programs within the Army and other services. The course assessments were consistent with the findings of the installation force-protection assessments done previously—training in recognizing and reacting to WMD incidents was insufficient or totally absent. Since this problem existed across the services, the USACMLS was able to obtain funding through the Defense Threat Reduction Agency (DTRA) to design and develop materials to supplement these training programs and provide the training that soldiers, sailors, airmen, and marines need to recognize and react to possible WMD incidents.

In August 1998, the first WMD AT/FP Council of Colonels was conducted at Fort McClellan, Alabama, with representatives from the Air Force, Navy, Marines, and the joint staff attending. At this meeting, the USACMLS was able to obtain consensus on the strategy and objectives for the effort:

- Relook the course assessments to identify commonalities, as well as service-unique aspects of WMD training requirements.
- Identify current training deficiencies and recommended training solutions.
- Develop training packages and support materials to eliminate the training deficiencies.

In August 1999, the products were completed and handed over to the services for incorporation as deemed appropriate into their specific training programs. The Level I training is a series of slides, complete with instructor notes, designed to give instructors the information they need to provide Level I students with appropriate and adequate training in WMD awareness.

The Level II training package consists of a detailed presentation containing the information and materials to be incorporated into each service's Level II training program. The package was designed to be adaptable to each service's needs and requirements. The Level II package also includes a module of instruction specifically designed to prepare the student to serve as an advisor to the commander. This module, appropriately titled "Advise the Commander," provides the WMD information that the unit AT/FP advisor should consider and address when assisting the commander and staff in preparing to prevent, detect, and respond to a WMD incident.

In addition to the training materials already described, interactive multimedia instruction (IMI) is provided as a resource tool for the FP advisor. This resource tool provides extensive information in a readily accessible format. Everything from identifying the threat to developing plans, identifying equipment requirements, and conducting exercises is covered along with an extensive list of references.

NBC weapons are identified and described in detail. The method of dissemination, route of entry, treatment, decontamination procedures, rate of action, and persistency are provided for all known agents and materials. The material is packaged in a very user-friendly software.

Level I, Level II, and the Force-Protection Advisor modules are contained on one compact disk (CD). The user needs Windows® 95/98 or NT® with 10 megabytes of hard drive, 32 megabytes of RAM, and 65k color. Every Level II training-course graduate is given a copy of this CD as part of his take-home package. The CD is also available by contacting SSG Englerth, Chemical Division, at DSN 676-7171, or e-mail at englerta@wood.army.mil. Make sure you ask for the **Weapons of Mass Destruction Force Protection Joint Service Training CD, 18 Jun 99, version 1.0**.

Efforts are nearing completion on a similar package for Level III training requirements. Level III students will take home a three-part CD. Included on the disk will be the slides that each service can integrate into its current Level III force-protection instruction. The second part of the package is the WMD tool box containing a variety of resource and reference tools for the commander's use. The third part of the package will be a simulated briefing to the commander from his FP advisor and other response-force players to include law-enforcement, fire, and emergency-medical-services personnel. This simulated briefing is built around information and materials provided in the **WMD Appendix** to the **AT/FP Installation Planning Template** developed by the J34. The Level III FP training package is scheduled for completion and distribution in September 2000. Copies of this CD will be available from the source previously stated once it is finalized and ready for distribution.

As new products continue to be designed and developed, every effort will be made to publicize them and make them available to the people who need them in the field. Those products that can be placed on the USACMLS Web site will be made available on the site. Others will be made available on CD-ROM. In the next issue of this publication, the **NBC NCO Job Aid** will be discussed.

At the time this article was written, Mike Sheheane was serving as the Chief, Chemical Warrior Division, Warrior Department, DOTD, MANSCEN. He is a career civil servant and a retired U.S. Army Reserve officer. Sheheane is a graduate of the Army Command and General Staff College, the Senior Training Manager's Course. He holds a master's degree in both education and criminal justice.

Combined-Arms Training-Strategies Aid—*short- and long-range training plans*

By Mike Souliere

Combined-Arms Training Strategies (CATSs) are the Army's overarching strategies for planning, resourcing, and executing short- and long-range individual and collective training. The CATSs discussed in this article are short-range collective-training strategies. They are the result of a five-year effort by the Office of the Deputy Chief of Staff for Training, HQ, TRADOC to develop unit CATS. The CATSs will assist you in developing short- and long-range training plans. Unit commanders and staffs are the primary audiences of these CATSs; however, all leaders can use the CATSs components to integrate individual and collective training.

Starting June 2000, with the fielding of the Standard Army Training System (SATS) 4.2, unit commanders and staffs will be able to download these CATSs from the Reimer Digital Library (General Dennis J. Reimer Training and Doctrine Digital Library Web site) in database format. They also will be able to download previously developed CATSs (in database format) from a compact disc (CD) issued with SATS 4.2 (for units with minimal Internet access). The CATS developed in the future will only be available through the Digital Library. HyperText-Markup-Language (HTML) versions of previously developed CATSs matrixes are also available from the Digital Library.

Find the Digital Library at:
http://155.217.58.58/atdls.htm

The Army Training and Evaluation Program (ARTEP) Mission Training Plan (MTP) collective tasks are the foundation for the unit CATSs and are organized to provide descriptive training options to the commander. They describe one way of organizing task-based, multiechelon training into a set of events that will achieve and maintain a high state of training readiness in today's environment of high personnel turbulence and key-leader turnover.

Commanders are the primary training managers and trainers of their organizations. FM 25-100, *Training the Force*, requires the commander to—

- Base training on wartime mission requirements.
- Identify applicable Army standards.
- Assess current levels of proficiency.
- Provide the required resources.
- Develop and execute training plans that result in proficient individuals, leaders, and units.

The CATSs—

- Provide a tool for commanders to use in carrying out this guidance.
- Recognize that the essence of training is to develop and maintain proficiency in executing mission-essential tasks.
- Emphasize that commanders must measure combined-arms proficiency against a clear standard.
- Emphasize that units must periodically train under rigorous, realistic conditions designed to challenge the unit, allowing the commander to make a valid assessment of the unit's mission-essential-task-list proficiency.

A commander can refine existing CATSs to support his unit's specific training requirements and local training conditions, or he can use them as they exist. When the commander downloads a CATS from the Digital Library or the SATS 4.2 CD, he can either view a CATS training event, copy it directly to build a SATS event, or modify it based on his requirements and conditions and then build his SATS training event. In HTML format and for the purpose of this article, a unit CATS is the CATS matrix (visible in HTML format on the Digital Library) and the

CATS calendar/plan. The CATS matrix provides one view of the data linked to a CATS training event, such as the purpose of an event, the training audience, or the resources used. A commander using SATS will not see this matrix but will see the same data (in some cases more data) in data "folders" for each event. The CATS calendar/plan provides an example of how a unit CATS could be scheduled over a two-year period and illustrates a strategy envisioned by the CATS developer for training a unit to maintain collective-task proficiency within the "band of excellence."

Each matrix displays a unit's MTP collective tasks in grouping (Task Selections) to train in a number of different events. A unit's CATSs are a number of task selections and events that a unit could use to train each task selection and a calendar/plan showing how a commander can schedule these events over a two-year period.

Currently, there are four different CATSs developed for chemical units as shown in the following table.

TO&E	Unit Type
03472L000	HHD, Chemical Brigade (USAR)
03377L200	Chemical Company, ACR
03477A000	BIDS Company
03219F000	NBC Reconnaissance Detachment (Digitized)

Mike Souliere is the CATS functional expert at the Army Training Support Center, Fort Eustis, Virginia. He is a Major in the USAR and is currently the S3 of a Training Support Battalion (Lanes Training). His active duty assignments include COAC small-group leader and chemical-biological counterterrorism course manager at the Chemical School; OPFOR Chemical Company Commander, Brigade Chemical OC, and Mechanized Infantry Task Force Chemical OC at the National Training Center; and Company XO, Smoke Platoon Leader, and Battalion Chemical Officer with the 3d Infantry Division in Germany. Mr. Souliere also works with the Chemical School to develop chemical units CATS.

1999 SIBERT AWARD WINNERS

The 1999 Sibert Award Committee has selected the following companies for the William L. Sibert Award:

Active Army

21st Chemical Company
82d Airborne Division
Fort Bragg, North Carolina 28307

Reserve Forces

413th Chemical Company (Corps)
(Smoke/Decon)
201 South Cashua Drive
Florence, South Carolina 29501

As in every year, the competition was close. The 71st, the 501st, the 46th, the 87th, and the 12th Chemical Companies submitted entries for the contest. All the entries were visually superb, and all exhibited a great deal of preparation. But the award is more than just a superb submission packet—it is the scores of tests, the human side of the company as evidenced by physical training, the military occupational specialty, the other scores, and also the awards the company has received during the year. It is the whole that determines the winners. All these units are commended for not only the quality of their submission but also the excellence of their scores.

Congratulations!

The Armored-Vehicle Protective-Mask History

By Major Robert D. Walk

In addition to the modern use of chemical agents in war, armored vehicles (tanks) were used first in World War I. The crewmen who operated these armored vehicles required protection. Initially, these soldiers were masked with the same mask as the infantry, but proper use of the sights required the use of special masks. Since operating in a tank is like operating in a confined space, air had to be supplied. After extensive research, air suppliers or "collective protectors" were developed and issued to tankers. They required special masks or adapters for the standard mask to work properly. This is their story.

Early Efforts

The Chemical Warfare Service developed a gas mask for use with optical instruments for the U.S. Navy in the 1920s. This was the experimental Navy Diaphragm Optical (NDO) Mark I. The Army recognized the need for the same capability and adopted the NDO as its optical gas mask, MI. This mask had a filter mounted behind the head and a diaphragm to allow better speech transmission. Although the theory was great, it was not successful for Army use. The optical lenses were good, but were small, which considerably narrowed the soldier's field of view. The filter mounted behind the head caused problems in the cramped confines of a tank turret. It was still on the armored-battalion equipment lists in 1943, but it was not truly acceptable to the armored force.

The M2 optical gas mask replaced the MI optical gas mask. The M2, sort of an NDO and lightweight gas-mask hybrid, had an NDO derivative facepiece with a lightweight gas-mask hose and M10 filter. This mask was produced in World War II with an M8 outlet valve and during the Korean conflict with a C15 outlet valve. The M2 optical gas mask provided improvements over the standard MI optical mask by mounting the filter on the soldier's side instead of behind the head. This improved the soldier's ability to maneuver inside the tank, but the soldier still suffered reduced visibility inside the tank turret. Development of a proper armored-vehicle crewman's mask continued, but further work included a centralized filter system to provide air for the vehicle crew.

Collective Protection

Much consideration was given to protecting the soldiers manning the tanks. Soldiers operating in the cramped, stuffy confines of a tank could use a blast of fresh air across the face. A formal requirement in 1943 established CWS D4.1-11, *Collective Protectors for Tanks*. Two areas of research were initiated—positive pressure for a sealed-crew compartment (fully overpressurized)—and supplied air to ventilated facepieces for already existing tanks. The first (overpressure) system was installed during manufacture, while the second (ventilated facepiece) system was a retrofit for current vehicles.

Beginning with the T23 tank project, the idea of an incorporated collective protector was included in the basic tank-design requirements. Because it was difficult to seal tanks completely, particularly during firing the main gun, the ventilated-facepiece program was more successful than the overpressurized system. It is interesting to note that captured German research revealed a planned overpressure system for their Tiger and Panther tanks. The American ventilated-facepiece-system program resulted in the E21-series collective protector.

Early efforts included the M1 (left) and the M2 (right). The lenses greatly restricted the soldier's field of vision.

The E21, designed by engineers at the Massachusetts Institute of Technology, used the concept of the ventilated facepiece for the soldier. A central filter unit provided air to two to three permanently connected facepieces. Efficient and effective, it provided overpressurized-filtered air to the soldier's facepieces. Each mask had no outlet valve, so the air was constantly flowing around the periphery of the mask. When the soldier inhaled, the mask, made of thin rubber, instantly sealed against his/her face. The facepieces were not detachable, so the soldiers carried standard masks with them at all times so they could quickly dismount from the tank while protected.

Units that were produced included the E21R2 with one filter unit that protected one to three soldiers; the E21R3 with two filter units that protected two to six soldiers; and the E21R4, which was an E21R3 with a different filter unit. An M4A3 Sherman tank required two E21R2 units or one E21R3 or E21R4 unit. In 1945, the E21R2 unit was considered satisfactory for use in the Pacific for the impending invasion of Japan, but the Army ground forces did not adopt it because of the lack of detachable masks. The mask was also deficient when used with optical devices.

World War II E21 tank mask.

A limited procurement (1,000 sets) of the E21-protector series was authorized in World War II. One hundred-fifty E21R2s and 350 E21R3s were produced. Electrolux™ manufactured all units in 24 volt, while a 12-volt conversion set was authorized, but cancelled after VJ-day.

After the war, research and development continued. Recognizing the need for adequate protection for tank crews, work continued and the specifications changed to include a removable mask for use by the tank crew outside of the tank. Postwar research resulted in the E25-series protector with two filter units and six masks. The blower used the tank's 24-volt system and delivered 3 1/2 cubic feet per minute of filtered air to each tank crewman. Each mask could be easily disconnected by the operator and used outside of the tank, eliminating the need for the soldier to carry a standard service mask.

While the E25 system worked, it did not fit into standard armored vehicles. Improvements and revisions resulted in the E26. Where the E25 was built for six masks, the E26 was built for up to three masks. Most tanks at that time required two E26s to protect the entire crew. Ultimately, the first revision of the experimental model 26 (E26R1) was adopted in 1954 as the M8 three-man-tank collective protector.

The M8 three-man-tank collective protector included an M2 air purifier, a 9-foot M6 tank protector hose, two 6-foot M7 tank protector hoses, and three M14 (E56) tank protective masks. The air purifier first cleans the air in a cyclone precleaner, filters the remaining particulates with a paper filter, and removes the chemical agents with a charcoal filter. The purifier can be used in or out of a chemical environment. The hoses were placed close to crew stations, and the M14 masks were plugged into the hoses when needed.

Improvements to the basic system in 1955 resulted in the M8A1 filter unit. Installation of the M8A1 in tanks required the M20 installation kit. In 1959, after logistics problems were identified in getting the M20 installation kit and the M8A1 gas-particulate filter unit

(GPFU) to the appropriate locations for installation, the two were combined to become the M8A2 filter unit—gas-particulate, tank, three-man, 12 cubic feet per minute. At the same time, the M14 masks were removed from a component of the end item and made separate end items. In 1963, the M8A3 became the final adopted version. These GPFUs were issued and mounted in M41 tanks, M48 tanks, and M113 armored personnel carriers (APCs). This unit is still a standard system in the M113-series APCs.

The M8 collective protector was acceptable as long as no more than three soldiers used the protector in one location. Certain experimental tanks had more than three soldiers in one location so, in 1952, experimental work began on a larger version. As an example, the M103A1 tank had four soldiers in the turret, which required two M8 protectors. This was not acceptable. Thus the Chemical Corps developed a more powerful version—the E37-series tank collective protector. In addition to the more powerful filter, this version included an airline heater to provide heated, filtered air to the soldier. No storage space was required in the vehicle because the unit was attached to ventilating ducts or placed under the floor for access to the individual plug-in stations.

The E37 unit consisted of five M14 masks, the M1 precleaner, five M1 canister couplings, and one E38 20-cubic-feet-per-minute gas filter. The E37R1 was a modification to adapt the kit to any heater or cooling system in the tank. This assembly, however, required storage space within the tank. When the M60 tank was in development, the E37R2 filter unit (adopted as the M13 collective protector) was developed especially for it. This consisted of an M1A1 precleaner, E45 20 particulate filter, two E44 10 gas filters, four E39 heaters, and the filter-unit hose. The M1A1 precleaner and E45 particulate filters were installed in a metal housing. The air then flowed to the two E44 gas filters so that purified air was conveyed through hose sections through a heater to the driver and through a modified slip ring and then through heaters to sockets for each crewmember. The crews attached their M14-series masks to self-locking quick-release couplings when they needed them. The improved M13A1 is used on the M60-series and M1-series tanks. After developing good filtration systems, the Army concentrated on improving the armored-vehicle crewman's mask.

M14 mask, ca. 1962.

Masks for the Collective Protector

The M14 protective mask has a gray, 85 percent natural-rubber faceblank with a large plastic, flexible lens designed so that air enters the chin and deflects over the lens to prevent fogging. An air deflector was used and not a true nosecup. The inner surface is stippled (rough) to allow a better grip on the face and, thus, a better seal. A 2-foot hose supplied air to an M10A2 filter. The M10A2 filter was an M10A1 filter with an M1 canister coupling. The M1 canister coupling was an adapter that attached the filter to the M6 or M7 hose. The only reference to the M10A2 is the early 1950s; thereafter, it was the M10A1 canister with M1 canister coupling.

An M51/UR microphone mounted in front of the mouth inside the mask enabled communications. A wire passed from the microphone through the facepiece to a connector to plug into the intercom system. The M1 antidim kit was included to reduce fogging in the mask. The operator carried the mask in the M13 tank mask carrier. For long-term storage, the M6 faceform was used to prevent distortion of the mask.

Tests found the M14 mask was acceptable, but not as good as the standard M9A1 protective mask. Other deficiencies noted in the mask included the following:

- A soldier could not wear glasses with the mask.
- The outlet airflow was bad.
- The eye lens scratched easily.
- The eye lens had a distracting glare.
- The mask had a tendency to fog up.

The Chemical Corps worked to correct the problems.

The M14A1 (E56R2) (1960) mask included a nosecup capability; was constructed of black rubber (for low-temperature flexibility); and had smooth inner surfaces, better eye-lens adhesion, and improved eye-lens design. In 1961, atomic, biological, and chemical (ABC) protection was added to the nomenclature to make it ABC-M14A1.

The M14A2 (E56R4), adopted in 1961, improved the mask by adding a permanent C11 nosecup, eyeglass capability, M9 harness, and the E34 hood. This mask was retained until the AN/ARC-44-series radio sets were deleted from the inventory. This mask was standardized with Canada and Australia in 1967. To modify this mask for the new radio sets, the M51/R microphone was replaced with the M116G microphone and the mask became the M25.

The initial M25 was only a remicrophoned M14A2 for use with the AN/VRC-12-series radios. The M25A1 (E56R5) (1963) was an improved M25 by adding an eye-lens outsert for arctic use and improving the fit. The M25A1 mask took the U.S. Army into the 1990s. This mask was effectively an M24 with a different microphone, simplifying logistics and procurement. Problems with lens scratching from use with a tank's sighting systems never went away; therefore, research for a better mask continued.

Continuing Research

Other work in the 1960s involved adding an overpressure system for the MBT-70. The idea of overpressure, rejected during World War II, resurfaced in the 1960s. In an overpressure environment, soldiers working in the tank can be in relative comfort while operating the tank in a contaminated area. Every time the tank is fired, though, the overpressure can be lost when reloading the cannon, and overpressure doesn't help the soldier when rapid egress is required in a contaminated environment.

Experimental mask from the early 1980s that combined the mask with the combat-vehicle crewman's helmet.

A common-mask system would simplify logistics and save money. Thus, the Army sought to develop a common-mask system—the XM29. This one mask would use a common facepiece for all variations and would be of one-piece, injection-molded, transparent, silicone rubber. The use of this revolutionary materiel was a tremendous leap forward. Silicone provides an excellent sealing to the face in a wide range of temperatures and has no adverse skin toxicity. The mask used a screw-mounted-filter canister that either mounted on the mask cheek (right or left side) or on a hose. The side opposite the filter or hose attachment had a voicemitter and a front voicemitter as well.

The tanker version of the mask had the appropriate microphone installed and had a permanently attached hose to a separate filter mounted on the belt or chest of the soldier. Unfortunately, the silicone itself did not provide adequate protection against CB agents or the decontamination chemical and required special coatings. In addition, the XM29 eye lens had a tendency to "frost," but this could be corrected by scrubbing it with a mild cleanser. The technology did not exist to coat the silicone properly and allow it to remain transparent. Problems with the lens coating led to the Army's development of the XM30 series, which was effectively an XM29 with a separate, glued-on lens.

1980s

The XM30-series masks continued the developmental work of the XM29-series and even had designations attached. The XM34 was combat-vehicle-crewman mask designation. The XM30-series mask was based on the earlier work of the XM29 mask. The XM30 was a hybrid approach that retained the silicone faceblank materiel, but mechanically bonded a transparent, urethane-materiel lens to the faceblank. There were some initial manufacturing problems with securing the lens adequately to the silicone facepiece, which were not resolved within the program schedule. The manufacturing bonding process to bond the urethane lens mechanically to the silicone faceblank was eventually solved, and the U.S. Air Force adopted the XM30, now redesignated the MCU-2/P, as their standard mask.

Both the U.S. Air Force and U.S. Navy have reliably used the inherent advantages of a flexible, full-windshield lens in a flexible, silicone faceblank for more than 18 years. Unfortunately for the Army's part of the program, in 1981 after an investment of more than $60 million dollars, it received a Senator William Proxmire "Golden Fleece Award" for a perceived waste of the taxpayers' money. Shortly afterwards, the Army's portion of the program was dropped and a minimum-change, minimum-risk program was initiated for the M40 series.

The M40 program was initiated to modernize the Army mask as quickly as possible. The objective of the M40 program was to combine the best elements of the mechanically attached, rigid lenses of the M17 and the silicone faceblank and replaceable filter canister of the XM30 program into a new mask for the military. Several versions were called for, including a tank mask. Scott Aviation®, ILC Dover, Inc., and Avon submitted masks for the program. The M42 mask was the armored-vehicle-crewman version of the M40 series.

This mask was adopted in 1987. It came in three sizes and included a microphone and air-hose connections to the vehicle's collective-protection system. The M42 had a permanently attached air hose. The M42A1 (1992) had most of the M40A1 mask improvements, including a better nosecup and quick-doff hood. The M42A1 also allowed the hose to be removed by incorporating a swivel connection on the hose. The hose then became a repair part. By including the standard M40 facepiece and an

external detachable microphone, it became the M42A2 mask in 1995 and is the Army's present standard armored-vehicle-crewman mask.

Collective protection improved during the 1980s. The M1 tank was fielded with the M13A1 system. In the M1A1, this became a total protection system because the overpressure system provided heated or cooled filtered air to the soldiers manning the tank. Presently, most U.S. armored vehicles include collective protection for the crew either using the ventilated facepiece system (for example, M113 armored personnel carrier and the Bradley fighting vehicle) or an overpressure system (for example, Abrams tank).

The ILC Dover and the Scott Aviation versions of the XM42. The Scott Aviation version was ultimately accepted.

The 1990s

The follow-on mask was scheduled to be the XM46, but was cancelled in 1995. This was a hybrid of the XM45 aviator mask. Comparative testing in the combat vehicle between the XM46 and XM42 did not demonstrate a significant improvement over the M42, so it was abandoned.

The RESPO-21 project was a technological leap, which has evolved into the joint-service general-purpose mask (JSGPM) program. As initially demonstrated, a prototype technology demonstrator proved to be a lightweight and compact mask issued to each soldier, sailor, marine, and airman. Comfortable to wear with minimal peripheral vision loss and low breathing resistance, this was the Cadillac among masks. The program's objective is to lower total ownership cost for the military. Since this mask will be used by all services, the initial unit cost and spare and repair parts will benefit from an economy of scale. In essence, the more the military buys, the less each mask will cost.

JSGPM mask.

Sustainment will be considered throughout the design and testing phases of the program. It is the DoD's hope to maximize new, revolutionary manufacturing methods and techniques to procure a proper mask that meets the requirements but will have a low enough initial unit-issue cost to consider alternative sustainment concepts. When grossly contaminated with liquid CB agents or toxic industrial materials/toxic industrial chemicals, or at the end of its service life, the mask would be disposed of. The soldier, marine, or airman would then be issued a replacement mask. The idea is to consider and simplify logistics.

The NBC-defense project manager will also work closely with other PMs that are developing other components of the NBC ensemble (such as overgarment, helmet, and gloves) to ensure that they meet the new joint-service sustainment initiatives like "Vision 2010" to create the best cost-effective, low-logistic-footprint protective mask for the twenty-first century. This would help ease logistics in the future battlefield (remember a good theater commander is always concerned about logistics). Reduction in overall weight and bulk are also critical, and the JSGPM mask must occupy less space than a replacement M40 facepiece. The armored-vehicle version of the JSGPM is the XM51. It includes the capability to attach to the vehicle's collective protection system and is compatible with vehicle-communication systems.

The XM51 is a technological leap forward, but it still has a long way to go. As of February 2000, a benchmark "cradle-to-grave" developmental, production, and sustainment request for quotation has been released. The JSGPM is in its final source selection, and the initial program-definition, risk-reduction phase will start later in FY00. Only with the continued dedication of an extensive, joint-service integrated-product team will the XM51 JSGPM be a

success. If you have spent time eating tanker dust or have a good idea or a bad experience, don't hesitate to write the PM. You can contact the system manager for the JSGPM at his Web site (SBCCOMs). He wants to develop the best mask for the soldiers, so he will review all ideas submitted.

Conclusion

The search for the best protection for our armored vehicle continues. Choosing the mask that performs best while logistically supportable is difficult. During the years, the Army has examined and procured masks to protect soldiers while continuing the search for the best mask. The current standard mask, the M42A2, has an excellent protection factor. Meanwhile, there is an ongoing search for a better mask in the JSGPM program. In addition to masks, from no collective protection system available in World Wars I and II, the Army has procured systems that filter and heat the air as needed to reduce the stress to the soldier in the tank. Future ideas in collective protection include the possibility of using catalysts to destroy chemicals drawn into the tank—eliminating the need for carbon filters that must be replaced. What will be next? Only the PM knows for sure…

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References:

1-A Form Data Sheet, CCTC, Item 2481, SUBJECT: Supplied Air Tank Protective Mask. 7 May 1952.

"Design and Development of a Collective Protector Unit for Main Battle Tanks." 8 Jun 64. Donaldson Company, Inc. Minneapolis, Minnesota.

Disposition Form, Chief of R&D, Item 3662, SUBJECT: Type Classification & Designation of Filter Unit, Gas-Particulate, Tank, Three-Man, 12 CFM, M8A2, 27 Oct 1959.

"Edgewood Quarterly" Issue No. 6. US Army Edgewood RDE Center. Aberdeen Proving Ground, Maryland. September 1995.

Memorandum, Army Material Command, AMCTC Item 2522, SUBJECT: Obsoletion of Mask, Protective, Tank, M14 & Reclassification of the ABC-M14A1 Mask to Standard-C Type, 6 July 1964.

Memorandum, Army Material Command, AMCTC Item 5390, SUBJECT: ABCA-ARMY-STD-158, Mask, Protective, Tank, M14A2; Carrier, Field Protective, Mask, M13A1 & Canister, NBCW Protective Mask, M14 (C1A1), 8 June 1967.

Memorandum, Chemical Corps Technical Committee, CCTC Item 1118, SUBJECT: Increase in Limited Procurement Authorization for Protector, Facepiece, E21R2, 31 Aug 1944.

Memorandum, Chemical Corps Technical Committee, CCTC Item 2770, SUBJECT: Classification of the Protector, Collective, Tank, Three-Man, M8 (E26R1) as a Standard Type, 17 Dec 1953.

Memorandum, Chemical Corps Technical Committee, CCTC Item 2770, SUBJECT: Filter Unit Study (Basis of Issue for M8A3 & M13 Units), 25 Feb 1963.

Memorandum, Chemical Corps Technical Committee, CCTC Item 3375, SUBJECT: Tank Collective Protector E37 Type, 4 Nov 1957.

Memorandum, Chemical Corps Technical Committee, CCTC Item 3627, SUBJECT: Conversion of Filter Unit, Gas-Particulate, Three-Man, 12 CFM, M8A1 to the M8A2 Unit Incorporating the M20 Installation Kit & Identification of Component M14 Mask as an End Item, 15 Aug 1959.

Memorandum, Chemical Corps Technical Committee, CCTC Item 3674, SUBJECT: Filter Unit, Tank, Five Man, E37R1, 25 Nov 1959.

Memorandum, Chemical Corps Technical Committee, CCTC Item 3691, SUBJECT: Classification of Mask, Protective, Tank, M14A1 as a Standard-A Type & Reclassification of the M14 Mask as Standard-B, 5 Feb 1960.

Memorandum, Chemical Corps Technical Committee, CCTC Item 3900, SUBJECT: Classification of Filter Unit, Gas-Particulate, Tank, Five-Man, 20 CFM, M13 (E37R2) as a Standard-A Type, 13 Sep 1961.

Memorandum, Chemical Corps Technical Committee, CCTC Item 3907, SUBJECT: Classification of Mask, Protective, Tank, M14A2 (E56R4) as a Standard-A Type & Reclassification of the M14 & M14A1 Masks, 22 Sep 1961.

Schilling, Robert. Gas-Proofing of Tanks. CIOS Target No. 8/132 (PB 948).Combined Intelligence Objectives Sub-Committee, G-2 Division, SHAEF (Rear) APO 413, 25 June 45.

TB CW 23, Protector, Facepiece, E21R2. War Department, Washington 25, D.C. 24 Nov 44.

TB CW 30, Protectors, Facepiece, E21R3 and E21R4. War Department, Washington 25, D.C. 7 May 45.

Training Notes

The 4/100th Chemical Battalion, based in Huntsville, Alabama, and commanded by Lieutenant Colonel Don A. Chiri, completed its annual-training rotation at Fort Leonard Wood. The unit trained 23 students in the 54B10 MOS and 63 students in the 54B20/30 MOS.

The students experienced live-agent training at Leonard Wood's newly established Chemical Defense Training Facility. They also conducted decontamination, physical, smoke operations, and field training. On 1 June 00, the 4/100th graduated 89 students.

MORTAR SUPPORT FROM THE SEA—

CWS MORTARS SUPPORT AMPHIBIOUS OPERATIONS IN WORLD WAR II

By Burton Wright III, Ph.D., Command Historian

In landings on hostile beaches during the early part of World War II, amphibious doctrine possessed a small disconnect. The first waves in any beach assault were largely infantry and engineers with a few support personnel. Supporting artillery normally landed later, so troops on the beach had to depend on fire support from the naval vessels offshore. Normally, these ships were destroyers.

The Navy rightly did not want its big ships close inshore because they were vulnerable to shellfire and air attacks. Something had to be done to provide an interim fire support to the infantry to cover the time that naval gunfire was no longer available and artillery landed and was able to fire. Enter the mortar boats manned by Chemical Warfare Service (CWS) soldiers. The CWS had been developing this capability since 1942.

In the summer of 1942, CWS mortars had been trained at the Amphibious Training Center, Camp Edwards, Massachusetts, and also at Camp Carabelle, Florida. In England, the U.S. Army set up an assault-training center where this concept was tested and later implemented for landings in the European theater of operation.

In fact, the 3d Chemical Mortar Battalion (now the 3d Chemical Brigade) sailed to Sicily prepared to support the ground forces with indirect fire from mortars mounted on six assault craft. However, their support was not necessary because of the tactical surprise of the Sicily landings.

Colonel George P. Unmacht, Chief Chemical Officer of the Pacific Area, recommended the use of 4.2 mortars to Navy officers and, in 1943, demonstrated this capability to observers in Hawaii. The Navy liked the idea and experimented with it for almost a year before its first use.

Mortar boats were nearly perfect for their intended mission— to provide indirect-fire support during the most vulnerable time of the amphibious operation. Working with Colonel Unmacht, the Navy developed both landing craft, tanks (LCTs) and landing craft, infantry (LCI) retrofitted with 4.2 mortars. The CWS and the Navy cooperated to develop a suitable mount for the mortar. (During the War, cooperation between the Navy and the Army often was not easy.)

After a series of training accidents, the Navy finally settled on using LCI mounted with three 4.2 mortars (one mounted forward and two amidships, with one on the port and the other on the starboard side) as mortar boats to support landings.

Each mortar's mount was bolted to the deck and reinforced with steel plating under the deck. The forward troop compartments were turned into magazines that allowed the LCI the capability of firing up to 1,200 rounds for the three onboard mortars. Four mortar boats were earmarked for the campaign in the Palaus (the principle fighting took place on the island of Pelielu and involved the First Marine Division and one Army regiment).

The crews came from diverse sources—the commanding officer and some soldiers from the 88th Chemical Mortar Battalion and some from the 111th Infantry Regiment. The results were excellent, so more LCIs were converted to mortar boats and two groups consisting of up to six mortar boats supported the Leyte Gulf landings. More supported the landings at Iwo Jima and at Okinawa.

The fighting in the Pacific proved that the concept of the mortar boat was sound, and these boats proved very effective in supporting the infantry ashore. The concept was so good that instead of four boats operating during the Palaus operation, up to 60 operated during the fighting on Okinawa.

Since these mortar boats were small, they could move very close inshore to give direct-fire support. They were also small enough so that they rarely drew any attention from kamikazes or shore-based artillery.

In future amphibious operations, there may still be a place for the mortar boats—of course, brought up to the level of current technology. CWS or corps personnel won't man them, but the concept belongs to the Chemical Corps.

U.S. Army Chemical School Directory

At the time this publication went to press, the following roster represented the Chemical School listings. However, changes are being made constantly.

Building 3203
Commercial Callers: Dial the main switchboard and when asked, dial the last five digits of the telephone number. The phone number for the switchboard is (573)596-0131.

DSN Callers: If the extension begins with "3," the DSN prefix is 676. If the extension begins with "6," the DSN prefix is 581.

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C Co, Commander, CPT William J. Epolito, 596-0347*
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D Co, Commander, CPT Stephanie Bracero, 596-0348*
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NCOIC, TAC RAD, SFC Cynthia Evans, 3-7696
OIC, RECON BR, CPT Daryl Hood, 3-7384
NCOIC, RECON BR, SFC Avery Woods, 3-7389

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HHC Commander, CPT Matthew Brown, 6-7792
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Innovation Clears Roadblock at the Johnston Atoll Chemical Agent Disposal System

The Gimbal Cam Socket Story

By William McLay & John Lambert

The end is in sight at the U.S. Army's Johnston Atoll Chemical Agent Disposal System (JACADS) where chemical-weapons disposal operations are in the final stages. The completion of disposal operations at JACADS will be a milestone event for the program manager for chemical demilitarization—the Army organization charged with the mission of destroying the nation's chemical-weapons stockpile. It is a milestone 10 years in the making and has significance not only for the team that has labored so long and hard to bring it about but for the country, as well as those who work to meet our international Chemical Weapons Convention Treaty obligations.

In May 1997, during the GB (sarin) nerve-agent campaign (the disposal of a specific agent and/or munition type), the Army faced a roadblock that threatened to delay the schedule at JACADS and cost the disposal program considerable time and money. The state-of-the-art machinery developed to disassemble the chemical weapons into separate parts for processing was rejecting 6 percent of a particular type of munition—155-mm projectiles—resulting in the need to process 6,402 munitions separately. Separate processing of munitions significantly increases both time and cost of disposal operations. With the prospect of facing the same challenge again during the final VX nerve-agent disposal campaign, the JACADS team, including Army and contractor personnel, resolved to find a permanent solution to the problem.

Identifying the Problem

The Army's chemical-weapons disposal facility on Johnston Island houses sophisticated equipment developed specifically for the purpose of processing a lethal chemical agent and munitions in all their various types and forms. The theory behind the process is simple: disassemble the munitions and distribute their parts and the chemical agent to appropriate high-temperature incinerators that decontaminate the metal and break down the composition of the agent. The sophistication of the equipment lies in its efficiency, adaptability and, especially, automation—it was designed to require as little human intervention as possible for safety purposes.

In the first step of the disposal process, where the munitions are introduced to the projectile mortar disassembly (PMD) machine, munitions are conveyed onto a round, slotted table that positions them into alignment with equipment engineered to unthread them. The unthreading equipment (at the center of a hydraulic chuck), grasps the nose of the munition (fuse adapter), exerts force, and spins to remove the fuse adapter, exposing the munitions' various parts for further disassembly. Once this operation is complete, the table rotates the munition around to the next operating station, which removes the miscellaneous parts from the munition body and places them on a conveyor to the deactivation furnace where they are thermally destroyed.

The table then moves the munition around to the burster-removal station where the projectile explosive is removed and also sent to the deactivation furnace. From the PMD machine, the projectile is conveyed to the multipurpose demil machine where the bursterwell is removed from the munition body and the chemical agent is drained from it. The agent is collected and sent to the liquid incinerator, which burns at 2,700 degrees Fahrenheit. Finally, the body and parts of the munition are sent to the metal-parts furnace where any remaining agent contamination is destroyed.

During the GB 155-mm projectile campaign at JACADS from May 1996 through May 1997, processing of the munitions was hampered occasionally when the fuse adapter on the projectile could not be removed. Inspection revealed that the fuse adapters were becoming seized to the projectile body during the unthreading cycle.

The seizure was a result of the steel threads on the fuse adapter galling, or grating, against the mating steel threads of the projectile body. It was discovered that precise alignment between the hydraulic chuck, the clamp securing the projectile, and the table was critical and there was virtually no tolerance for any misalignment.

The jaws of the hydraulic chuck are designed to close symmetrically around the projectile to exert even pressure in removing the fuse adapter. When the centerline of the projectile is aligned properly with the unthreading equipment, the chuck is able to function as it was designed. However, the slightest misalignment of the projectile forces the chuck to close on the fuse adapter unevenly, thereby causing the threads to grate against each other. When this happens, the projectiles must be removed from the processing equipment and set aside for a separate cutting operation and disposal.

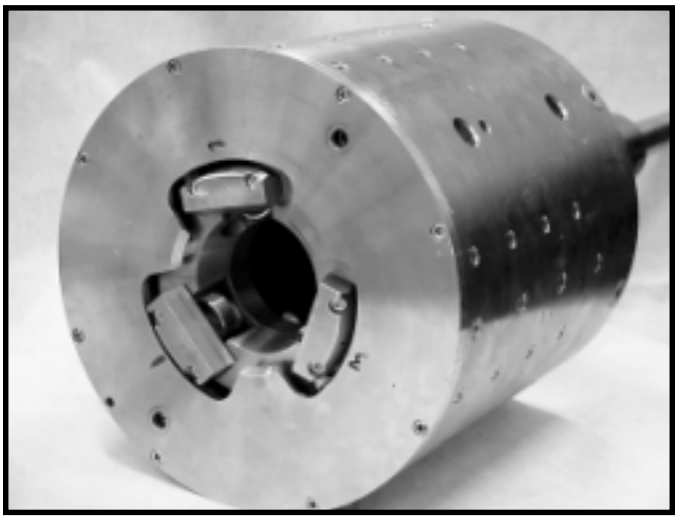
Finding the Solution

To resolve the problem of processing munitions separately, the Army initially focused its attention on finding a way to ensure proper munition alignment with the unthreading equipment. Various attempts were made to align the slots on the table with the unthreading equipment, but the alignment was difficult to set and hard to maintain. Because of this difficulty, it was decided to modify the PMD machine so that alignment was not critical. Several different modifications to the PMD were designed and tested. These designs were an attempt to overcome the force imparted by the chuck jaws onto the fuse adapter so that the threads would not gall. The methods included rubber chuck jaws, two-finger wrenches, and the socket and nut, which led to the development of the gimbal cam socket. Preliminary testing at the Army's Chemical Demilitarization Training Facility in Edgewood, Maryland, demonstrated that the gimbal cam socket was the most promising.

The Gimbal Cam Socket

The gimbal cam socket was the brainchild of the Army's operating contractor at JACADS—the Raytheon Demilitarization Corporation. It is a direct replacement assembly for the hydraulic chuck. Like the hydraulic chuck it replaces, it is designed to engage the projectile fuse adapter and provide rotational force to unthread the fuse adapter from the nose of the projectile. Unlike the hydraulic chuck, the gimbal cam socket is designed to allow for some side-to-side movement (compliance) of the fuse adapter while it is being unthreaded from the projectile body. Compliance is required to allow for any misalignment between the projectile and the unthreading equipment. The lack of compliance during the unthreading cycle was the cause for the high number of rejects during the 155-mm GB projectile campaign at JACADS.

The gimbal cam socket assembly consists of a set of three eccentric (not centered on the same axis) cams designed to tightly grip onto the fuse adapter, similar to the rubber pad used to twist the lids off stubborn jars. Their eccentric design and mounting locations cause them to grip progressively tighter onto the fuse adapter as resistance to unthreading increases. This arrangement of the gimbals allows the cam ring to move and wobble continuously throughout the unthreading cycle without causing any stress on the fuse-adapter threads due to noncompliance. As a result, the fuse adapter and the projectile body easily unscrew, whether the munition is precisely aligned with the unthreading equipment or not.



Cylindrical steel-socket housing for the gimbal cam socket assembly.

The entire gimbal assembly is one complete unit that is mounted inside a large, cylindrical steel-socket housing. The housing contains rails on the inside that line up with slots machined into the outer ring. These rails allow the gimbal assembly to slide (front to back) inside the housing, while the gimbal assembly rotates. The gimbal assembly is held in the housing by a retainer plate, which closes the front of the socket housing after the gimbal cam is installed against a large compression spring.

Performance Excellence

In January 1998, the gimbal cam socket was installed at JACADS for prototype testing during the GB 8-inch projectile campaign. During that testing, approximately 5,000 projectiles were processed. While reject projectiles were virtually eliminated, lessons learned from the testing resulted in the need for several changes to the gimbal cam socket, and it was modified and rebuilt. Once again, the tool was sent to the facility in Edgewood, Maryland, for pilot testing where it functioned with great success. Several units were built and sent to JACADS for full-scale testing during the VX nerve-agent 155-mm projectile campaign in December 1999.

The VX 155-mm projectile campaign was completed on 10 March 2000 – six days ahead of schedule. During

this campaign, 42,678 projectiles were disassembled using the gimbal cam socket, which performed flawlessly. The gimbal cam socket simplified the unthreading operation, reduced the cycle time, reduced maintenance time, and virtually eliminated munition rejects. Of the 42,678 projectiles processed, only 2 were unable to be processed using the gimbal cam socket.

Programmatic Impact

As of April 2000, the gimbal cam socket is being used to process 8-inch projectiles at JACADS. After this munition campaign, only two more remain—VX land mines and VX ton containers—accomplishment of which will take the facility from 93 percent completed disposal operations to 100 percent. The gimbal cam socket has greatly contributed to successful operations at the Johnston Atoll Chemical Agent Disposal System and helped the Army to maintain its disposal schedule. The tool has been so successful that, as a programmatic lesson learned and solution, it will be used at the Army's chemical-agent disposal facilities in the continental United States to process all nerve-agent (GB and VX) 155-mm and 8-inch projectiles, resulting in significant schedule and cost savings. The gimbal cam socket, and the story surrounding its development and use, is a perfect example of the Army's commitment to innovation and excellence in its mission to dispose of the U.S. chemical-weapons stockpile.

Mr. William McLay currently is the Process Improvement Team Leader for all chemical demilitarization operations. In this capacity, Mr. McLay manages the campaign process for the gimbal cam socket. Previous employments include 22 years at the Kaiser Aluminum and Chemical Corporation, retiring in 1989. During his years with the Kaiser Corporation, he held a variety of industrial engineering and management positions. His career with Kaiser culminated with an appointment as operations manager of a hard alloy extrusion plant. He has a bachelor of science degree in industrial engineering and electrical engineering from the University of Washington.

Mr. John Lambert is currently the Test and Evaluation Group Leader for the General Physics Corporation at the U.S. Army's Chemical Demilitarization Training Facility. His previous employments include the Flair Corporation Research and Development Department where he primarily was involved with the design and development of industrial machinery. During this time, he obtained his professional engineering registration both in Maryland and Delaware. Mr. Lambert has a bachelor of science degree in mechanical engineering from the University of Delaware.

The original stockpile of chemical weapons stored on Johnston Island consisted of the following:

AGENT	ITEM	QUANTITY	POUNDS	STATUS
HD-blister	155-mm projectiles	5,779	66,340	Destroyed
HD-blister	105-mm projectiles	46	140	Destroyed
HD-blister	M60 projectiles	45,108	133,971	Destroyed
HD-blister	4.2 mortars	43,600	261,960	Destroyed
HD-blister	Ton containers	68	116,294	Destroyed
GB-nerve	M55 rockets	58,353	624,377	Destroyed
GB-nerve	155-mm projectiles	107,197	696,780	Destroyed
GB-nerve	105-mm projectiles	49,360	80,460	Destroyed
GB-nerve	8-inch projectiles	13,020	188,800	Destroyed
GB-nerve	MC-1 bombs	3,047	670,340	Destroyed
GB-nerve	MK 94 bombs	2,490	268,920	Destroyed
GB-nerve	Ton containers	66	101,158	Destroyed
VX-nerve	M55 rockets	13,889	141,770	Destroyed
VX-nerve	155-mm projectiles	42,682	256,100	Destroyed
VX-nerve	8-inch projectiles	14,519	210,520	In progress
VX-nerve	Land mines	13,302	139,680	Remaining
VX-nerve	Ton containers	66	97,360	Remaining

NOTE: *For information on what the facility has destroyed to date, please refer to the JACADS Processing Status on the Web at http://www-pmcd.apgea.army.mil/aag_jacads.html, or contact the PMCD Public Outreach and Information Office at 800-488-0648 or 410-436-3629/2583.*

The Chemical Corps Role in Homeland Security

By Major Robert D. Walk

"I, John Doe... do solemnly swear that I will support and defend the Constitution of the United States against all enemies—foreign and domestic; ... SO HELP ME GOD." With these words, I and millions like me, of all branches and components of the armed forces, swore to defend the homeland of the United States. These words show that homeland security is not the providence of one component of the armed forces but is the realm of ALL components of the armed forces. The Chemical Corps, as part of the Army, must also prepare to defend the homeland. This article presents some ideas on how the Chemical Corps must prepare to defend the homeland as part of the total-response team. It discusses the threat, civilian capabilities, and Chemical Corps capabilities. It also evaluates Chemical Corps capabilities in homeland security, recommends changes to individual and unit training, and shows some Chemical Corps accomplishments in this area.

The Threat

Most chemical weapons originated as industrial chemicals. Chlorine and phosgene both were used in German industry during World War I. All hazardous industrial chemicals available at that time (and others synthesized) were evaluated for effectiveness in degrading the enemy. Those that were effective in their assigned mission were weaponized and used. All chemicals used or weaponized for war were included in the Chemical Weapons Convention. This does not mean that they were the only hazards or threats available.

Methyl isocyanate is a toxic chemical that was accidentally released in Bhopal, India, but was never weaponized for war. This chemical is not a militarily significant agent; however, it has killed and could be used by terrorists or others to kill, maim, and terrorize. It is only one of hundreds of chemicals that could be used in terrorism. Contrary to the Chemical/Biological Study (CB 2010), the real threat against our force in the United States is probably from an industrial chemical, not a military chemical.

Current Civilian Capabilities

In a WMD incident, large numbers of citizens could be contaminated with a chemical or biological agent and would require decontamination. Unfortunately, very little specialized mass-decontamination capability is available on the civilian side. It is too expensive to purchase and maintain, so most communities use fire-fighting equipment to perform mass decontamination.

The site of a WMD incident would have to be surveyed, and the limits of the contamination found quickly. Civilian hazardous-materials (HAZMATs) technicians are trained to respond to HAZMATs incidents. They are trained to try and determine unknown contaminants at an incident scene. They respond in civilian Level A (fully encapsulated and a self-contained breathing apparatus) equipment and then work and rest according to Occupational Safety and Health Administration (OSHA) requirements. Civilian capability is not evenly distributed throughout the United States. Major cities like New York maintain a robust capability. Small towns generally maintain much less capability.

Chemical Corps Capability

Chemical soldiers train for war. They are fully trained to use negative-pressure respirators (M40-series masks), other personal protective equipment (battle-dress overgarment with boots and gloves), specialized detection equipment, and decontamination equipment.

Chemical companies prepare for mass decontamination. Currently, all Chemical Corps units prepare for expected missions overseas in a force-projection mode. Expected missions for Chemical Corps units include equipment decontamination and the oversight of troop decontamination. Chemical companies actually do not perform troop decontamination because it is the responsibility of the supported unit. Medical units, not Chemical units, conduct casualty decontamination when needed. With limited personnel, medical units do not have a robust capability to do the necessary decontamination, so they must rely on additional duty personnel.

Reconnaissance units perform reconnaissance functions by using specialized equipment to find contamination of militarily significant chemicals. These procedures are designed to be performed under military conditions against known agents. This is the same capability they can bring to the fight in the United States.

Specialized units do downwind nuclear-, biological-, and chemical-hazard predictions using established procedures. Some units use the Joint Warning and Reporting System (JWARN), currently under advanced development. Using actual meteorological data, these soldiers can predict downwind hazard areas quickly and efficiently. This information can then be used to transmit hazard- and protective-requirement data to affected areas and units.

(Above and below) A soldier suits up in protective gear.

Evaluation of Chemical Corps Capability in Homeland Security

The Chemical Corps has a robust capability and appears able to provide a great deal of support to our fellow citizens. Unfortunately, this capability does not meet the Office of Safety and Health (OSH) Act requirements for personal protection and training in the United States. The OSH standards were constructed to provide complete protection for the responder, while the military protection assumes some risk. Under AR 385-10, *The Army Safety Program*, to provide support to the first responders, chemical soldiers must meet the same standard of protection and training. Chemical soldiers must become experts in the civilian side to become an asset to the civilian responders. A recommendation to make this happen covers individual-soldier training and unit training and equipping.

Individual-Soldier Training

In a world where WMD use is expected, all chemical soldiers must become decontamination experts. Each soldier must have the knowledge to provide basic decontamination support in any circumstance. All entry-level 54B soldiers must have some decontamination training about equipment, troops, casualties, and civilians. While not true "experts," entry-level soldiers go through the individual methods several times so that they can be useful at any time. The basic tenets of decontamination remain the same—get the goop off and keep it from going where it shouldn't. The primary difference is the use of water and the types of protection used. As the skill level increases, soldiers should receive more training in each area until the 54B40 is able to plan for and supervise the setup of any decontamination line.

In a civilian or toxic industrial-material environment, the contaminant is assumed to be unknown and the responders assume the highest level of protection. To be able to provide support to civilian authorities, chemical soldiers must use this same level of protection. Thus, our soldiers must be trained to use self-contained breathing apparatus and work in Level A. They must also be able to check the area for industrial contaminants. This means training the soldiers to use civilian-style equipment. The advantages are twofold: it enables chemical-reconnaissance soldiers to work in industrial areas overseas in contested areas to check for industrial-hazard leakage and to provide support in a CONUS environment.

Hazard prediction requires some alteration as well. Many responders use the North American Emergency Response Guidebook for quick estimates of hazards for industrial chemicals. Our soldiers need training on this guidebook, which requires a major adjustment of thinking of the leaders and soldiers in this area. Our soldiers can no longer just think of the military-significant agents but must know (or have access to) information on all chemicals. In an overseas deployment, industrial areas will be hazards to our soldiers, and we must have the information to deal with them.

Finally, we need to better certify the training of our soldiers. To support the first responders in a mass-casualty incident, our soldiers must hold a certification that the responders recognize. This means that any soldier entering the "hot zone" must hold a HAZMAT technician certificate, preferably meeting the standards the firefighters meet—the International Association of Firefighters (IAFF) HAZMAT technician standard. Soldiers working on the periphery conducting decontamination need to be trained to the standard necessary to perform their job, at a minimum, the 40-hour hazardous-waste-operations emergency response (HAZWOPER) standard. This would provide them with a certification recognized by the local responders and an incentive to get into the Chemical Corps—they will be getting something they can actually use in the civilian world.

Civilian and soldier check response equipment.

Unit Training and Equipping

To be able to support our responders, decontamination units must be able to decontaminate people. It can be either easy or hard. Easy means the people are mobile; hard means the people are not mobile. For mobile people, the procedure is simple. Using the M17 SANATORS equipped with a shower apparatus provides the needed support. It is generally gross decontamination with lots of water and stripping and then decontaminating with a solution or even soap and then flushing with more water. For immobile people (litter-borne), the procedure is not simple. This is where our units really come in handy for the civilian responders.

Civilians have no procedures for mass-litter decontamination. At this point, neither do we; we must have procedures; we must have the equipment. We must have the training to support the civilian responders. Our soldiers, as decontamination experts, will be able to provide the necessary decontamination support to the responders if we equip them to do it. We would also have the training and equipment necessary to support our medical units, when necessary.

Reconnaissance units must have OSHA Level A equipment and the civilian-style detection equipment on hand for war- and peacetime use. Their soldiers must be intimately familiar with their equipment. By training the soldiers to the HAZMAT standard and equipping them to use it, they would be able to provide backup support to first responders. They could also be pre-positioned at national events to provide a large federal-response capability. As noted before, this capability will also enhance contingency operations.

Hazard-predication units (JA and JB teams) must have the hardware, software, and training to predict the movement of all WMD agents and their effects on others. Modifying the tools used by the JA and JB teams is a must. JWARN must be modified to predict the downwind movement of the myriad of industrial chemicals in use. Our soldiers must be trained in this modification or on the use of some commercial program for hazard prediction. Units need reference materials covering industrial chemicals available for their use.

Current Accomplishments

Under Defense Reform Initiative Directive 25, U.S. Army and Air Force Reserve and National Guard reconnaissance and decontamination units are being trained and equipped to support our first responders in a WMD incident.

By the end of FY 1999, most U.S. Army Reserve (USAR) dual-purpose chemical companies will have soldiers trained in casualty decontamination. Some soldiers have attended the five-day Field Management of Chemical and Biological Casualties Course at the Medical Research Institute of Chemical Defense in Edgewood, Maryland. Using regional medical training sites at Fort McCoy, Wisconsin, and Fort Gordon, Georgia, most unit trainers learned casualty decontamination in both military and civilian environments in one weekend. Each trainer received a CD with all presentations used in the training. Each dual-purpose chemical company received four platoon-level casualty decontamination equipment sets specifically for the domestic mission. If necessary, this equipment could be deployed overseas with the unit to provide casualty decontamination support in the OCONUS environment.

Both reconnaissance companies sent unit trainers to the HAZMAT technician course at the Pennsylvania State Fire Academy. This provided them with the necessary skills for the domestic response mission, and they were tasked to pass these skills on to the other soldiers in their units. Their companies will be issued three sets of reconnaissance equipment for use in domestic response.

USAR JA and JB teams have received the first JWARN package. They can begin to refine their skills on this program. As JWARN matures, they will continue to receive updates.

Bottom Line

The homeland-security mission is real; the hazards are multiple. We cannot depend solely on our capability of decontamination, detection, and prediction in a force-protection environment to allow us the capability of responding in the United States. We must improve the capability of our units through improved training for our soldiers and improved equipping of our units and by refining the Chemical Corps mission. The final results will include a continuing mission for the Chemical Corps, better recruiting and retention of soldiers, and better support to the citizens of the United States.

Major Robert D. Walk is currently assigned to the U.S. Army Reserve Command's DCSOPS in the Weapons of Mass Destruction Division. He is a graduate of the Command and General Staff College and the Army Chemical School. He is a graduate of the University of New Hampshire with a B.S. degree in chemical engineering, an M.B.A. degree from Long Island University, and an M.S. degree in civil environmental engineering from the University of Oklahoma. MAJ Walk can be contacted through the Chemical Doctrine Net.

Online

4.2 Mortar Goes Online

There is now a Web site for all of the Chemical Corps's 32 chemical mortar battalions. Check it out at www.4point2.org and find out all you ever wanted to know and more about these distinct units that employed the superb 4.2 mortar in distinguished support to the infantry in WWII and the Korean War. While these proud battalions are no more, their outstanding service lives on in history.

63D Chemical Company Conducts First M56 "Coyote" Air Assault

By First Lieutenant Randy Hohbein and Sergeant First Class Paul King

On 25 January 2000, during a rare Western Tennessee blizzard where the wind chill hovered around zero degrees Fahrenheit, 1st Platoon, 63d Chemical Company, completed the first successful air assault of the M56 Coyote smoke-generator system. The soldiers performed admirably, the mission went off without a hitch, but accomplishing it was a challenge.

The 63d is assigned to the 101st Airborne Division (Air Assault)—the world's only air-assault division. Therefore, being able to sling load the M56 Coyote into battle is an essential capability this company must possess to be of any use to the division. However, until that cold January day, we did not possess that capability. Clearly the responsibility to prove that the Coyote could be air assaulted into battle sat directly on the shoulders of the 63d.

It doesn't seem very complicated—hook a rope to the Coyote and pick it up with a helicopter, right? It is not that simple. During the fielding, the company participated in a brigade-level sling-load training event. This training lead to the discovery that the published link count would not work with **any** fuel in the vehicle. The link count and rigging procedures published in FM 10-450-5, *Multiservice Helicopter Sling Load: Dual-Point Load Rigging Procedures*, lists a link count of 60 in the front and 3 in the rear. When the vehicle was lifted by the CH-47 Chinook, the link count was incorrect, so the pilot had to place the vehicle back on the ground. It was very frustrating, but safety was our main concern. The company had problems finding a link count that would keep the vehicle level with the proper "nose-down" attitude in spite of its odd shape and weight distribution.

Shortly thereafter, we were told to coordinate with the division safety office and 372d Transportation Company to rig the vehicle and lift it, using a crane, to test various link counts. We submitted the certification paperwork to Natick for approval. The link count submitted was 65 to the front right and left, 3 to the right, and 14 for the left rear. It seemed we would finally air assault the new system.

After about three months, the new certified link count came back as 50 to the left and right front, 3 to the left rear, and 14 to the right rear. This was a shock because it was such a drastic difference from the original link count we received a few months earlier. However, it was no mistake; this time it was correct and, in spite of terrible weather conditions, three M56 Coyotes were successfully flown and placed on the ground as 100 percent mission-capable.

The big battle is over, but there are still unanswered questions that need to be addressed and worked out. The first problem is that there is not a sling-load configuration that can fly the M56 along with its trailer. To air assault into a mission, still maintaining a dual-purpose capability, we needed extra helicopters to sling the trailers with the decontamination supplies. The combined weight exceeds the maximum capacity of the spreader bar used on the load. This is especially a problem because it requires a significant number of aircraft to support such a mission in a division where the aircraft is perhaps the most precious resource it owns. Therefore, the likelihood of five aircraft (three CH-47s and two UH-60s) being dedicated to a smoke squad would tax an already precious resource.

In conclusion, being able to sling load our vehicles has opened many doors for this company. In each training cycle, the company will participate in a large-scale air assault. In addition, every time units conduct their military decision-making process, the leaders know that generated smoke is an asset they may employ in all phases of their operations and as deep into enemy territory as needed.

At the time this article was written, 1LT Hohbein was leader of 1st Platoon, 63d Chemical Company, 101st Airborne Division (Air Assault), Fort Campbell, Kentucky. He has also served with 2/327 Infantry Regiment, Fort Campbell, as the Battalion Chemical Officer and as an Antiarmor Platoon Leader. He is a graduate of North Dakota State University in Fargo, North Dakota.

At the time this article was written, SFC King was Platoon Sergeant of 1st Platoon, 63d Chemical Company, 101st Airborne Division (Air Assault), Fort Campbell. His previous assignments include Squad Leader at 71st Chemical Company at Schofield Barracks, Hawaii; Battalion NBC NCO for 2-11 FA Regiment, Schofield Barracks; and Company NBC NCO 546th Maintenance Company Fort Polk, Louisiana. He is currently attending ANCOC at Fort Leonard Wood, Missouri.

Cold Comfort

Proper Wear of Duty Uniforms in Winter

By Specialist Jennifer Smith, 10th Mountain Division Journalist

Private Joe Snuffy awoke on an average morning and hurried outside to the first formation of the day dressed improperly for physical training (PT). Because he did not know that he could wear polypropylene underwear underneath the PT uniform, Snuffy experienced one of his coldest mornings in the North Country.

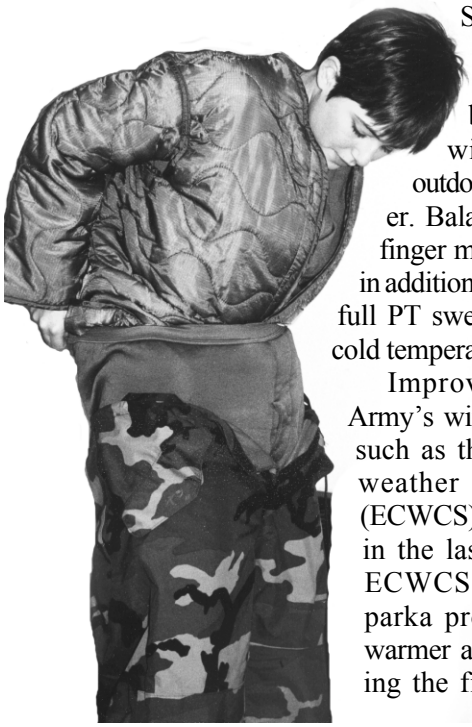
The North Country can be a dangerous place during the winter months, especially if a soldier's clothing knowledge and readiness levels are lower than they should be. Chances are if a soldier has been stationed at Fort Drum during a normal winter, then he or she has experienced the bone-chilling wind that cuts through the PT uniform when he or she failed to dress properly during negative-degree weather because it never crossed their mind.

Insulate—Layer—Ventilation

The acronym COLD should be used when dressing for adverse weather.

Keep it **C**lean
Avoid **O**verheating
Wear it **L**oose and layered
Keep it **D**ry

Wearing polypros under the PT uniform is not the only permitted addition to the Army gray PT uniform during the winter months. Fort Drum pamphlet 600-5, *10th Mountain Division (LI) Basic Standards*, and Army Regulation 670-1, *Wear and Appearance of Army Uniform and Insignia*, outline the wear and appearance of both PT and field uniforms during the winter months. Additional cold-weather information can be found in Field Manual 31-70, *The Army's Cold Weather Manual*.



Soldiers may wear their black knit watch cap and black leather gloves with inserts during outdoor PT in cold weather. Balaclava and trigger-finger mittens can be worn in addition to polypros and the full PT sweat suit in extreme cold temperatures.

Improvements to the Army's winter field uniform, such as the extended cold-weather clothing system (ECWCS), have been made in the last few years. The ECWCS GORE-TEX® parka provides soldiers a warmer alternative to wearing the field jacket during extreme cold weather. However, proper wear of the ECWCS is essential for the clothing system to work correctly.

"Cold weather is a dangerous adversary," said Staff Sergeant James Vchulek, cold-weather-course instructor. "(The ECWCS) will work; you just have to learn how to use it." Failure to use the ECWCS properly can result in various cold weather injuries. Many soldiers wear their ECWCS GORE-TEX® parka and bottoms over their battle-dress uniform, which is incorrect and should not be practiced as part of the complete ECWCS, according to Vchulek.

The ECWCS consists of polypros worn against the skin (no underwear), GORE-TEX® top and bottoms, the balaclava, trigger-finger mittens, and GORE-TEX® boots during moderately cold temperatures to prevent cold-weather injuries early in the season.

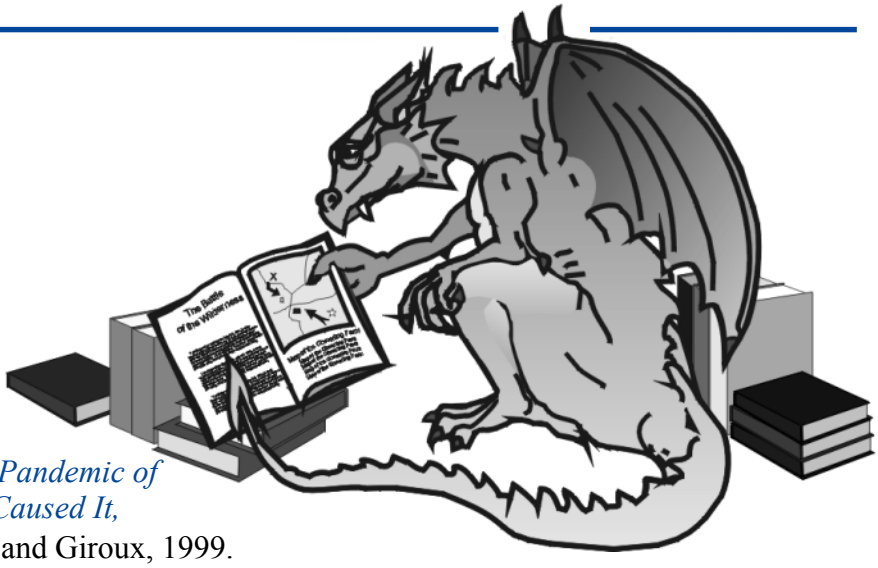
When the temperature drops, soldiers also may wear coat and trouser liners, pile cap, and ECW boots and mittens with the ECWCS. The cold-weather shirt (also known as the bear shirt) can be worn under the GORE-TEX® parka in extremely cold weather.

"(Wearing the proper uniform) is important to prevent the soldier from becoming a cold-weather casualty," said Staff Sgt. Donald McMillan, cold-weather-course instructor. Ensuring that equipment is serviceable and knowing the limitations of the equipment are also part of a soldier's responsibility to protect against the dangerous cold weather, according to McMillan.

When teaching Fort Drum's cold-weather course, Vchulek reiterates the proper use of the clothing system. "Learn how to use the ECWCS and use it correctly," he tells soldiers. "This is some great stuff."

SPC Jennifer Smith is currently assigned to the 10th Mountain Division (LI) as a journalist. She just returned to Fort Drum after a six-month tour in Kosovo in support of Operation Joint Guardian II. SPC Smith was a member of the 27th Public Affairs Detachment while in Kosovo.

Book Reviews



By USACMLS Command Historian, Dr. Burton Wright

FLU: The Story of the Great Influenza Pandemic of 1918 and the Search for the Virus that Caused It,
Gina Kolata. New York: Farrar, Straus, and Giroux, 1999.

The year 1918 has a uniqueness not associated with the successful ending of World War I. Human history is riddled with different kinds of plagues and disasters. Diseases caused some of them. The great and often unknown pandemic of 1918 killed an estimated 20 to 30 million people worldwide.

Few individuals die pleasantly, and those who died from this epidemic died most unpleasantly. A total of 500,000 Americans died during this time—15,000 in New York City alone. In Alaska, where the Eskimos were among the hardest hit, whole villages perished in just a few weeks. The stunned survivors could only bury the dead and try to get on with their lives.

Newspapers in the United States, in their usual search for the truth, stated that the Germans had loosed the plague on the United States through either Bayer Aspirin® (a German Company) or a camouflaged ship that entered the Boston harbor and spread the virus.

In many cities of the United States, people cut themselves off from any association with their friends and others. Why?—to avoid contracting the disease. Major parts of families were wiped out one by one. People were fearful and spent much time praying to God to deliver them from the disease.

To this day, no one knows what strain of flu caused the disease. If you enjoy mysteries—a search for the ultimate truth to the disease—then you've got to read *FLU: The Story of the Great Influenza Pandemic of 1918 and the Search for the Virus that Caused It* by Gina Kolata, a science reporter for the *New York Times*. It is a well-written and well-researched book that reads like both an adventure novel and a mystery like those written by Agatha Christie.

This book begins with a snapshot of the effects of the disease and how it affected thousands of soldiers in camps all over the United States as well as cities and towns. Ms. Kolata leaves no doubt in the reader's mind of the horrible nature of the plague and takes no more than two chapters to tell this story. She doesn't need to go into great detail because the story has fully been told in other books. The "guts" of the book is not the flu but the search for it.

The author shows how the plague suddenly stopped and never reoccurred. She introduces Dr. Johan V. Hultin from Sweden who later settled in the United States and became a very successful pathologist. As early as 1950, he conducted serious research to acquire fluid from the lungs of plague victims to possibly obtain strains of the live virus. He was unsuccessful.

Why? Dr. Hutlin and others, such as Jeffrey Taubenberger who took up the search, wanted to map the genetic structure of one of the greatest killers of all time. Several scientists who performed in-depth studies of the 1918 disease believed that this flu killed about 40 million in India alone. The standard numbers for deaths attributed to the 1918 strain are in the range of 20 to 30 million. If new information about the 1918 flu is accurate, the true number of deaths could be much higher. If, for example, 40 million alone died in India, then the total deaths worldwide could number up to 100 million, which would make this the greatest killer of all time.

If the live virus could be found and mapped, then humankind would be protected if the virus returned again to plague this planet. That is why those people mentioned in the book have spent many years attempting to unlock the secrets of the 1918 flu.

Chapter 5 deals with the mid-1970's flap over a particular strain of killer flu that broke out in and around Fort Dix, New Jersey. A number of physicians were afraid that the Fort Dix strain of flu was a potential repeat of the 1918 pandemic and that the nation could expect it to hit heavy the next flu season. Alarms went off to Washington, and President Gerald Ford interjected the government in the

fight when he tasked the Department of Health, Education, and Welfare to develop a vaccine to immunize the entire nation. President Ford and his advisors had noble intentions, but a small problem arose. The vaccine had a tendency to trigger Guillain-Barre' Syndrome—a potentially fatal disease for some people.

After long and sometimes bitter debates, the government forged ahead with the vaccination program, and true to form, people died of the Guillain-Barre' Syndrome. This exposed the government to litigation, and a hurricane of suits hit the government—no doubt pleasing the Trial Lawyers Association. In the final few chapters, the author summarizes what we know about the disease and recent attempts to discover the live tissue in the corpses of long-deceased individuals. We now have live strains of the disease, but so far, science cannot map it accurately enough to chart its genetic structure. Some of the best scientific minds in the world have attempted to not only chart the disease but also to understand how it spread so far so fast.

The important reason for reading this excellent book can be found in the ending sentences:

> *"Perhaps we grow almost smug about influenza, that most quotidian of infections, a new plague is now gathering deadly force. Except this time we stand armed with a better understanding of the past to better survive the next pandemic."*

This, if nothing else, should cause concern about the possibilities of the flu. We cannot be overconfident. We could become a reincarnation of the 1918 flu, which could devastate the United States and not destroy a single man-made object. Small towns could be intact, but deserted. It happened once, and it can happen again.

Saddam's Secrets: The Hunt for Iraq's Hidden Weapons,

Tim Trevan. New York: Harper, Collins, 1999

At the end of the Gulf War, it was assumed that Iraq's weapons of mass destruction (WMD) had been destroyed. The final authority laid in the hands of the UN inspectors whose task was to ensure that all Iraq's WMD were completely destroyed. However, Saddam Hussein had other ideas. To keep his WMD, Saddam was willing to let the people of Iraq suffer considerably because of UN sanctions. All Iraq had to do was to comply with UN resolutions and, once the WMD had been eliminated, the sanctions would have been lifted.

Since 1991, the Iraqis have continued to be defiant and less than truthful in their contacts with the United Nations Special Commission (UNSCOM), the WMD inspection arm of the United Nations. For an inside look at the "cat-and-mouse" game between the United Nations and Iraq over its WMD infra-structure, read Tim Trevan's *Saddam's Secrets: The Hunt For Iraq's Hidden Weapons*.

Mr. Trevan's book is not objective nor is it intended to be an exhaustive academic history of the UNSCOM. Trevan was there in the middle of all Iraq's lies, deceit, and obstruction aimed against the United Nations for nearly a decade. He writes from personal experience and, in the wording of the text, it is obvious that he, as well as the UNSCOM, was very frustrated. They were trying to do their job. Iraq, however, was not cooperating and was also going to considerable lengths to stop the teams from finding what they needed to get the job done.

In one case, a UNSCOM team happened onto a large archive of documents that it wanted to remove from the parking lot of a building. For four days, there was a standoff between the unarmed team and hundreds of heavily armed Iraqi soldiers. Trevan's time in Baghdad was often punctuated by US air raids to encourage Iraq to cooperate. Eventually Iraq did agree to cooperate and went into the mode made popular at the time—"cheat and retreat."

This book is important for one chilling reason—if counterproliferation operations are to rid the world of WMD, it will be much harder to do that now because Iraq has shown that if a nation or, in this case, an absolute leader wants to defy the United Nations and the United States and is willing to take the heat, there is not much either can do short of a direct invasion.

Saddam's Secrets is a primer for any state that develops WMD and stands up to outside pressure to retain that capability. Both India and Pakistan have WMD. Neither is as militarily weak as Iraq, but both would go to any length to retain their WMD programs. They have spent too much money, time, and effort to develop them; thus, it would be very difficult, if not impossible, to persuade them to stop. Pressure like that applied against Saddam would not work. Both nations would be willing to undergo privations to keep their WMD.

If counterproliferation is to work, Saddam must comply, and *Saddam's Secrets* shows that is next to impossible. He will fight to the last Iraqi to retain his WMD because that is what he thinks. Iraq is surrounded by countries Saddam perceives as threats (such as Syria, Iran, and Israel), and having WMD capability preserves Iraq's and, of course, Saddam's position.

In reading this book, one can truly appreciate the hard work and dedication of UNSCOM's teams and the genuine risks they took to attempt to complete what Iraq had originally agreed to do with U.S. and Allied forces with a clear road to Baghdad.

You should read this book; it is a precursor of things to come. There can be no doubt that other rogue states will take heart from Iraq's defiance and continue to make and test WMD. The world will not be the better for it.

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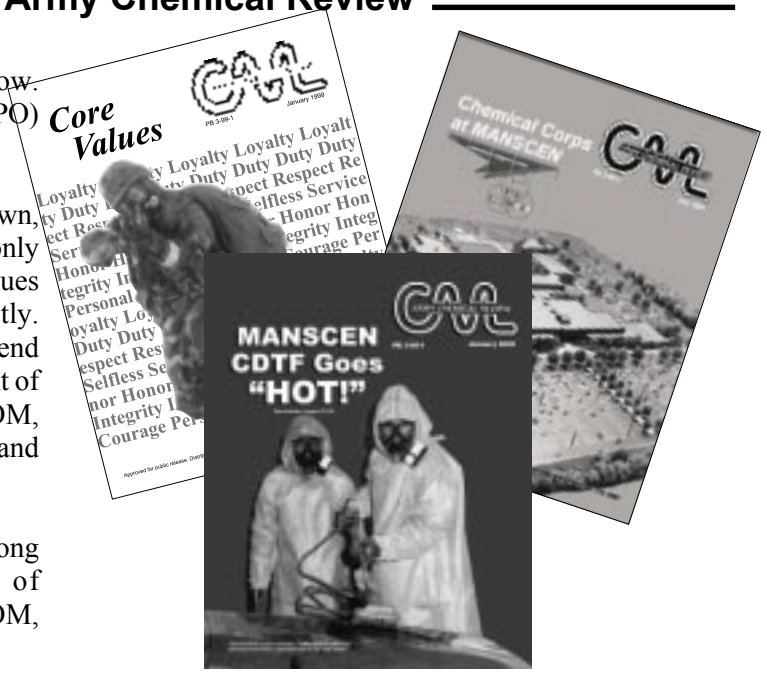

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LETTER FROM THE CHIEF OF CHEMICAL TO THE CORPS

KOREAN WAR—50th ANNIVERSARY

Dragon Soldiers,

On 25 June 1950, North Korea invaded South Korea, and President Truman committed U.S. Army troops to help South Korea repel the invasion. As the Army built up its strength, Chemical Corps units were sent to assist. This year we celebrate the 50th Anniversary of what often has been called "the Forgotten War."

The 21st Decontamination Company, known as "the Deacons," was deployed to assist the South Koreans. This small company provided much support to the 8th Army during the war. Members of the company stated fondly, "We provide hot foots and hot showers."

The 21st Decontamination Company mixed all the Napalm for the entire 8th Army. If it was dropped, used in flame-field expedients, or shot through a flamethrower, chances are the 21st mixed it. In fact, those who mixed the various components of thickened fuel were called "mix masters," after the kitchen tool of the same name—hence, the term "hot foot" to the enemy.

Decontamination companies operated 2.5-ton trucks filled with water for use in decontamination. However, since the enemy never used chemicals, these decontamination trucks were not needed in their primary role. Equipped with a heater and three showerheads, they provided hot showers to frontline units.

The 21st was only one of many Chemical units in theater that stood ready to provide support. The 2d Chemical Mortar Battalion was attached to various units of the 8th Army to provide direct support to the infantry. In fact, "to support the infantry" was the motto of ALL Chemical mortar battalions in Korea. The 2d Chemical Mortar Battalion earned both a Presidential and a Republic of Korea Presidential Unit citation for its outstanding combat actions.

The Corps could supply direct support in small groups. When King Company, 31st Infantry, attacked up Pork Chop Hill under the command of First Lieutenant Joseph G. Clemons, Jr., three members of the Chemical Corps marched and fought with it. These Dragon soldiers' mission was to reactivate a smoke generator when King Company cleared the top of Pork Chop Hill. After King Company cleared part of the area, the soldiers immediately set its generator into action. Within 20 minutes, the Chinese put the generator out of action and wounded one of the three Dragon soldiers. The Chinese knew the value of smoke screens and reacted quickly to silence them when the soldiers attempted the maneuver.

Throughout the Korean conflict, more than five decades ago, the Chemical Corps provided outstandingly dedicated support to the infantry, particularly, and other branches of the U.S. Army. Since the First World War, Dragon soldiers have bravely performed their missions and gotten the job done successfully. Even though five decades have gone by since the Korean War, we should not forget the hard work and sacrifices of these Dragon soldiers of the past. We owe it to them to preserve and honor their memory.

Elementis Regamus Proelium

Remembering the "Forgotten War"

See page 45.

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